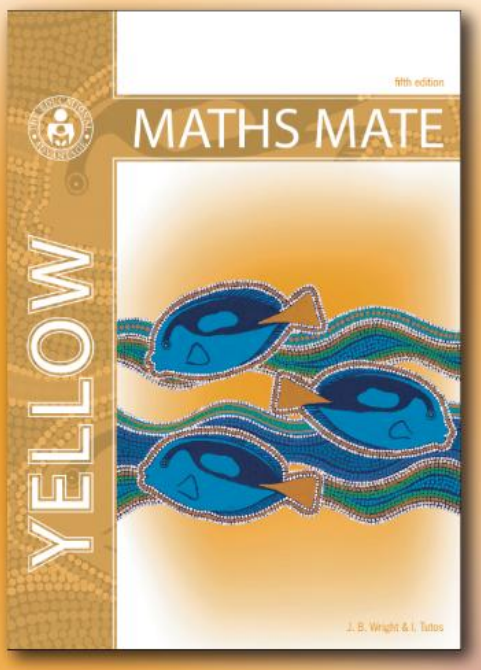
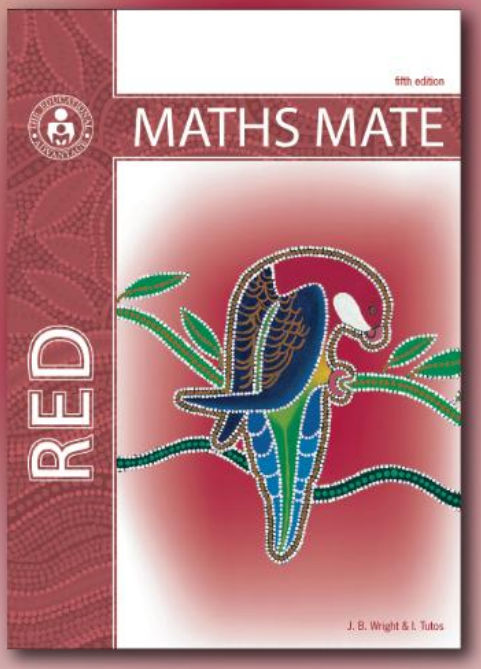
SKILL BUILDER

fifth edition

MATHS MATE





J. B. Wright & I. Tutos

MATHS MATE

Skill Builder Yellow/Red

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J. B. Wright & I. Tutos

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The Educational Advantage Pty Ltd
Building 5 / 29 Clarice Road
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Phone: 613 9899 9065
Email: info@mathsmate.net
Website: www.mathsmate.net

New Zealand editions available at
Learning Works
408 Anglesea Street
Hamilton 3240 NEW ZEALAND
Phone: 647 929 4063
Email: info@mathsmate.co.nz
Website: www.mathsmate.co.nz

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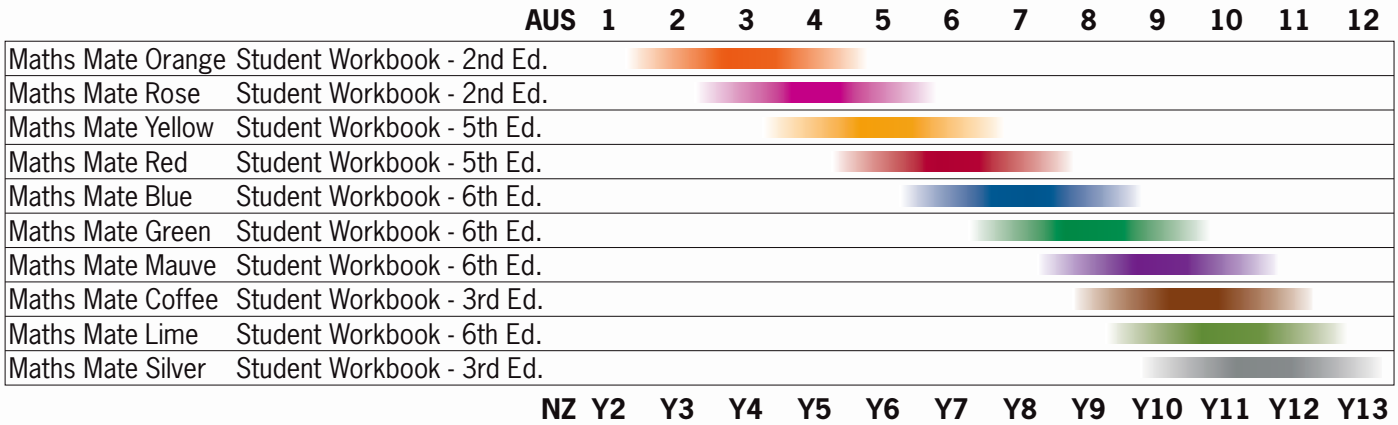
Maths Mate materials available for use

STUDENT WORKBOOKS

GRADE / YEAR LEVEL INDICATOR



TEACHER RESOURCES

Maths Mate Teacher Resources (for all year levels, PDF format)

SKILL BUILDERS

Skill Builder Orange/Rose - 2nd Ed.	PDF format
Skill Builder Yellow/Red - 5th Ed.	PDF format
Skill Builder Blue/Green - 6th Ed.	PDF format
Skill Builder Mauve/Lime - 6th Ed.	PDF format

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FORWARD

Why use Skill Builders?

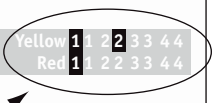
Too often, through the teaching, learning and assessment process, teachers identify weaknesses and gaps in student learning but the constraints of the classroom severely limit remediation opportunities.

The Maths Mate Skill Builder series was prepared in response to requests from teachers and parents who want an easy but effective way to help students who identify skill deficiencies using the Maths Mate Program, and are motivated to do something about them.

The Maths Mate record keeping sheets found at the start of each term in each Student Pad (and on the Teacher Resources ~ Record Keeping Sheets, pages 1 to 4) enable students to find out what they know and what they still need to learn and practise.

The Skill Builders extensively target through instruction and practice, all skills within the related Maths Mate Program except the problem solving questions. The Problem Solving Hints & Solutions (see Teacher Resources ~ Problem Solving Hints & Solutions) can be used by teachers to develop students' problem solving skills. The Skill Builders also contain a Glossary of important facts and reference material that will provide instant help when students present with difficulties.

Background to the design of Maths Mate and Skill Builders



Any question on the Maths Mate sheets is part of a set of 4 similar questions in the term. For example, consider sheets 1, 2, 3 and 4 in Maths Mate Yellow term 1. Question 10 on each sheet is similar in design, content and degree of difficulty. This grouping of question style is also true of the next set of four sheets and so on. Thus the Maths Mate tests made available in the Teacher Resources (see Teacher Resources ~ Test Masters, pages 1 to 32 and Test Answers, pages 1 to 32) also reflect this grouping of question style and substance. Generally too, the Skill Builders can be linked to each set of 4 similar questions. These links are identified in the grid at the title of each skill. The grid shown here for example, would relate a skill to questions in the first 4 sheets of MM Yellow term 1, the last 4 sheets of MM Yellow term 2 and the first 4 sheets of MM Red term 1. Once understood, these links will be helpful to students in their selection of Skill Builders and to you in your allocation of Skill Builders to students.

On each Maths Mate worksheet, questions 1 through to 21 get progressively harder. (Refer - How to use the Skill Builders, page iv)

Suggestions for the preparation and organisation of Skill Builders

Teachers can either direct students to their digital copies or print copies of particular pages for students. Rather than photocopying Skill Builders one at a time, you may find it helpful to set up a file in a central area that contains perhaps five copies of each Skill Builder. In this way you will save time and be prepared in advance. Students should be reminded that the Glossary is a valuable resource that can be added to. The Glossary too can be photocopied for students as a resource.

How you can help

We are confident that your students will be rewarded for the effort you have made in making these worksheets available to them. As with any program, however, there is always room for improvement and we place great value in feedback from people like yourself. Please, if you have any suggestions at all, contact us.

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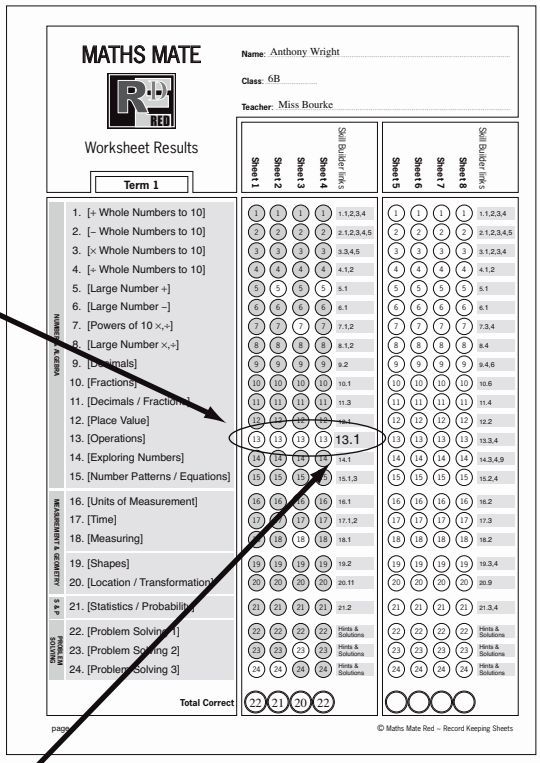
HOW TO USE MATHS MATE SKILL BUILDERS

1. Determine which Maths Mate questions pose a difficulty

If a student gets one or more incorrect answers, represented by one or more successive unshaded boxes on their worksheet results sheet, then that question requires a Skill Builder.

For example, question 13 in Sheets 1, 2, 3 and 4 is not shaded, so Skill 13.1 from Skill Builder 13 needs to be handed to the student.



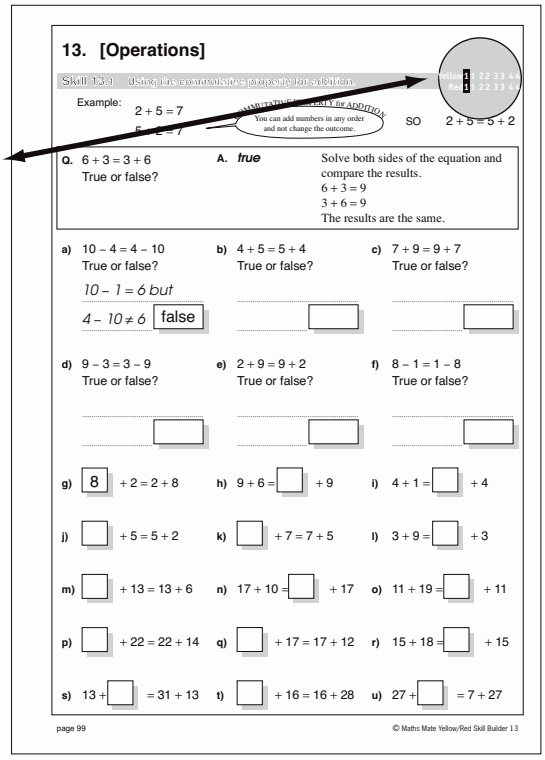
2. Find the relevant Skill Builder on the Maths Mate worksheet results sheet

Check across the question that is posing difficulties on the worksheet results sheet to find the list of skills within the Skill Builder that are most relevant to that question.

Obtain a copy of one or all of the skills listed for that question (pages 1 to 205). You can also double check with the grid at the right of each skill title, that the chosen skill is appropriate.

Remember, students should work through the skills in order. The skills where possible are arranged in increasing degree of difficulty.

Be aware that some skills may require the knowledge of previous skills, so when a student has several areas of weakness, they should work on the lowest numbered skill builders first. For example, a student struggling with Q9 and Q12 may need to build skills required for Q9 before they can improve Q12.



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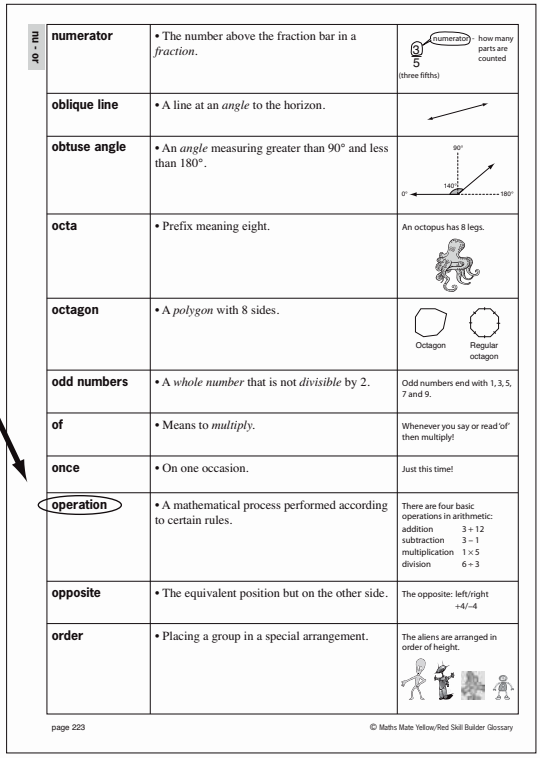
3. Look up any unknown terms in the Skill Builder glossary

The glossary (pages 207 to 240) is more than just a list of definitions. It contains a wealth of relevant information that may help the students to better understand the question at hand. Weaker students may find that referring to a copy of the glossary, and even building on it, is a helpful strategy for improving their overall mathematical competency.

For example, a student might need to look up the word "operation" before attempting to complete Skill 13.1



NU - OF

numerator	• The number above the fraction bar in a *fraction*.	numerator · how many parts are counted; 3/5 (three fifths)
oblique line	• A line at an *angle* to the horizon.	
obtuse angle	• An *angle* measuring greater than 90° and less than 180°.	90°, 140°, 0°, 180°
octa	• Prefix meaning eight.	An octopus has 8 legs.
octagon	• A *polygon* with 8 sides.	Octagon · Regular octagon
odd numbers	• A *whole number* that is not *divisible* by 2.	Odd numbers end with 1, 3, 5, 7 and 9.
of	• Means to *multiply*.	Whenever you say or read 'of' then multiply!
once	• On one occasion.	Just this time!
operation	• A mathematical process performed according to certain rules.	There are four basic operations in arithmetic: addition 3 + 12; subtraction 3 − 1; multiplication 1 × 5; division 6 ÷ 3
opposite	• The equivalent position but on the other side.	The opposite: left/right +4/−4
order	• Placing a group in a special arrangement.	The aliens are arranged in order of height.

page 223 © Maths Mate Yellow/Red Skill Builder Glossary

4. Complete the relevant Skill Builder

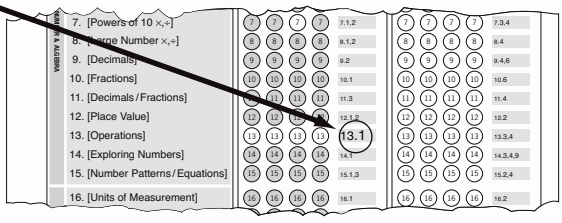
Work through the examples given for that skill, and complete the exercises.

There are many techniques or methods that can be used to teach the same basic skills, even something as simple as adding 7 and 9. It is good for a student to be given a range of alternatives appropriate for each skill but space restrictions make this impossible. These sheets often suggest an approach that may be different to a student's past experience. If a student feels more comfortable with his current technique, that is fine. In most cases it is the end result that counts.

It is possible to take a very weak student back to a Skill Builder from a lower level if this is necessary. It is also possible to use a higher level book for students to have further practice if required.

5. Correct the relevant Skill Builders from the Skill Builder answer sheets (from page 249)

6. Circle the completed skill numbers on the Maths Mate worksheet results sheet



7. [Powers of 10 ×,÷]	7.1,2
8. [Large Number ×,÷]	8.1,2
9. [Decimals]	9.2
10. [Fractions]	10.1
11. [Decimals / Fractions]	11.3
12. [Place Value]	12.1,2
13. [Operations]	13.1
14. [Exploring Numbers]	14.1
15. [Number Patterns / Equations]	15.1,3
16. [Units of Measurement]	16.1

7. [Powers of 10 ×,÷]	7.3,4
8. [Large Number ×,÷]	8.4
9. [Decimals]	9.4,6
10. [Fractions]	10.6
11. [Decimals / Fractions]	11.4
12. [Place Value]	12.2
13. [Operations]	13.3,4
14. [Exploring Numbers]	14.3,4,9
15. [Number Patterns / Equations]	15.2,4
16. [Units of Measurement]	16.2

7. Go back and repeat previous Maths Mate questions

After completing a Skill Builder, students should be encouraged to go back and attempt again those particular questions on the recently completed Maths Mate worksheets.

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1.		**[+ Whole Numbers to 10]** **1**
	1.1	Adding whole numbers from 1 to 10 by counting on.
	1.2	Adding whole numbers from 1 to 10 using a number line.
	1.3	Adding 7, 8 or 9 by making 10.
	1.4	Adding whole numbers from 1 to 10 using an addition table.
2.		**[– Whole Numbers to 10]** **5**
	2.1	Subtracting whole numbers from 1 to 10 by counting back.
	2.2	Subtracting whole numbers from 1 to 10 using a number line.
	2.3	Subtracting whole numbers from 1 to 10 from two-digit numbers with smaller unit values (e.g. 13 – 8 = 5).
	2.4	Subtracting 7, 8 or 9 by building up.
	2.5	Subtracting whole numbers from 1 to 10 using an addition table.
3.		**[× Whole Numbers to 10]** **11**
	3.1	Multiplying whole numbers from 1 to 10 by 1 or 10.
	3.2	Multiplying whole numbers from 1 to 10 by 5.
	3.3	Multiplying whole numbers from 1 to 10 by 2 or 4.
	3.4	Multiplying whole numbers from 1 to 10 by 3.
	3.5	Multiplying whole numbers from 1 to 10 by 6, 7, 8 or 9.
	3.6	Multiplying whole numbers from 1 to 10 by 9.
4.		**[÷ Whole Numbers to 10]** **17**
	4.1	Dividing by whole numbers from 1 to 10 using a multiplication table.
	4.2	Dividing by whole numbers from 1 to 10 using subtraction.
5.		**[Large Number +]** **19**
	5.1	Adding large numbers without carry over using columns.
	5.2	Adding large numbers with carry over using columns.
	5.3	Adding large numbers by adding each place value, then adding the totals.
6.		**[Large Number –]** **23**
	6.1	Subtracting large numbers without carry over using columns.
	6.2	Subtracting large numbers with carry over using columns.
	6.3	Subtracting from a multiple of 10 (e.g. 20, 700, etc).
7.		**[Powers of 10 ×,÷]** **27**
	7.1	Multiplying a whole number by a power of 10 using zeros as place holders.
	7.2	Multiplying a whole number by a power of 10 using columns.
	7.3	Dividing a whole number by a power of 10 using fractions.
	7.4	Dividing a whole number by a power of 10 by removing zeros or changing place values.

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MM Question	SB Skill No.	[Maths Mate - Mathematical strand] Skill Builder - Skill description	
8.		**[Large Number ×,÷]**	**31**
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MM Question	SB Skill No.	[Maths Mate - Mathematical strand] Skill Builder - Skill description

13. [Operations] 99

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13.4 Recognising the identity element for multiplication.
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18.6 Calculating the area of a shape as a result of the enlargement of another shape.
18.7 Describing volume of prisms by counting cubes.
18.8 Comparing volume of prisms by counting cubes.
18.9 Calculating perimeter by using a ruler.

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MM Question	SB Skill No.	[Maths Mate - Mathematical strand] Skill Builder - Skill description	

19. **[Shapes]** **159**

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19.2 Recognising 2D shapes.
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20.4 Following directions to find a place on a map.
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20.6 Using regions on a grid to describe location, e.g. A3.
20.7 Sketching symmetrical shapes.
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21.8 Recognising the relative likelihood of an event.
21.9 Finding the number of objects to achieve a given outcome.
21.10 Describing the likelihood of an outcome.
21.11 Calculating the probability of a simple event.
21.12 Interpreting pie charts.

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1. [+ Whole Numbers to 10]

Skill 1.1 Adding whole numbers from 1 to 10 by counting on.

Yellow 11 22 33 44
Red 11 22 33 44

- Start with the largest number.
- Count on the smaller number.

Q.

	9	2	4	1	7	6	3	10	8	5
+ 3										

A.

	9	2	4	1	7	6	3	10	8	5
+ 3	***12***	***5***	***7***	***4***	***10***	***9***	***6***	***13***	***11***	***8***

9 counting on...

OR

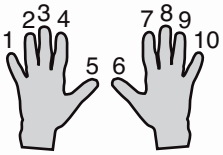
9 counting on... 10,11,12

9 + 3 = ?

Start with the largest number 9.
Count on 3 more.
9 + 3 = ?

a)

	8	6	5	3	2	7	9	1	4	10
+ 2	10									



b)

	3	7	1	10	6	8	4	5	9	2
+ 6										

c)

	2	8	7	1	10	3	6	5	4	9
+ 5										

d)

	2	9	3	7	10	1	4	6	8	5
+ 8										

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Skill 1.2 Adding whole numbers from 1 to 10 using a number line.

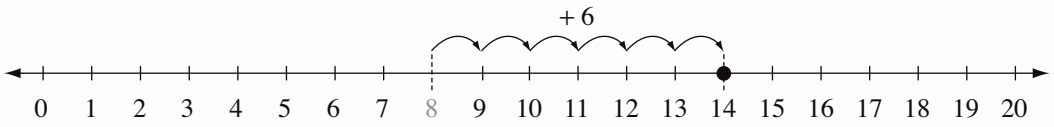
Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

Q.

	8	4	10	2	7	5	3	1	9	6
+ 6										

A.

	8	4	10	2	7	5	3	1	9	6
+ 6	***14***	***10***	***16***	***8***	***13***	***11***	***9***	***7***	***15***	***12***

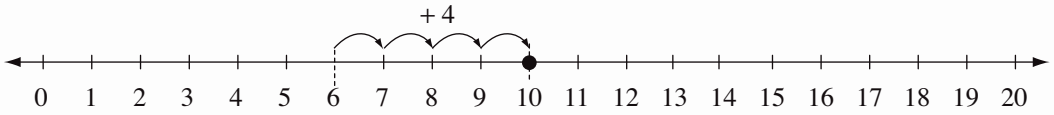


$8 + 6 = ?$ Start at 8. Go forward 6 places. You are at 14.

$8 + 6 = 14$

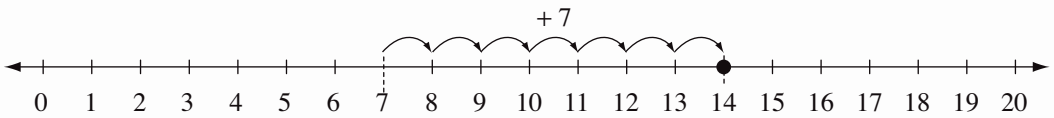
a)

	6	5	2	8	3	4	1	7	10	9
+ 4	10									



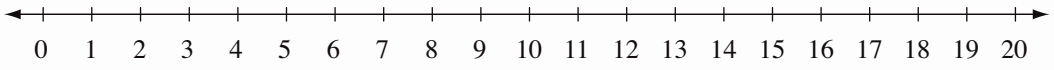
b)

	7	6	2	8	10	1	5	4	9	3
+ 7										



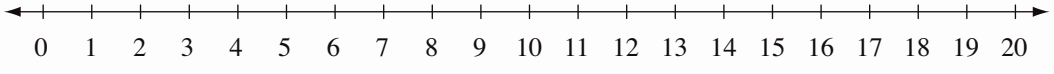
c)

	5	7	10	9	1	8	3	4	2	6
+ 8										



d)

	9	11	4	12	7	5	10	8	3	6
+ 3										



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Skill 1.3 Adding 7, 8 or 9 by making 10.

Yellow 11 22 33 44
Red 11 22 33 44

- Find the largest number.
- Work out what number you need to add to the largest number, to make 10.
- Break down the smaller number to include the number you need.
- Regroup the numbers to create a sum of 10. (10's are easy!)

Q.

	8	6	2	7	10	1	5	4	9	3
+ 7										

A.

	8	6	2	7	10	1	5	4	9	3
+ 7	***15***	***13***	***9***	***14***	***17***	***8***	***12***	***11***	***16***	***10***

$8 + 7 = ?$ 8 is the largest number.

Ask: 'What number added to 8, will make 10?'

Answer: $8 + ? = 10$

$8 + 2 = 10$ You need a 2

Break down the smaller number 7, into 2 and 5.

$2 + 5 = 7$

Regroup the 2 with the 8 to make 10.

$8 + 7$
$= 8 + 2 + 5$
$= 8 + 2 + 5$
$= 10 + 5$
$= \mathbf{15}$

a)

	4	9	2	10	8	3	6	1	7	5
+ 9	13	18								

Hint: When you add 9 the unit in the answer is always one less than the unit in the question!

$4 + 9$
$= 3 + 1 + 9$
$= 3 + 1 + 9$
$= 3 + 10$
$= \mathbf{13}$

b)

	7	6	2	8	10	1	5	4	9	3
+ 8										

c)

	9	11	4	12	7	5	10	8	3	6
+ 7										

d)

	5	1	14	7	9	6	10	3	12	8
+ 8										

e)

	7	6	8	3	9	11	15	4	10	2
+ 9										

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Q.

	5	7	9	1	8	6	3	10	2	4
+8										

A.

	5	7	9	1	8	6	3	10	2	4
+8	***13***	***15***	***17***	***9***	***16***	***14***	***11***	***18***	***10***	***12***

+	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
3	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
4	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
5	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
6	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
7	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
8	*9*	*10*	*11*	*12*	***13***	*14*	*15*	*16*	*17*	*18*
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*
10	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*

$5 + 8 = ?$
Move down the column from 5.
Move across the row from 8.
The number crossed is the result.
$5 + 8 = 13$
$8 + 5 = 13$

a)

	4	10	2	3	5	7	9	1	8	6
+5	9	15								

b)

	7	8	2	1	5	10	4	3	9	6
+4										

c)

	1	6	4	8	2	9	5	10	3	7
+9										

d)

	2	9	7	3	10	8	4	6	1	5
+2										

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2. [– Whole Numbers to 10]

Skill 2.1 Subtracting whole numbers from 1 to 10 by counting back.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Start with the first number given.
- Count backwards the second number.

Q.

	9	12	4	11	7	6	13	10	8	5
– 3										

A.

	9	12	4	11	7	6	13	10	8	5
– 3	***6***	***9***	***1***	***8***	***4***	***3***	***10***	***7***	***5***	***2***

9 counting back...

OR

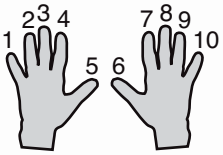
9 counting back... 8, 7, 6

9 – 3 = ?

Start with the first number given, 9.
Count backwards 3.
9 – 3 = 6

a)

	8	6	5	3	12	7	9	11	4	10
– 2	6	4								



b)

	13	7	11	10	6	8	14	15	9	12
– 6										

c)

	12	8	7	11	10	13	6	15	14	9
– 5										

d)

	12	9	13	17	10	11	14	16	18	15
– 8										

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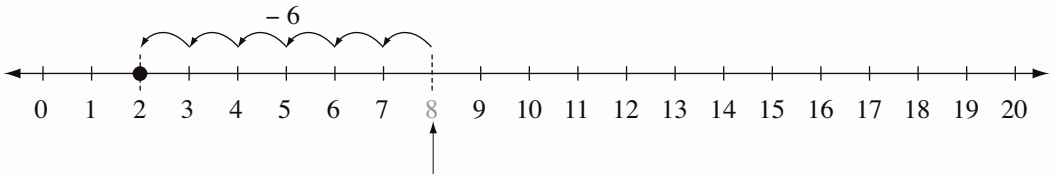
Q.

	8	14	10	12	7	15	13	11	9	16
– 6										

A.

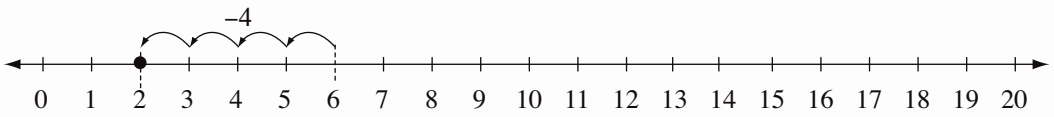
	8	14	10	12	7	15	13	11	9	16
– 6	***2***	***8***	***4***	***6***	***1***	***9***	***7***	***5***	***3***	***10***



8 – 6 = ? Start at 8. Go backward 6 places. You are at 2.
8 – 6 = 2

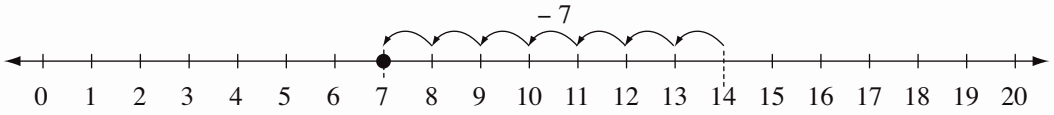
a)

	6	5	12	8	13	14	11	7	10	9
– 4	2									



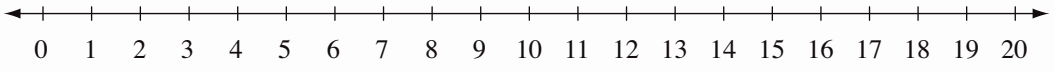
b)

	14	7	12	8	10	11	16	13	9	15
– 7										



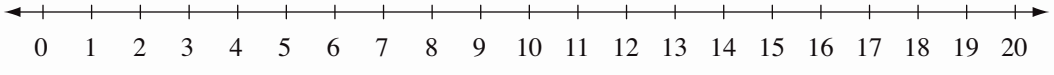
c)

	15	17	10	14	11	18	13	9	12	16
– 8										



d)

	9	11	4	12	7	5	10	8	13	6
– 3										



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Skill 2.3 Subtracting whole numbers from 1 to 10 from two-digit numbers with smaller unit values (e.g. 13 – 8 = 5).

Yellow 11 22 33 44
Red 11 22 33 44

- Look at the unit value of the two-digit number.
- Break down the single digit number to include this number and the remainder.
- Subtract the number from the two-digit number, 10 will be the result.
- Then subtract the remainder from 10.

Q.

	17	15	11	14	9	16	18	10	13	12
– 8										

A.

	17	15	11	14	9	16	18	10	13	12
– 8	***9***	***7***	***3***	***6***	***1***	***8***	***10***	***2***	***5***	***4***

$17 - \boxed{8}$
$= 17 - \boxed{7 - 1}$

$= \boxed{17 - 7} - 1$
$= 10 - 1$
$= \mathbf{9}$

The unit value of 17 is 7. You need a 7.
Breakdown 8 into 7 and 1. $7 + 1 = 8$

Subtract 7 from 17 to get 10.
Subtract 1 from 10.

a)

	14	9	16	12	8	13	10	11	7	15
– 6	8									

$14 - \boxed{6}$
$= 14 - \boxed{4 - 2}$
$= \boxed{14 - 4} - 2$
$= 10 - 2$
$= \mathbf{8}$

b)

	17	16	12	8	10	11	15	14	9	13
– 7										

c)

	9	11	14	12	17	15	10	18	13	16
– 8										

d)

	10	15	14	18	19	12	16	13	11	17
– 9										

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Skill 2.4 Subtracting 7, 8 or 9 by building up.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Build up from 7, 8 or 9 to reach to 10, by adding the amount needed.
- Build up the number being subtracted from, by adding the same amount.
- Then complete the subtraction from 10.

Q.

	16	15	14	13	12	11	10	9	8	17
– 7										

A.

	16	15	14	13	12	11	10	9	8	17
– 7	***9***	***8***	***7***	***6***	***5***	***4***	***3***	***2***	***1***	***10***

$= \overset{+1}{(}\ 16 - 7\ \overset{+1}{)}$
$= \overset{+1}{(}\ 17 - 8\ \overset{+1}{)}$
$= \overset{+1}{(}\ 18 - 9\ \overset{+1}{)}$
$= \overset{+1}{(}\ 19 - 10\ \overset{+1}{)}$
$= \mathbf{9}$

To subtract 7 from 16: Build up 7 to 10 by adding 3.
Also build up 16 by adding 3.
16 becomes 19.
Then subtract 10 from 19.

a)

	16	19	13	18	12	15	17	10	14	11
– 9	7									

$= \overset{+1}{(}\ 16 - 9\ \overset{+1}{)}$
$= \overset{+1}{(}\ 17 - 10\ \overset{+1}{)}$
$= \mathbf{7}$

Hint: When you subtract 9 the unit in the answer is always one more than the unit in the question!

b)

	13	17	18	10	15	11	14	16	12	9
– 8			10							

c)

	10	12	8	11	14	15	9	13	17	16
– 7										

d)

	20	17	11	13	9	12	19	16	18	14
– 9										

e)

	15	10	18	12	11	16	13	14	17	19
– 8										

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Q.

	15	17	9	11	18	16	13	10	12	14
– 8										

A.

	15	17	9	11	18	16	13	10	12	14
– 8	***7***	***9***	***1***	***3***	***10***	***8***	***5***	***2***	***4***	***6***

+	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
3	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
4	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
5	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
6	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
7	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
8	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
9	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*
10	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*

15 – 8 = ?
Reword the subtraction by turning it into an addition.

Ask: ‘What number, when added to 8, will give 15?’
8 + ? = 15

Answer: Using the addition table:
8 + 7 = 15
So 15 – 8 = 7

a)

	14	10	12	13	15	7	9	11	8	6
– 5	9									

b)

	7	8	12	11	5	10	14	13	9	6
– 4										

c)

	11	16	14	8	12	9	15	10	13	7
– 6										

d)

	12	9	7	3	10	8	4	6	11	5
– 2										

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3. [× Whole Numbers to 10]

Skill 3.1 Multiplying whole numbers from 1 to 10 by 1 or 10.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

Multiplication forms patterns.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	**6**	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	**60**	70	80	90	100

Multiplication is the same as repeated additions.

Any number, multiplied by 1, equals the sum of 1 of the numbers.
Example: $6 \times 1 = 6$
Hint: The number stays the same.

Any number, multiplied by 10, equals the sum of 10 of the numbers.
Example:
$6 \times 10 = 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 = 60$
Hint: Add a zero to the number.

Multiplication is 'counting by' a number of times.

You can multiply by 1 by counting by that number, 1 time.
Example: $\underbrace{6}_{1 \text{ time}}$

You can multiply by 10 by counting by that number, 10 times.
Example: $\underbrace{6, 12, 18, 24, 30, 36, 42, 48, 54, 60}_{10 \text{ times}}$

Multiplication is reversible.
Example: $10 \times 6 = 6 \times 10$

Q.

	6	7	4	8	1	5	3	10	2	9
×10										

A.

	6	7	4	8	1	5	3	10	2	9
×10	***60***	***70***	***40***	***80***	***10***	***50***	***30***	***100***	***20***	***90***

When you multiply a number by 10, add a zero to the end of the number.

a)

	3	8	10	4	1	6	2	9	5	7
×1										

b)

	10	4	9	3	5	7	1	2	8	6
×10										

c)

	6	2	10	9	7	3	5	1	4	8
×10										

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Skill 3.2 Multiplying whole numbers from 1 to 10 by 5.

Multiplication forms patterns.

Multiplication is the same as repeated additions.

Any number, multiplied by 5, equals the sum of 5 of the numbers.
Example: $9 \times 5 = 9 + 9 + 9 + 9 + 9 = 45$

Multiplication is 'counting by' a number of times.

You can multiply by 5 by counting by that number, 5 times.
Example: 9, 18, 27, 36, 45

5 times

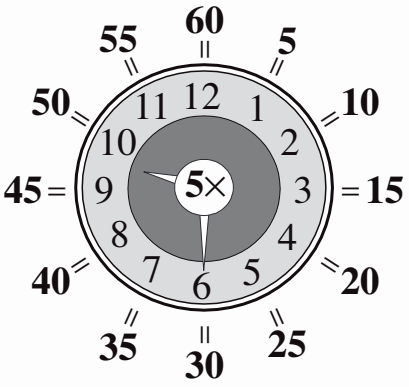
Multiplication is reversable.
Example: $9 \times 5 = 5 \times 9$

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	**45**	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Hint: Multiplying by 5 produces a value that is half that of a multiplication by 10.
$9 \times 10 = 90$
$9 \times 5 = 45$

Hint: Multiplying by 5 produces a value that always ends in 0 or 5.

Hint: Multiplying by 5 produces the same values as the minutes on a clock face.



Q.

	9	2	1	5	7	8	3	10	6	4
× 5										

A.

	9	2	1	5	7	8	3	10	6	4
× 5	***45***	***10***	***5***	***25***	***35***	***40***	***15***	***50***	***30***	***20***

a)

	5	1	6	2	7	4	9	3	10	8
× 5										

b)

	3	8	5	9	1	10	7	2	6	4
× 5										

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Skill 3.3 Multiplying whole numbers from 1 to 10 by 2 or 4.

Yellow 1 1 2 2 3 4 4
Red 1 1 2 2 3 3 4 4

Multiplication forms patterns.

Multiplication is the same as repeated additions.

Any number, multiplied by 2,
equals the sum of 2 of the numbers.
Example: $7 \times 2 = 7 + 7 = 14$

Any number, multiplied by 4,
equals the sum of 4 of the numbers
Example: $7 \times 4 = 7 + 7 + 7 + 7 = 28$

Multiplication is 'counting by' a number of times.

You can multiply by 4
by counting by that number, 4 times.
Example: 7, 14, 21, 28
(4 times)

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	**14**	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	**28**	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Multiplication is reversable.
Example: $7 \times 2 = 2 \times 7$

Hint: Multiplying by 2 always produces an even number.
Hint: Multiplying by 2 is the same as doubling.
Double 7 is 14 OR $7 \times 2 = 14$
Hint: Multiplying by 4 is the same as doubling the number and then multiplying by 2.
$7 \times 4 = 14 \times 2 = 28$

Q.

	6	3	8	1	7	9	2	10	4	5
×4										

A.

	6	3	8	1	7	9	2	10	4	5
×4	***24***	***12***	***32***	***4***	***28***	***36***	***8***	***40***	***16***	***20***

a)

	5	8	2	7	3	1	6	10	9	4
×2										

5×2
$= 5 + 5$ *Repeated additions*
$= \mathbf{10}$

b)

	3	10	5	4	9	7	2	6	1	8
×4										

3×4
$= 6 \times 2$ *Double 3 and × by 2*
$= \mathbf{12}$

c)

	6	8	2	5	3	10	4	7	1	9
×4										

3×4
$= 6 \times 2$ *Double 3 and × by 2*
$= \mathbf{12}$

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Skill 3.4 Multiplying whole numbers from 1 to 10 by 3.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

Multiplication forms patterns.

Multiplication is the same as repeated additions.

Any number, multiplied by 3,
equals the sum of 3 of the numbers.
Example: $8 \times 3 = 8 + 8 + 8 = 24$

Multiplication is 'counting by' a number of times.

You can multiply by 3
by counting by that number, 3 times.
Example: 8, 16, 24
(3 times)

Multiplication is reversable.
Example: $8 \times 3 = 3 \times 8$

×	1	2	3	4	5	6	7	8	9	10
1	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
2	*2*	*4*	*6*	*8*	*10*	*12*	*14*	*16*	*18*	*20*
3	*3*	*6*	*9*	*12*	*15*	*18*	*21*	***24***	*27*	*30*
4	*4*	*8*	*12*	*16*	*20*	*24*	*28*	*32*	*36*	*40*
5	*5*	*10*	*15*	*20*	*25*	*30*	*35*	*40*	*45*	*50*
6	*6*	*12*	*18*	*24*	*30*	*36*	*42*	*48*	*54*	*60*
7	*7*	*14*	*21*	*28*	*35*	*42*	*49*	*56*	*63*	*70*
8	*8*	*16*	*24*	*32*	*40*	*48*	*56*	*64*	*72*	*80*
9	*9*	*18*	*27*	*36*	*45*	*54*	*63*	*72*	*81*	*90*
10	*10*	*20*	*30*	*40*	*50*	*60*	*70*	*80*	*90*	*100*

Q.

	8	1	6	9	7	3	2	4	5	10
× 3										

A.

	8	1	6	9	7	3	2	4	5	10
× 3	***24***	***3***	***18***	***27***	***21***	***9***	***6***	***12***	***15***	***30***

a)

	6	4	10	1	5	8	7	9	3	2
× 3										

b)

	1	5	9	8	4	7	2	10	6	3
× 3										

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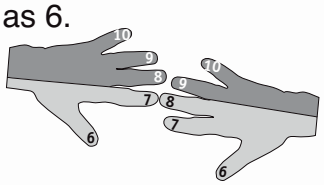
Skill 3.5 Multiplying whole numbers from 1 to 10 by 6, 7, 8 or 9.

- Number the fingers on each hand from 6 to 10 starting with the thumb as 6.



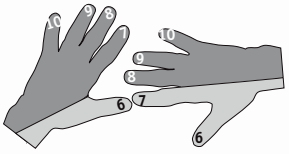
- Touch the appropriate fingers together to match the table you are working on. Example: 7×8
- Count your thumbs, the touching fingers and any fingers in between (shaded lightly). This result makes up the tens.
  (2 fingers on left hand, 3 fingers on right hand) $\Rightarrow 2 + 3 = 5$
  5 tens = 50
- Count separately, the fingers on each hand that are beyond the touching fingers (shaded dark).
  Multiply the sums. This result makes up the units.
  (3 fingers on left hand, 2 fingers on right hand) $\Rightarrow 3 \times 2 = 6$
  6 units = 6
- Finally add the tens and units.
  $50 + 6 = 56$
  So $7 \times 8 = 56$

Q.

	6	2	5	1	8	7	4	10	3	9
$\times 7$										

A.

	6	2	5	1	8	7	4	10	3	9
$\times 7$	***42***	***14***	***35***	***7***	***56***	***49***	***28***	***70***	***21***	***63***

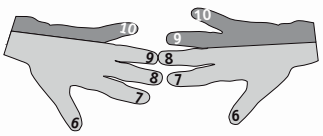


$6 \times 7 = ?$

$1 + 2 = 3$ tens $= 30$ (light fingers)
$4 \times 3 = 12$ units $= 12$ (dark fingers)
$30 + 12 = 42$
So $6 \times 7 = 42$

a)

	9	4	7	2	5	6	10	3	1	8
$\times 8$	72									



b)

	3	6	2	8	10	1	5	4	9	7
$\times 7$										

c)

	9	6	5	8	1	4	3	7	10	2
$\times 6$										

d)

	4	2	9	1	7	3	8	5	6	10
$\times 9$										

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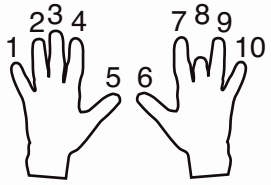
Skill 3.6 Multiplying whole numbers from 1 to 10 by 9.

- Number the fingers on each hand from 1 to 10.



- Bend the finger that matches the 9× table you are working on.
  Example: For 8 × 9, bend the 8th finger.
- Count the fingers before the bent finger. This result makes up the tens.
  7 fingers ⇒ 7 tens = 70
- Count the fingers after the bent finger. This result makes up the units.
  2 fingers ⇒ 2 units = 2
- Add the tens and units.
  70 + 2 = 72
  So 8 × 9 = 72

Q.

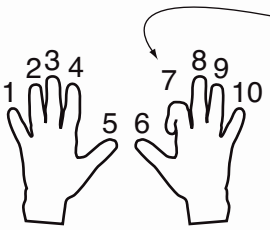
	7	5	1	9	2	8	10	6	3	4
× 9										

A.

	7	5	1	9	2	8	10	6	3	4
× 9	***63***	***45***	***9***	***81***	***18***	***72***	***90***	***54***	***27***	***36***

6+3=9 4+5=9 9+0=9 8+1=9 1+8=9 7+2=9 9+0=9 5+4=9 2+7=9 3+6=9

Hint: When multiplying by 9, the digits in the answer always add to 9.



To find 7 × 9 = ?, bend the 7th finger.
6 fingers before the bent finger ⇒ 6 tens = 60
3 fingers after the bent finger ⇒ 3 units = 3
60 + 3 = 63
So 7 × 9 = 63

a)

	4	5	2	7	6	9	10	1	3	8
× 9	36									

b)

	3	10	6	2	1	8	5	4	9	7
× 9										

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4. [÷ Whole Numbers to 10]

Skill 4.1 Dividing by whole numbers from 1 to 10 using a multiplication table.

Yellow 11 22 33 44
Red 11 22 33 44

Division forms patterns.

Division and multiplication are inverse operations.
(Division undoes multiplication)

Example: If $7 \times 8 = 8 \times 7 = 56$
then $56 \div 8 = 7$
or $56 \div 7 = 8$

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Q.

	56	7	14	35	21	42	28	49	70	63
÷ 7										

A.

	56	7	14	35	21	42	28	49	70	63
÷ 7	***8***	***1***	***2***	***5***	***3***	***6***	***4***	***7***	***10***	***9***

$56 \div 7 = ?$ How many 7's go into 56?
Reword the division by turning it into a multiplication.
Ask: '7 multiplied by what number makes 56?' $(7 \times ? = 56)$
Answer: Using the multiplication table
$7 \times 8 = 56$
So $56 \div 7 = 8$

a)

	28	20	8	4	16	12	36	24	32	40
÷ 4	7									

b)

	80	8	56	24	48	32	72	40	16	64
÷ 8										

c)

	12	18	60	42	30	36	24	48	6	54
÷ 6										

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Skill 4.2 Dividing by whole numbers from 1 to 10 using subtraction.

Division is the same as repeated subtractions.

Example: $56 \div 7 = ?$ How many 7's go into 56?
OR If you have 56, how many times can you take away 7?

$56 - \underbrace{7 - 7 - 7 - 7 - 7 - 7 - 7 - 7}_{\text{8 times}} = 0$

If you have 56 you can take 7 away, 8 times.
So $56 \div 7 = 8$

Q.

	21	6	12	30	24	3	18	27	9	15
÷ 3										

A.

	21	6	12	30	24	3	18	27	9	15
÷ 3	***7***	***2***	***4***	***10***	***8***	***1***	***6***	***9***	***3***	***5***

How many 3's go into 21?
Reword the division by turning it into a subtraction.
Ask: 'If you have 21, how many times can you take away 3?'

$21 - \underbrace{3 - 3 - 3 - 3 - 3 - 3 - 3}_{\text{7 times}} = 0$

Answer: If you have 21 you can take 3 away, 7 times. So $21 \div 3 = 7$

a)

	16	2	6	20	12	4	14	18	10	8
÷ 2	8									

$16 \div 2$
$\Rightarrow$ $16 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 = 0$ *Take 2 away 8 times.*
So $16 \div 2 =$ ***8***

b)

	18	54	63	27	9	36	90	72	45	81
÷ 9										

c)

	15	40	25	35	50	5	30	45	20	10
÷ 5										

d)

	56	70	14	35	21	49	7	28	42	63
÷ 7										

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5. [Large Number +]

Skill 5.1 Adding large numbers without carry over using columns.

Yellow **1 1** 2 2 3 3 4 4
Red **1** 1 2 2 3 3 4 4

- Always keep your working columns in line, aligning units with units, tens with tens, etc.
- Add from right to left.

Q.

$$\begin{array}{r} 125 \\ +\ 43 \\ \hline \square \end{array}$$

A.

hundreds	tens	units
1	2	5
	+ 4	3
1	**6**	**8**

Units first!

Units:
$5 + 3 = 8$ $\Rightarrow$ 8 units

Tens:
$2 + 4 = 6$ $\Rightarrow$ 6 tens

Hundreds:
$1 + 0 = 1$ $\Rightarrow$ 1 hundred

a)

$$\begin{array}{r} 63 \\ +\ 24 \\ \hline 87 \end{array}$$

Units first!

b)

$$\begin{array}{r} 38 \\ +\ 41 \\ \hline \square \end{array}$$

c)

$$\begin{array}{r} 15 \\ +\ 43 \\ \hline \square \end{array}$$

d)

$$\begin{array}{r} 134 \\ +\ 23 \\ \hline \square \end{array}$$

e)

$$\begin{array}{r} 437 \\ +\ 152 \\ \hline \square \end{array}$$

f)

$$\begin{array}{r} 305 \\ +\ 681 \\ \hline \square \end{array}$$

g)

$$\begin{array}{r} 4245 \\ +\ 742 \\ \hline \square \end{array}$$

h)

$$\begin{array}{r} 6031 \\ +\ 2358 \\ \hline \square \end{array}$$

i)

$$\begin{array}{r} 212 \\ 413 \\ +\ 31 \\ \hline \square \end{array}$$

j)

$$\begin{array}{r} 53 \\ 516 \\ +\ 20 \\ \hline \square \end{array}$$

k)

$$\begin{array}{r} 114 \\ 863 \\ +\ 22 \\ \hline \square \end{array}$$

l)

$$\begin{array}{r} 7164 \\ 1403 \\ +\ 231 \\ \hline \square \end{array}$$

m)

$$\begin{array}{r} 1730 \\ 15 \\ 3021 \\ +\ 12 \\ \hline \square \end{array}$$

n)

$$\begin{array}{r} 3205 \\ 210 \\ 534 \\ +\ 40 \\ \hline \square \end{array}$$

o)

$$\begin{array}{r} 300 \\ 402 \\ 7056 \\ +\ 21 \\ \hline \square \end{array}$$

p)

$$\begin{array}{r} 6201 \\ 140 \\ 1035 \\ +\ 322 \\ \hline \square \end{array}$$

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Skill 5.2 Adding large numbers with carry over using columns.

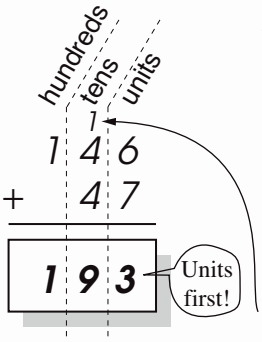
Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Always keep your working columns in line, aligning units with units, tens with tens, etc.
- Add from right to left.

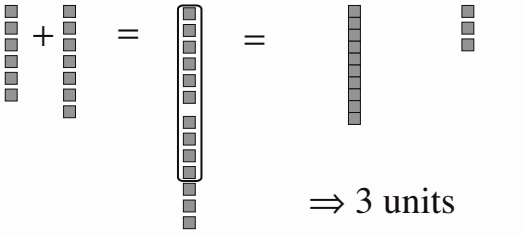
Q.

$$\begin{array}{r} 146 \\ +\ 47 \\ \hline \square \end{array}$$

A.



Units: $6 + 7 = 13 = 1 \text{ ten} + 3 \text{ units}$



$\Rightarrow$ 3 units

Carry over the 1 ten to the tens column.

Tens:

$4 + 4 + 1$ (carry over) $= 9$ $\Rightarrow$ 9 tens

Hundreds:

$1 + 0 = 1$ $\Rightarrow$ 1 hundred

a)

$$\begin{array}{r} {\scriptstyle 1\ \ } \\ 38 \\ +\ 55 \\ \hline \square\square \end{array}$$

Units first!

b)

$$\begin{array}{r} 67 \\ +\ 19 \\ \hline \square\square \end{array}$$

c)

$$\begin{array}{r} 84 \\ +\ 56 \\ \hline \square\square \end{array}$$

d)

$$\begin{array}{r} 527 \\ +\ 37 \\ \hline \square\square \end{array}$$

e)

$$\begin{array}{r} 206 \\ +\ 89 \\ \hline \square\square \end{array}$$

f)

$$\begin{array}{r} 323 \\ +\ 268 \\ \hline \square\square \end{array}$$

g)

$$\begin{array}{r} 1754 \\ +\ 52 \\ \hline \square\square \end{array}$$

h)

$$\begin{array}{r} 3062 \\ +\ 4528 \\ \hline \square\square \end{array}$$

i)

$$\begin{array}{r} {\scriptstyle 1\ 1\ } \\ 328 \\ 220 \\ +\ 73 \\ \hline \square\square \end{array}$$

j)

$$\begin{array}{r} 41 \\ 237 \\ +\ 905 \\ \hline \square\square \end{array}$$

k)

$$\begin{array}{r} 202 \\ 538 \\ +\ 62 \\ \hline \square\square \end{array}$$

l)

$$\begin{array}{r} 2486 \\ 1397 \\ +\ 200 \\ \hline \square\square \end{array}$$

m)

$$\begin{array}{r} 645 \\ 21 \\ 3057 \\ +\ 43 \\ \hline \square\square \end{array}$$

n)

$$\begin{array}{r} 400 \\ 118 \\ 2532 \\ +\ 4271 \\ \hline \square\square \end{array}$$

o)

$$\begin{array}{r} 529 \\ 301 \\ 7136 \\ +\ 64 \\ \hline \square\square \end{array}$$

p)

$$\begin{array}{r} 5271 \\ 12 \\ 1825 \\ +\ 369 \\ \hline \square\square \end{array}$$

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Skill 5.3 Adding large numbers by adding each place value, then adding the totals.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Add the digits in each place value.
- Then add the totals.

Q.

$$\begin{array}{r} 685 \\ +\ 246 \\ \hline \square \end{array}$$

A.

	hundreds	tens	units
	6	8	5
+	2	4	6
	9	**3**	**1**

Add the units (U): $5 + 6 = 11$

Add the tens (T): $80 + 40 = 120$

Add the hundreds (H): $600 + 200 = 800$

hundreds	tens	units
	1	1
1	2	0
8	0	0
9	3	1

a)

$$\begin{array}{r} 18 \\ +\ 73 \\ \hline \square \end{array}$$

U $8 + 3 = 11$

T $10 + 70 = 80$

91

b)

$$\begin{array}{r} 26 \\ +\ 44 \\ \hline \square \end{array}$$

U $6 + 4 = 10$

T $20 + 40 =$

c)

$$\begin{array}{r} 287 \\ +\ 195 \\ \hline \square \end{array}$$

U =

T =

H =

d)

$$\begin{array}{r} 318 \\ +\ 246 \\ \hline \square \end{array}$$

U =

T =

H =

e)

$$\begin{array}{r} 16 \\ 512 \\ +\ 47 \\ \hline \square \end{array}$$

U $6 + 2 + 7 = 15$

T $10 + 10 + 40 = 60$

H $500 = 500$

f)

$$\begin{array}{r} 39 \\ 373 \\ +\ 51 \\ \hline \square \end{array}$$

U =

T =

H =

g)

$$\begin{array}{r} 82 \\ 325 \\ +\ 435 \\ \hline \square \end{array}$$

U =

T =

H =

h)

$$\begin{array}{r} 132 \\ 767 \\ +\ 84 \\ \hline \square \end{array}$$

U =

T =

H =

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6. [Large Number –]

Skill 6.1 Subtracting large numbers without carry over using columns. Yellow 1 1 2 2 3 3 4 4 Red 1 1 2 2 3 3 4 4

- Always keep your working columns in line, aligning units with units, tens with tens, etc.
- Subtract from right to left.

Q.

$$\begin{array}{r} 147 \\ -\ 43 \\ \hline \square \end{array}$$

A.

hundreds	tens	units
1	4	7
	− 4	3
1	0	4

Units first!

Units:
$7 - 3 = 4$ ⇒ 4 units

Tens:
$4 - 4 = 0$ ⇒ 0 tens

Hundreds:
$1 - 0 = 1$ ⇒ 1 hundred

a)
$$\begin{array}{r} 98 \\ -\ 54 \\ \hline \square \end{array}$$
Units first!

b)
$$\begin{array}{r} 29 \\ -\ 20 \\ \hline \square \end{array}$$

c)
$$\begin{array}{r} 567 \\ -\ 25 \\ \hline \square \end{array}$$

d)
$$\begin{array}{r} 436 \\ -\ 31 \\ \hline \square \end{array}$$

e)
$$\begin{array}{r} 156 \\ -\ 140 \\ \hline \square \end{array}$$

f)
$$\begin{array}{r} 534 \\ -\ 123 \\ \hline \square \end{array}$$

g)
$$\begin{array}{r} 888 \\ -\ 208 \\ \hline \square \end{array}$$

h)
$$\begin{array}{r} 795 \\ -\ 673 \\ \hline \square \end{array}$$

i)
$$\begin{array}{r} 683 \\ -\ 112 \\ \hline \square \end{array}$$

j)
$$\begin{array}{r} 497 \\ -\ 281 \\ \hline \square \end{array}$$

k)
$$\begin{array}{r} 3434 \\ -\ \ 13 \\ \hline \square \end{array}$$

l)
$$\begin{array}{r} 1134 \\ -\ 123 \\ \hline \square \end{array}$$

m)
$$\begin{array}{r} 6789 \\ -\ 432 \\ \hline \square \end{array}$$

n)
$$\begin{array}{r} 2505 \\ -\ 205 \\ \hline \square \end{array}$$

o)
$$\begin{array}{r} 8796 \\ -7465 \\ \hline \square \end{array}$$

p)
$$\begin{array}{r} 6745 \\ -3123 \\ \hline \square \end{array}$$

q)
$$\begin{array}{r} 9758 \\ -1543 \\ \hline \square \end{array}$$

r)
$$\begin{array}{r} 4794 \\ -1370 \\ \hline \square \end{array}$$

s)
$$\begin{array}{r} 6319 \\ -4008 \\ \hline \square \end{array}$$

t)
$$\begin{array}{r} 8378 \\ -2265 \\ \hline \square \end{array}$$

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Skill 6.2 Subtracting large numbers with carry over using columns.

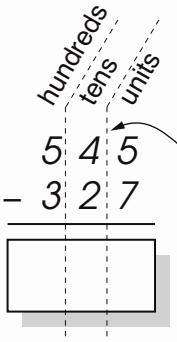
Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Always keep your working columns in line, aligning units with units, tens with tens, etc.
- Subtract from right to left.

Q.

$$\begin{array}{r} 5\,4\,5 \\ -\,3\,2\,7 \\ \hline \square \end{array}$$

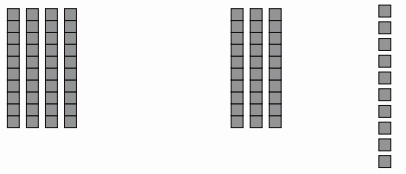
A.

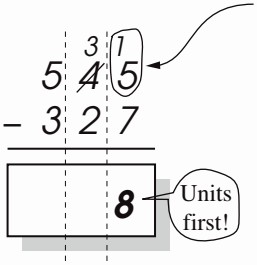


Units:

5 – 7 = ? units. The result is < 0.
To make the answer positive break down the 4 tens.

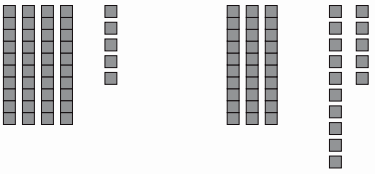
4 tens = 3 tens + 10 units





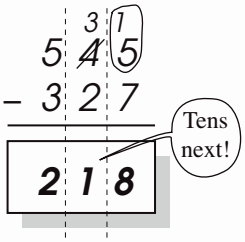
Re-group the 10 units with the 5 units to make 15 units.

40 + 5 = 30 + 15



Now...

15 – 7 = 8 ⇒ 8 units



Tens:

3 – 2 = 1 ⇒ 1 ten

Hundreds:

5 – 3 = 2 ⇒ 2 hundreds

a)

$$\begin{array}{r} 6\,\overset{2}{\cancel{3}}\,\overset{1}{2} \\ -\quad 2\,8 \\ \hline \square \end{array}$$

Units first!

b)

$$\begin{array}{r} 4\,4\,4 \\ -\quad 3\,9 \\ \hline \square \end{array}$$

c)

$$\begin{array}{r} 3\,6\,3 \\ -\,2\,0\,7 \\ \hline \square \end{array}$$

d)

$$\begin{array}{r} 7\,0\,0 \\ -\,1\,4\,6 \\ \hline \square \end{array}$$

e)

$$\begin{array}{r} 5\,7\,3\,9 \\ -\quad 1\,8\,3 \\ \hline \square \end{array}$$

f)

$$\begin{array}{r} 2\,4\,1\,4 \\ -\quad\;\; 6\,5 \\ \hline \square \end{array}$$

g)

$$\begin{array}{r} 6\,0\,0\,0 \\ -\quad 4\,5\,7 \\ \hline \square \end{array}$$

h)

$$\begin{array}{r} 3\,6\,4\,8 \\ -\quad 3\,8\,8 \\ \hline \square \end{array}$$

i)

$$\begin{array}{r} 4\,5\,9\,1 \\ -2\,4\,3\,5 \\ \hline \square \end{array}$$

j)

$$\begin{array}{r} 5\,7\,8\,4 \\ -3\,1\,5\,8 \\ \hline \square \end{array}$$

k)

$$\begin{array}{r} 9\,2\,1\,3 \\ -4\,6\,5\,8 \\ \hline \square \end{array}$$

l)

$$\begin{array}{r} 4\,3\,7\,2 \\ -1\,0\,7\,6 \\ \hline \square \end{array}$$

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Skill 6.3 Subtracting from a multiple of 10 (e.g. 20, 700, etc).

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Always keep your working columns in line, aligning units with units, tens with tens, etc.
- Subtract from right to left.

Q.

$$\begin{array}{r} 300 \\ -\ 58 \\ \hline \end{array}$$

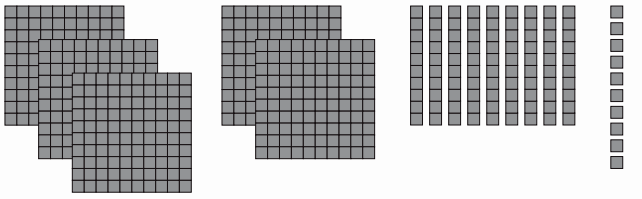
A.

hundreds	tens	units
2	9	1
~~3~~	~~0~~	10
	5	8
2	**4**	**2**

Units first!

Units:
0 – 8 = ? units. The result is < 0.
To make the answer positive break down the 3 hundreds (no tens available).

3 hundreds = 2 hundreds + 9 tens + 10 units



Now...
10 – 8 = 2 ⇒ 2 units

Tens:
9 – 5 = 4 ⇒ 4 tens

Hundreds:
2 – 0 = 2 ⇒ 2 hundreds

a) 90 − 7 = 83 (Units first!)

b) 30 − 4 = ____

c) 60 − 15 = ____

d) 40 − 28 = ____

e) 90 − 16 = ____

f) 50 − 13 = ____

g) 70 − 37 = ____

h) 80 − 54 = ____

i) 400 − 5 = ____

j) 500 − 9 = ____

k) 900 − 57 = ____

l) 800 − 63 = ____

m) 540 − 82 = ____

n) 810 − 29 = ____

o) 1000 − 205 = ____

p) 2050 − 461 = ____

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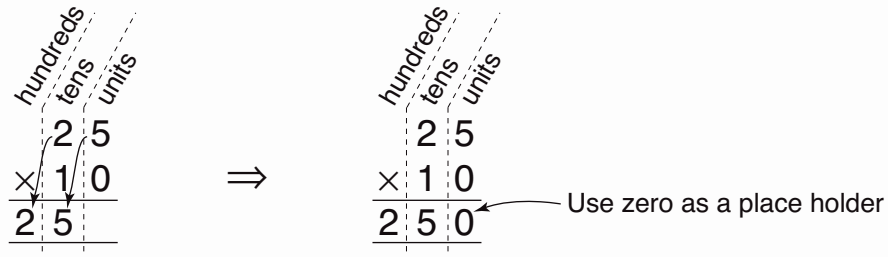
7. [Powers of 10 ×,÷]

Skill 7.1 Multiplying a whole number by a power of 10 using zeros as place holders.

Yellow 1 2 3 4
Red 1 2 3 4

- When multiplying by 10 move each digit one place to the left.



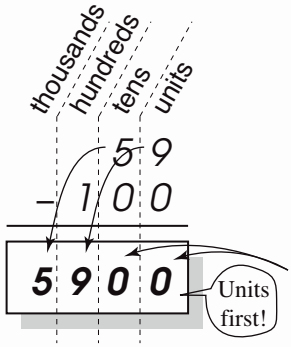
Hint: Multiplying by a power of 10 does not change the digits in the number.
Example: $25 \times 10 = 250$ the 2 and the 5 remain in the answer.

- When multiplying by 100 move each digit two places to the left.
- When multiplying by 1000 move each digit three places to the left.
- Add zeros as place holders in the vacated places.

Q.

$$\begin{array}{r} 59 \\ \times\ 100 \\ \hline \square \end{array}$$

A.



59×100 means 59 groups of 100.

Shift 5 and 9 two places to the left.

Use 0's as place holders in the vacated units and tens places.

a)

$$\begin{array}{r} 70 \\ \times\ 10 \\ \hline 700 \end{array}$$

Use zero as a place holder

b)

$$\begin{array}{r} 25 \\ \times\ 10 \\ \hline \square \end{array}$$

c)

$$\begin{array}{r} 224 \\ \times\ 10 \\ \hline \square \end{array}$$

d)

$$\begin{array}{r} 370 \\ \times\ 10 \\ \hline \square \end{array}$$

e)

$$\begin{array}{r} 25 \\ \times\ 100 \\ \hline \square \end{array}$$

f)

$$\begin{array}{r} 73 \\ \times\ 100 \\ \hline \square \end{array}$$

g)

$$\begin{array}{r} 80 \\ \times\ 100 \\ \hline \square \end{array}$$

h)

$$\begin{array}{r} 109 \\ \times\ 100 \\ \hline \square \end{array}$$

i)

$$\begin{array}{r} 39 \\ \times\ 1000 \\ \hline \square \end{array}$$

j)

$$\begin{array}{r} 60 \\ \times\ 1000 \\ \hline \square \end{array}$$

k)

$$\begin{array}{r} 850 \\ \times\ 1000 \\ \hline \square \end{array}$$

l)

$$\begin{array}{r} 247 \\ \times\ 1000 \\ \hline \square \end{array}$$

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Skill 7.2 Multiplying a whole number by a power of 10 using columns.

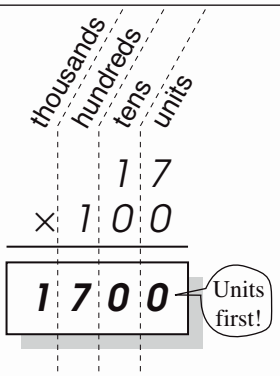
Yellow 1 2 3 4
Red 1 2 3 4

- When multiplying a number by a power of 10, simply add the same number of zeros at the end of the number.

Q.

$$\begin{array}{r} 17 \\ \times 100 \\ \hline \\ \hline \end{array}$$

A.



Units:
$0 \times 17 = 0$ $\Rightarrow$ 0 units

Tens:
$0 \times 17 = 0$ $\Rightarrow$ 0 tens

Hundreds:
$1 \times 17 = 17$
17 hundreds = 1 thousand + 7 hundreds
$\Rightarrow$ 7 hundreds
Carry over the 1 thousand to the thousands column.

Thousands: $\Rightarrow$ 1 thousand

Hint: One thousand, seven hundred can also be called seventeen hundred.

a)

$$\begin{array}{r} 56 \\ \times 10 \\ \hline 560 \\ \hline \end{array}$$

Units first!

b)

$$\begin{array}{r} 138 \\ \times 10 \\ \hline \\ \hline \end{array}$$

c)

$$\begin{array}{r} 470 \\ \times 10 \\ \hline \\ \hline \end{array}$$

d)

$$\begin{array}{r} 2095 \\ \times 10 \\ \hline \\ \hline \end{array}$$

e)

$$\begin{array}{r} 47 \\ \times 100 \\ \hline \\ \hline \end{array}$$

f)

$$\begin{array}{r} 75 \\ \times 100 \\ \hline \\ \hline \end{array}$$

g)

$$\begin{array}{r} 50 \\ \times 100 \\ \hline \\ \hline \end{array}$$

h)

$$\begin{array}{r} 953 \\ \times 100 \\ \hline \\ \hline \end{array}$$

i)

$$\begin{array}{r} 600 \\ \times 100 \\ \hline \\ \hline \end{array}$$

j)

$$\begin{array}{r} 340 \\ \times 100 \\ \hline \\ \hline \end{array}$$

k)

$$\begin{array}{r} 702 \\ \times 100 \\ \hline \\ \hline \end{array}$$

l)

$$\begin{array}{r} 581 \\ \times 100 \\ \hline \\ \hline \end{array}$$

m)

$$\begin{array}{r} 98 \\ \times 1000 \\ \hline \\ \hline \end{array}$$

n)

$$\begin{array}{r} 70 \\ \times 1000 \\ \hline \\ \hline \end{array}$$

o)

$$\begin{array}{r} 950 \\ \times 1000 \\ \hline \\ \hline \end{array}$$

p)

$$\begin{array}{r} 326 \\ \times 1000 \\ \hline \\ \hline \end{array}$$

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Skill 7.3 Dividing a whole number by a power of 10 using fractions.

Yellow 1 **1** **2** **3** **4**
Red 1 **1** **2** **3** **4**

- Convert the division to a fraction and.....

EITHER

- Divide both the numerator and the denominator by the value of the denominator.

$40 \div 10 = \quad \frac{40}{10} = \frac{40^{\div 10}}{10_{\div 10}} = \frac{4}{1} = 4$

$600 \div 100 = \quad \frac{600}{100} = \frac{600^{\div 100}}{100_{\div 100}} = \frac{6}{1} = 6$

OR

- Cancel the zeros in the numerator against the zeros in the denominator.

$\frac{40}{10} = \frac{4\cancel{0}}{1\cancel{0}} = \frac{4}{1} = 4$

$\frac{600}{100} = \frac{6\cancel{0}\cancel{0}}{1\cancel{0}\cancel{0}} = \frac{6}{1} = 6$

Q. $5400 \div 100 =$

A. $5400 \div 100 = \frac{5400^{\div 100}}{100_{\div 100}} = \frac{54}{1} = \mathbf{54}$

How many groups of 100 make up 5400?

Convert the division to a fraction.

Divide the numerator and the denominator by 100.

54 groups of 100 make up 5400.

Hint: Five thousand, four hundred can also be called fifty-four hundred.

a) $800 \div 100 =$

$= \frac{8\cancel{0}\cancel{0}}{1\cancel{0}\cancel{0}} =$ ☐

b) $70 \div 10 =$

$=$ ☐

c) $850 \div 10 =$

$=$ ☐

d) $900 \div 100 =$

$=$ ☐

e) $500 \div 100 =$

$=$ ☐

f) $2400 \div 100 =$

$=$ ☐

g) $13\,200 \div 100 =$

$=$ ☐

h) $9800 \div 10 =$

$=$ ☐

i) $15\,000 \div 1000 =$

$=$ ☐

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Skill 7.4 Dividing a whole number by a power of 10 by removing zeros or changing place values.

Yellow 1 1 2 3 4
Red 1 1 2 3 4

EITHER

- Remove the same number of zeros as in the divisor from the end of the whole number.
  (1 for 10,
  2 for 100,
  3 for 1000, etc.)
  Example:

  98 00Ø ÷ 1Ø = 9800
  98 0ØØ ÷ 1ØØ = 980
  98 ØØØ ÷ 1ØØØ = 98

OR

- Move the decimal point the same number of places to the left as there are zeros in the divisor.

  Hint: There is a decimal point and zeros which are not written, at the end of any whole number.

1 zero ⇒ 1 place left. 98 000.0 ⇒ 9800
2 zeros ⇒ 2 places left. 98 000.0 ⇒ 980
3 zeros ⇒ 3 places left. 98 000.0 ⇒ 98

Q. 44 000 ÷ 1000 =

A. *44 000 ÷ 1000 =*
= 44 ØØØ ÷ 1ØØØ
= 44

1000 has 3 zeros.
To divide by 1000 remove 3 zeros from both numbers.

a) 600 ÷ 10 =
= 600.0 ÷ 10

b) 90 ÷ 10 =
=

c) 330 ÷ 10 =
=

d) 1600 ÷ 10 =
=

e) 5500 ÷ 10 =
=

f) 400 ÷ 100 =
=

g) 800 ÷ 100 =
=

h) 9500 ÷ 100 =
=

i) 7100 ÷ 100 =
=

j) 45 900 ÷ 100 =
=

k) 9000 ÷ 1000 =
=

l) 74 000 ÷ 1000 =
=

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8. [Large Number ×,÷]

Skill 8.1 Multiplying a large number by a single digit without carry over, using columns.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Multiply the units, tens, hundreds and thousands by the single digit.
- Multiply from right to left.

Q.

$$\begin{array}{r} 3\,1\,2 \\ \times \quad 3 \\ \hline \square \end{array}$$

A.

hundreds	tens	units
3	1	2
×		3
9	3	6

Units first!

Units:
$3 \times 2 = 6$ ⇒ 6 units

Tens:
$3 \times 1 = 3$ ⇒ 3 tens

Hundreds:
$3 \times 3 = 9$ ⇒ 9 hundreds

a)

$$\begin{array}{r} 9\,7 \\ \times \quad 1 \\ \hline 9\,7 \end{array}$$

Units first!

b)

$$\begin{array}{r} 2\,2 \\ \times \quad 4 \\ \hline \square \end{array}$$

c)

$$\begin{array}{r} 2\,3 \\ \times \quad 3 \\ \hline \square \end{array}$$

d)

$$\begin{array}{r} 1\,3 \\ \times \quad 2 \\ \hline \square \end{array}$$

e)

$$\begin{array}{r} 3\,0 \\ \times \quad 3 \\ \hline \square \end{array}$$

f)

$$\begin{array}{r} 4\,1 \\ \times \quad 2 \\ \hline \square \end{array}$$

g)

$$\begin{array}{r} 4\,3 \\ \times \quad 2 \\ \hline \square \end{array}$$

h)

$$\begin{array}{r} 3\,2 \\ \times \quad 2 \\ \hline \square \end{array}$$

i)

$$\begin{array}{r} 1\,2\,3 \\ \times \quad 3 \\ \hline \square \end{array}$$

j)

$$\begin{array}{r} 3\,3\,2 \\ \times \quad 2 \\ \hline \square \end{array}$$

k)

$$\begin{array}{r} 8\,0\,8 \\ \times \quad 1 \\ \hline \square \end{array}$$

l)

$$\begin{array}{r} 1\,1\,2 \\ \times \quad 3 \\ \hline \square \end{array}$$

m)

$$\begin{array}{r} 3\,4\,0 \\ \times \quad 2 \\ \hline \square \end{array}$$

n)

$$\begin{array}{r} 1\,3\,1 \\ \times \quad 3 \\ \hline \square \end{array}$$

o)

$$\begin{array}{r} 4\,2\,3 \\ \times \quad 2 \\ \hline \square \end{array}$$

p)

$$\begin{array}{r} 3\,2\,2 \\ \times \quad 3 \\ \hline \square \end{array}$$

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Skill 8.2 Multiplying a large number by a single digit with carry over, using columns.

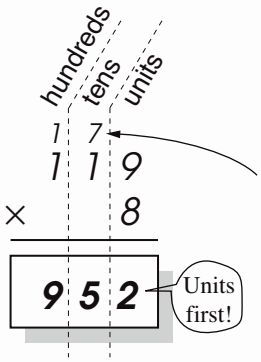
Yellow 1 1 2 3 4 4
Red 1 1 2 3 3 4 4

- Multiply the units, tens, hundreds and thousands by the single digit.
- Multiply from right to left.
- If there is a 'carry over': First multiply.
  Then add on the carry over.

Q.

$$\begin{array}{r} 119 \\ \times\ \ 8 \\ \hline \square \end{array}$$

A.



Units:
$8 \times 9 = 72$
72 units = 7 tens and 2 units $\Rightarrow$ 2 units
Carry over the 7 tens to the tens column.

Tens:
$8 \times 1 = 8$
$8 + 7$ (carry over) $= 15$
15 tens = 1 hundred and 5 tens $\Rightarrow$ 5 tens
Carry over the 1 hundred to the hundreds column.

Hundreds:
$8 \times 1 = 8$
$8 + 1$ (carry over) $= 9$ $\Rightarrow$ 9 hundreds

a)

$$\begin{array}{r} {\scriptstyle 4\ \ } \\ 80 \\ \times\ \ 5 \\ \hline 400 \end{array}$$

Units first!

b)

$$\begin{array}{r} 90 \\ \times\ \ 4 \\ \hline \square \end{array}$$

c)

$$\begin{array}{r} 94 \\ \times\ \ 2 \\ \hline \square \end{array}$$

d)

$$\begin{array}{r} 65 \\ \times\ \ 3 \\ \hline \square \end{array}$$

e)

$$\begin{array}{r} 36 \\ \times\ \ 3 \\ \hline \square \end{array}$$

f)

$$\begin{array}{r} 23 \\ \times\ \ 7 \\ \hline \square \end{array}$$

g)

$$\begin{array}{r} 48 \\ \times\ \ 6 \\ \hline \square \end{array}$$

h)

$$\begin{array}{r} 82 \\ \times\ \ 6 \\ \hline \square \end{array}$$

i)

$$\begin{array}{r} {\scriptstyle 1\ \ } \\ 164 \\ \times\ \ 2 \\ \hline \square \end{array}$$

j)

$$\begin{array}{r} 207 \\ \times\ \ 5 \\ \hline \square \end{array}$$

k)

$$\begin{array}{r} 409 \\ \times\ \ 7 \\ \hline \square \end{array}$$

l)

$$\begin{array}{r} 803 \\ \times\ \ 4 \\ \hline \square \end{array}$$

m)

$$\begin{array}{r} 180 \\ \times\ \ 6 \\ \hline \square \end{array}$$

n)

$$\begin{array}{r} 567 \\ \times\ \ 3 \\ \hline \square \end{array}$$

o)

$$\begin{array}{r} 410 \\ \times\ \ 9 \\ \hline \square \end{array}$$

p)

$$\begin{array}{r} 522 \\ \times\ \ 5 \\ \hline \square \end{array}$$

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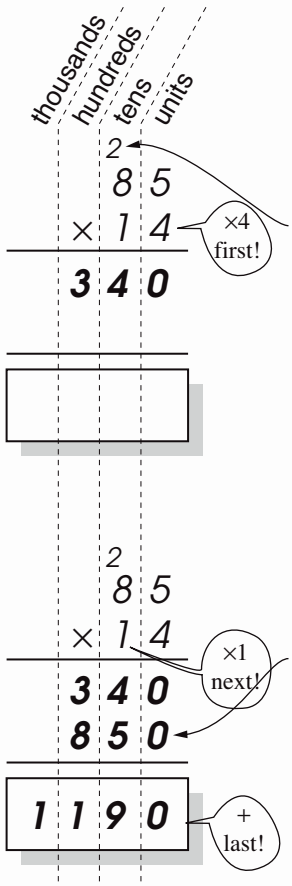
Skill 8.3 Multiplying a large number by a two-digit number, using columns.

- Multiply by the unit digit first, working from right to left.
  Reminder: Put a zero in the units place before you start multiplying by the tens.
- Then multiply by the ten digit, working from right to left.
- Add the results last.

Q.

$$\begin{array}{r} 85 \\ \times\ 14 \\ \hline \\ \hline \\ \square \end{array}$$

A.



First multiply 85 by the 4 units.

Units:

$4 \times 5 = 20$

20 units = 2 tens and 0 units $\Rightarrow$ 0 units

Carry over the 2 tens to the tens column.

Tens:

$4 \times 8 = 32$

$32 + 2$ (carry over) $= 34$

34 tens = 3 hundreds and 4 tens $\Rightarrow$ 4 tens

Hundreds: $\Rightarrow$ 3 hundreds

Then multiply 85 by the 1 ten.

Units:

Write 0 as a place holder for the ten.

$\Rightarrow$ 0 units

Tens:

$1 \times 5 = 5$ $\Rightarrow$ 5 tens

Hundreds:

$1 \times 8 = 8$ $\Rightarrow$ 8 hundreds

Add these results: $340 + 850 = 1190$

a)

$$\begin{array}{r} 34 \\ \times\ 21 \\ \hline 34 \\ 680 \\ \hline \\ \hline \square \end{array}$$

×1 first! ×2 next! Use zero as a place holder + last!

b)

$$\begin{array}{r} {\scriptstyle 1}\ 15 \\ \times\ 32 \\ \hline \\ \hline \square \end{array}$$

×2 first! ×3 next!

c)

$$\begin{array}{r} 24 \\ \times\ 43 \\ \hline \\ \hline \square \end{array}$$

d)

$$\begin{array}{r} 71 \\ \times\ 62 \\ \hline \\ \hline \square \end{array}$$

e)

$$\begin{array}{r} 58 \\ \times\ 45 \\ \hline \\ \hline \square \end{array}$$

f)

$$\begin{array}{r} 92 \\ \times\ 73 \\ \hline \\ \hline \square \end{array}$$

g)

$$\begin{array}{r} 46 \\ \times\ 38 \\ \hline \\ \hline \square \end{array}$$

h)

$$\begin{array}{r} 33 \\ \times\ 96 \\ \hline \\ \hline \square \end{array}$$

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Skill 8.4 Dividing a large number by a single digit, without carry over.

- Divide from left to right across the digits, one at a time.

Q. $2\overline{)486}$

A. $2\overline{)486}$ → **243**

hundreds first!

hundreds | tens | units

Hundreds:
$4 \div 2 = 2$ ⇒ 2 hundreds

Tens:
$8 \div 2 = 4$ ⇒ 4 tens

Units:
$6 \div 2 = 3$ ⇒ 3 units

Read as: 486 divided by 2 equals?
OR How many 2's go into 486?
OR 486 divides by 2 how many times?

Consider: $486 \div 2 = 243$
$2 \times 243 = 486$

a) $4\overline{)80}$ → 20

b) $3\overline{)69}$

c) $2\overline{)46}$

d) $4\overline{)48}$

e) $2\overline{)200}$ (hundreds first!)

f) $2\overline{)800}$

g) $3\overline{)909}$

h) $7\overline{)770}$

i) $4\overline{)408}$

j) $3\overline{)396}$

k) $2\overline{)284}$

l) $3\overline{)366}$

m) $3\overline{)6000}$ (thousands first!)

n) $2\overline{)8000}$

o) $2\overline{)2860}$

p) $3\overline{)9063}$

q) $2\overline{)8864}$

r) $2\overline{)4806}$

s) $3\overline{)3009}$

t) $4\overline{)4048}$

u) $3\overline{)3966}$

v) $2\overline{)8204}$

w) $4\overline{)8408}$

x) $3\overline{)3699}$

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Skill 8.5 Dividing a large number by a single digit, with carry over - no remainder.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Divide from left to right across the digits one at a time.
- If any result is less than 1: Break down the number being divided into.
  'Carry over' this amount to the next column.
  Add on the carry.
  Then try dividing again.

Q. $4\overline{)128}$

A. hundreds first!

$$\begin{array}{r} 3\ 2 \\ 4\overline{)\cancel{1}\,{}^{1}2\ 8} \end{array}$$

hundreds tens units

Hundreds:
$1 \div 4 = ?$
The result is < 1.
Break down the 1 hundred into 10 tens and carry them to the tens column.

Tens:
$2 + 10$ (carry over) $= 12$
$12 \div 4 = 3$ $\Rightarrow$ 3 tens

Units:
$8 \div 4 = 2$ $\Rightarrow$ 2 units

Read as: 128 divided by 4 equals?
OR How many 4's go into 128?
OR 128 divides by 4 how many times?

Consider: $128 \div 4 = 32$
$4 \times 32 = 128$

a) hundreds first!

$$\begin{array}{r} 5\ 1 \\ 5\overline{)\cancel{2}\,{}^{2}5\ 5} \end{array}$$

b) $3\overline{)216}$

c) $2\overline{)148}$

d) $4\overline{)320}$

e) $4\overline{)212}$

f) $8\overline{)592}$

g) $6\overline{)204}$

h) $7\overline{)336}$

i) thousands first!

$6\overline{)1800}$

j) $5\overline{)4500}$

k) $4\overline{)1060}$

l) $2\overline{)1734}$

m) $3\overline{)6081}$

n) $3\overline{)4125}$

o) $6\overline{)7218}$

p) $5\overline{)5150}$

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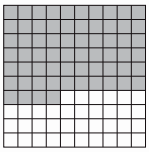
9. [Decimals]

Skill 9.1 Counting tenths and hundredths in a 10 × 10 grid (1).

- Count the number of squares in 1 row or 1 column.
  Hint: Each row (or column) shows 10 tenths. The whole grid shows 100 hundredths.

To count tenths
- Count the number of completely shaded rows (or columns).

To count hundredths
- Add on the amount of shaded squares in the shorter shaded row (or column) to the number of tenths. OR
- Count the total number of shaded squares.

Q. 

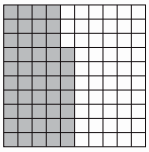
[ ] tenths +

[ ] hundredths =

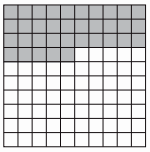
A. ***6*** *tenths +* ***4*** *hundredths* = *0.****64***

Tenths:
There are 6 rows completely shaded
⇒ 6 tenths

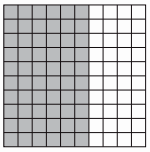
Hundredths:
There are 4 shaded squares in the shorter row
⇒ 4 hundredths

a) 

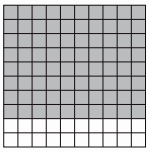
47 hundredths = 0.

b) 

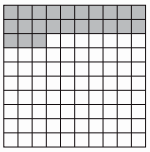
35 hundredths = 0.

c) 

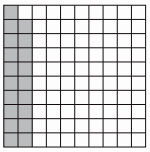
[ ] tenths = 0.

d) 

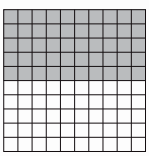
[ ] tenths = 0.

e) 

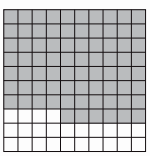
[ ] hundredths = 0.

f) 

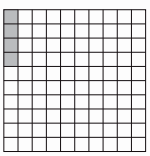
[ ] hundredths = 0.

g) 

[ ] tenths = 0.

h) 

[ ] hundredths = 0.

i) 

[ ] hundredths = 0.

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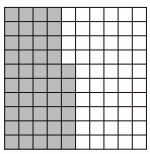
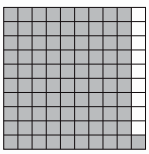
Skill 9.1 Counting tenths and hundredths in a 10 × 10 grid (2).

j) 

☐ tenths +

☐ hundredths =

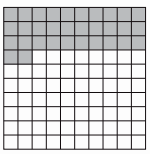
0.☐

k) 

☐ tenths +

☐ hundredth =

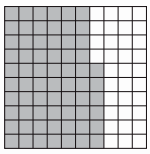
0.☐

l) 

☐ tenths +

☐ hundredths =

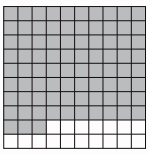
0.☐

m) 

☐ tenths +

☐ hundredths =

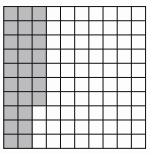
0.☐

n) 

☐ tenths +

☐ hundredths =

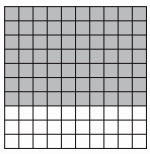
0.☐

o) 

☐ tenths +

☐ hundredths =

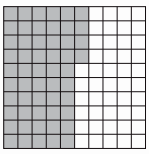
0.☐

p) 

☐ tenths +

☐ hundredths =

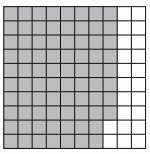
0.☐

q) 

☐ tenths +

☐ hundredths =

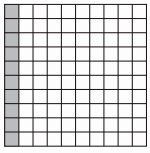
0.☐

r) 

☐ tenths +

☐ hundredths =

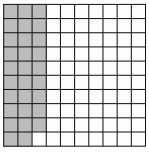
0.☐

s) 

☐ tenth +

☐ hundredths =

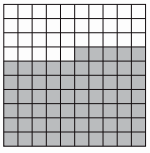
0.☐

t) 

☐ tenths +

☐ hundredths =

0.☐

u) 

☐ tenths +

☐ hundredths =

0.☐

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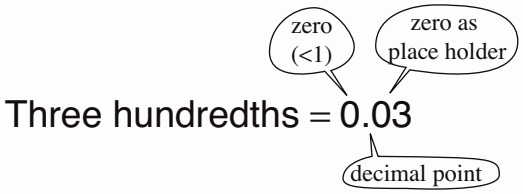
Skill 9.2 Expressing word decimal numbers in numerals.

Rule 1: Write the numbers from left to right in the same order as the words.
Rule 2: If the number is less than one then put a zero before the decimal point.
Rule 3: The decimal point goes between the units and the tenths.
Rule 4: Write a zero as a place holder in any place that is left empty between other digits.



DECIMAL PLACE VALUE

Units	Tenths	Hundredths
0 •	0	3

Q. Write as a decimal:
fifty-eight hundredths

A. ***0.58***

To show a number is less than 1, first put a zero and then a decimal point.
Then write the numbers 5 and 8 in order.
Check that the 8 is in the hundredths position.
The 5 should be in the tenths position.

a) Write as a decimal:
two tenths

b) Write as a decimal:
seven tenths

c) Write as a decimal:
nine tenths

d) Write as a decimal:
three and two tenths

e) Write as a decimal:
four and one tenth

f) Write as a decimal:
five and eight tenths

g) Write as a decimal:
six and one tenth

h) Write as a decimal:
six hundredths

i) Write as a decimal:
three hundredths

j) Write as a decimal:
twenty-four hundredths

k) Write as a decimal:
seventy-one hundredths

l) Write as a decimal:
sixty-six hundredths

m) Write as a decimal:
two and thirty-one hundredths

n) Write as a decimal:
five and sixty-nine hundredths

o) Write as a decimal:
one and twelve hundredths

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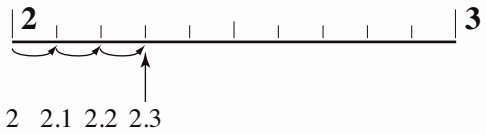
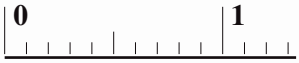
Skill 9.3 Reading a decimal number on a scale (1).

- Count the number of spaces between two whole numbers.
  (Always one more than the number of marks.)
- Work out the value of each space.
  Example: 10 spaces between each whole number ⇒ 1 ÷ 10 = 0.1
  Each mark is further along the scale by one tenth or 0.1

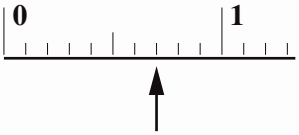


- Starting at the last whole number, count on by 0.1. Point to each mark as you go.

Q. Show with an arrow the number 0.7 on the scale.



A.

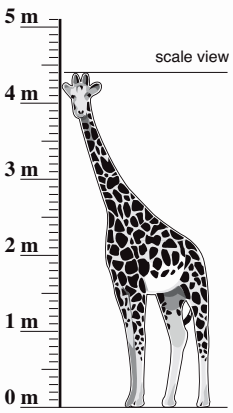


There are 10 spaces between 0 and 1.

Each space is worth one tenth:
$\frac{1}{10} = 1 \div 10 = 0.1$

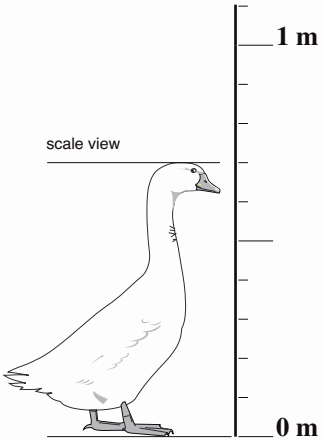
From '0' you can count on:
0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7 OR
Knowing the middle mark is 0.5, count on from 0.5: 0.5, 0.6, 0.7

a) Use the scale to find the height of the giraffe in metres.



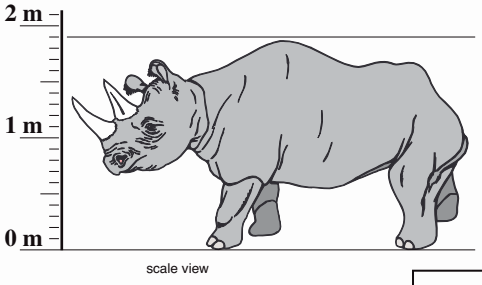
m

b) Use the scale to find the height of the goose in metres.



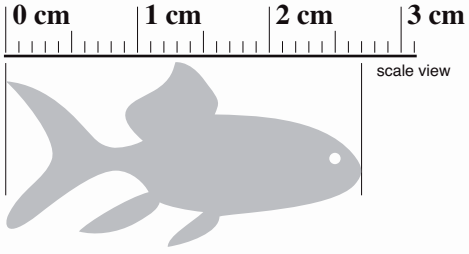
m

c) Use the scale to find the height of the rhinoceros in metres.



m

d) Use the scale to find the length of the fish in centimetres.



cm

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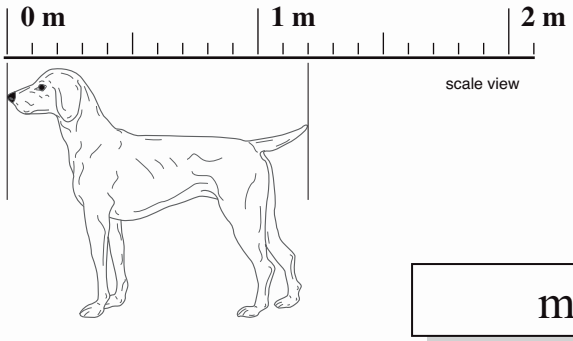
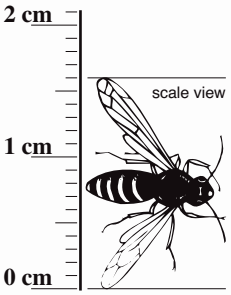
Skill 9.3 Reading a decimal number on a scale (2).

e) Use the scale to find the length of the dog in metres.



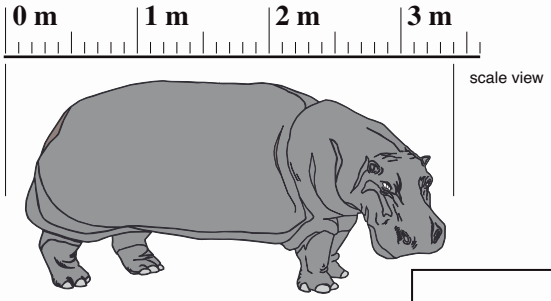
m

f) Use the scale to find the wing span of the bee in centimetres.



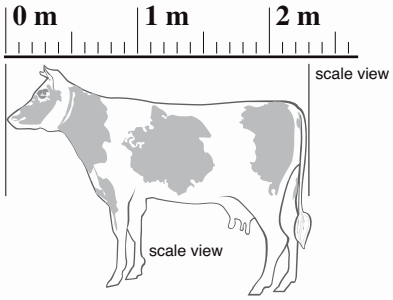
cm

g) Use the scale to find the length of the hippopotamus in metres.



m

h) Use the scale to find the length of the cow in metres.

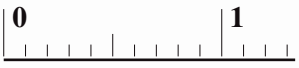


m

i) Show with an arrow the number 3.8 on the scale.

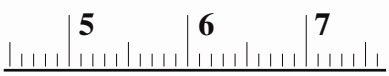
j) Show with an arrow the number 7.3 on the scale.

k) Show with an arrow the number 0.6 on the scale.



l) Show with an arrow the number 4.2 on the scale.

m) Show with an arrow the number 6.5 on the scale.



n) Show with an arrow the number 1.9 on the scale.

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Skill 9.4 Converting cent amounts into dollar amounts.

Less than 100 cents

- Write a zero first if the cents are less than 100.
- Write the decimal point.
- Write the cents after the decimal point.

Hint: Use a 0 as a place holder after the decimal point for any amount less than 10 cents.

Example: 6¢ = $0.06

More than 100 cents

- Separate the hundreds of cents to make whole dollars.
- Write the whole dollars followed by the decimal point.
- Write the remaining cents after the decimal point.

Conversion Fact - MONEY
100 cents = 1 dollar

Q. Write these cents in dollars:

638¢ =

A. *638¢*
= 600¢ + 38¢
= $6 + 38¢
= $6.38

a) Write these cents in dollars:

24¢ = $ 0.24

b) Write these cents in dollars:

31¢ = $

c) Write these cents in dollars:

59¢ = $

d) Write these cents in dollars:

100¢ = $

e) Write these cents in dollars:

900¢ = $

f) Write these cents in dollars:

400¢ = $

g) Write these cents in dollars:

126¢ = $

h) Write these cents in dollars:

459¢ = $

i) Write these cents in dollars:

746¢ = $

j) Write these cents in dollars:

90¢ = $

k) Write these cents in dollars:

30¢ = $

l) Write these cents in dollars:

50¢ = $

m) Write these cents in dollars:

206¢ = $

n) Write these cents in dollars:

704¢ = $

o) Write these cents in dollars:

801¢ = $

p) Write these cents in dollars:

8¢ = $

q) Write these cents in dollars:

4¢ = $

r) Write these cents in dollars:

3¢ = $

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Skill 9.5 Comparing place value in decimal numbers.

- Line up the decimal numbers at their decimal points.
- Compare the size of digits in the same places, starting from the left.

Place value	thousands	hundreds	tens	units	decimal point	tenths	hundredths	thousandths
	1000	100	10	1		0.1	0.01	0.001

Hint: Using zeros as place holders does not change the value of a number when the zeros are put:

EITHER
Before the first digit in any number
Example: 5
The digit 5 is in the units place:
5 = 05 = 005

OR
After the last digit of a decimal number, after the decimal point
Example: 0.5
The digit 5 is in the tenths place:
0.5 = 0.50 = 0.500

Q. Which of the following are true?
A) 6.0 = 6.00
B) 400 = 40
C) 0.7 = 0.070
D) 0.8 = 0.800

A. ***A*** *and* ***D***

Line up the numbers at their decimal points.
Compare from the left.

A) 6.0 = 6.00 True
B) 400 = 40 False
C) 0.7 = 0.070 False
D) 0.8 = 0.800 True

Only A and D are true.

a) Which of the following are true?
A) 6 = 60.0
B) 50.0 = 50
C) 0.3 = 0.3
D) 00.2 = 2.00

and

b) Which of the following are true?
A) 70 = 7
B) 9 = 0.9
C) 0.5 = 0.50
D) 8.0 = 8.00

and

c) Which of the following are true?
A) 10.0 = 1.0
B) 50.0 = 50
C) 0.07 = 0.007
D) 4 = 4.0

and

d) Which of the following are true?
A) 90 = 90.0
B) 4 = 40.0
C) 20.0 = 0.20
D) 0.50 = 0.5

and

e) Which of the following are true?
A) 0.03 = 0.30
B) 0.4 = 0.40
C) 7 = 0.70
D) 8.0 = 8.0000

and

f) Which of the following are true?
A) 5.0 = 5
B) 20 = 20.0
C) 0.4 = 0.004
D) 0.30 = 3.0

and

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Skill 9.6 Adding dollars and cents.

- Add the cents first.
- Convert cents to dollars where possible.
- Add the dollars next.
- Add the totals.

Conversion Fact - MONEY
100 cents = 1 dollar

Q. $3.40 + $3.65 =

A. *$3.40 + $3.65 =*
40¢ + 65¢ = 105¢
105¢ = $1.05
$3.00 + $3.00 = $6.00
*= **$7.05***

Cents:
40 + 65 = 105 cents
105 cents = 1 dollar and 5 cents

Dollars:
1 + 6 = 7 dollars

Totals:
$1.05 + $6.00 = $7.05

a) $2.30 + $3.95 =

30¢ + 95¢ = 125¢
125¢ = $1.25
$2.00 + $3.00 = $5
= $

b) $2.40 + $5.60 =

40¢ + 60¢ = 100¢
¢ = $
= $
= $

c) $4.55 + $2.05 =

¢ = ¢
¢ = $
= $
= $

d) $1.65 + $3.45 =

¢ = ¢
¢ = $
= $
= $

e) $3.50 + $1.95 =

¢ = ¢
¢ = $
= $
= $

f) $3.85 + $4.50 =

¢ = ¢
¢ = $
= $
= $

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Skill 9.7 Calculating the change from whole dollars.

- Write the word problem as a number sentence.

Conversion Fact - MONEY
100 cents = 1 dollar

EITHER
- Consider the cents first.
- Build up the cents, in steps if necessary, to the next whole dollar.

OR
- Subtract the decimal number from the whole number. (see skill 9.10, page 49)

Q. How much change will you receive from $10.00 if you spend $5.15?

A. *$5.15 + 85¢ = $6.00*
$6.00 + $4.00 = $10.00
85¢ + $4.00 = ***$4.85***

"How much must I add to $5.15 to have $6.00?"

"$5.15 plus 5 cents makes $5.20
And 80 cents more will make $6.00
Altogether I need 85 cents more."

So $5.15 and $0.85 make $6.00
Then $4.00 more will make $10.00

a) How much change will you receive from $5.00 if you spend $3.45?

$3.45 + 55¢ = $4.00

$4.00 + $1.00 = $5.00

55¢ + $1.00 = $

b) How much change will you receive from $5.00 if you spend $2.30?

$

c) How much change will you receive from $10.00 if you spend $2.05?

$

d) How much change will you receive from $10.00 if you spend $0.90?

$

e) How much change will you receive from $10.00 if you spend $4.65?

$

f) How much change will you receive from $5.00 if you spend $3.85?

$

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Skill 9.8 Adding decimal numbers with carry over using columns (1).

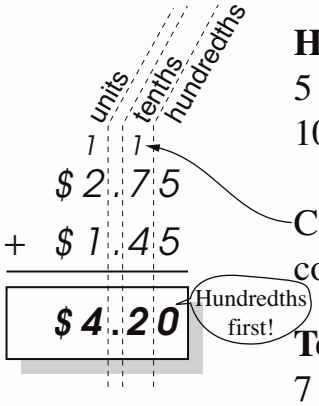
Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Always keep your working columns in line, aligning the decimal points, the decimal places, units with units, tens with tens, etc.
- Add from right to left.

Q.

$$\begin{array}{r} \$2.75 \\ +\ \$1.45 \\ \hline \square \end{array}$$

A.



Hundredths:
5 + 5 = 10
10 hundredths = 1 tenth and 0 hundredths
⇒ 0 hundredths
Carry over the 1 tenth to the tenths column.

Tenths:
7 + 4 + 1 (carry over) = 12
12 tenths = 1 unit and 2 tenths
⇒ 2 tenths
Carry over the 1 unit to the units column.

Put the decimal point in the answer box under the other decimal points.

Units:
2 + 1 + 1 (carry over) = 4 ⇒ 4 units

a)

$$\begin{array}{r} {\scriptstyle 1} \\ \$1.50 \\ +\ \$3.50 \\ \hline \$\ . \end{array}$$

Hundredths first!

b)

$$\begin{array}{r} \$4.35 \\ +\ \$2.45 \\ \hline \square \end{array}$$

c)

$$\begin{array}{r} \$2.60 \\ +\ \$1.75 \\ \hline \square \end{array}$$

d)

$$\begin{array}{r} \$3.75 \\ +\ \$8.05 \\ \hline \square \end{array}$$

e)

$$\begin{array}{r} \$4.60 \\ +\ \$1.90 \\ \hline \square \end{array}$$

f)

$$\begin{array}{r} \$2.30 \\ +\ \$2.85 \\ \hline \square \end{array}$$

g)

$$\begin{array}{r} \$7.80 \\ +\ \$0.65 \\ \hline \square \end{array}$$

h)

$$\begin{array}{r} \$6.25 \\ +\ \$3.95 \\ \hline \square \end{array}$$

i)

$$\begin{array}{r} 0.64 \\ +\ 1.5 \\ \hline \square \end{array}$$

j)

$$\begin{array}{r} 4.1 \\ +\ 3.94 \\ \hline \square \end{array}$$

k)

$$\begin{array}{r} 2.05 \\ +\ 6.65 \\ \hline \square \end{array}$$

l)

$$\begin{array}{r} 4.8 \\ +\ 2.75 \\ \hline \square \end{array}$$

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Skill 9.8 Adding decimal numbers with carry over using columns (2).

Yellow 1 1 2 2 3 **3** 4 4
Red 1 1 2 **2** 3 3 4 4

m) 6.37 + 1.34 = ☐

n) 9.18 + 0.34 = ☐

o) 2.19 + 8.72 = ☐

p) 5.65 + 3.8 = ☐

q) 7.65 + 3.63 = ☐

r) 2.38 + 5.72 = ☐

s) 1.5 + 4.74 = ☐

t) 3.66 + 0.9 = ☐

u) 17.5 + 0.96 = ☐

v) 1.88 + 12.4 = ☐

w) 3.08 + 10.45 = ☐

x) 26.7 + 4.31 = ☐

y) 1.81 + 2.53 + 4.52 = ☐

z) 5.05 + 6.28 + 1.43 = ☐

A) 2.6 + 3.7 + 1.99 = ☐

B) 9.81 + 2.57 + 4.13 = ☐

C) 25.04 + 10.87 ++ 3.95 = ☐

D) 16.32 + 4.08 + 3.64 = ☐

E) 9.17 + 42.53 + 14.7 = ☐

F) 23.59 + 8.43 + 36.01 = ☐

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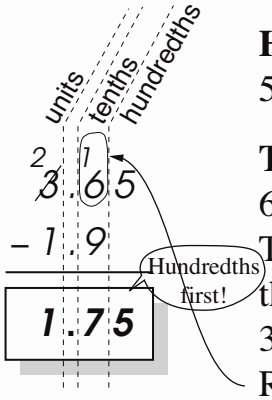
Skill 9.9 Subtracting decimal numbers with carry over using columns.

- Keep the units, decimal points, tenths and hundredths in their own column.
- Work from right to left.

Q.

$$\begin{array}{r} 3.65 \\ -\ 1.9 \\ \hline \end{array}$$

A.



Hundredths:
5 – 0 = 5 ⇒ 5 hundredths

Tenths:
6 – 9 = ? tenths.
To make the answer positive break down the 3 units.
3 units = 2 units and 10 tenths.
Re-group the 10 tenths with the 6 tenths to make 16 tenths.
Now...
16 – 9 = 7 ⇒ 7 tenths

Put the decimal point in the answer box under the other decimal points.

Units:
2 – 1 = 1 ⇒ 1 unit

a)

$$\begin{array}{r} 5\ 1 \\ 6.65 \\ -\ 2.8 \\ \hline \end{array}$$

Hundredths first!

b)

$$\begin{array}{r} 3.27 \\ -\ 1.54 \\ \hline \end{array}$$

c)

$$\begin{array}{r} 5.51 \\ -\ 2.36 \\ \hline \end{array}$$

d)

$$\begin{array}{r} 4.82 \\ -\ 3.84 \\ \hline \end{array}$$

e)

$$\begin{array}{r} 4.21 \\ -\ 3.04 \\ \hline \end{array}$$

f)

$$\begin{array}{r} 7.75 \\ -\ 1.08 \\ \hline \end{array}$$

g)

$$\begin{array}{r} 6.13 \\ -\ 0.62 \\ \hline \end{array}$$

h)

$$\begin{array}{r} 5.55 \\ -\ 1.73 \\ \hline \end{array}$$

i)

$$\begin{array}{r} 3.54 \\ -\ 0.97 \\ \hline \end{array}$$

j)

$$\begin{array}{r} 2.06 \\ -\ 1.29 \\ \hline \end{array}$$

k)

$$\begin{array}{r} 4.24 \\ -\ 1.98 \\ \hline \end{array}$$

l)

$$\begin{array}{r} 3.66 \\ -\ 2.88 \\ \hline \end{array}$$

m)

$$\begin{array}{r} 18.37 \\ -\ 5.62 \\ \hline \end{array}$$

n)

$$\begin{array}{r} 24.19 \\ -\ 11.73 \\ \hline \end{array}$$

o)

$$\begin{array}{r} 36.52 \\ -\ 20.18 \\ \hline \end{array}$$

p)

$$\begin{array}{r} 17.46 \\ -\ 8.09 \\ \hline \end{array}$$

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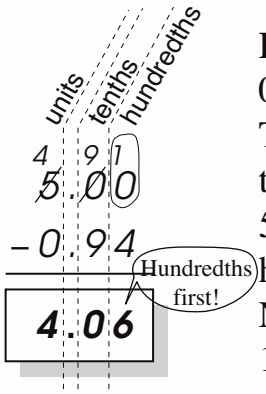
Skill 9.10 Subtracting a decimal number less than 1 from a whole number.

- Write the whole number first, with a decimal point and one or two zeros after it.
  Hint: The number does not change. 5 = 5.00
- Write the decimal number underneath.
- Line up the decimal points.
- Subtract using columns. (see skill 9.9, page 48)

Q. 5 – 0.94 =

A.



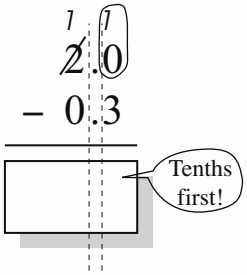
Hundredths:
0 – 4 = ? hundredths
To make the answer positive break down the 5 units:
5 units = 4 units + 9 tenths + 10 hundredths
Now...
10 – 4 = 6 ⇒ 6 hundredths

Tenths:
9 – 9 = 0 ⇒ 0 tenths

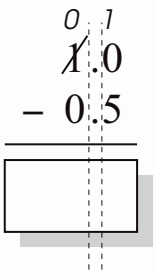
Put the decimal point in the answer box.

Units:
4 – 0 = 4 ⇒ 4 units

a) 2 – 0.3 =



b) 1 – 0.5 =



c) 7 – 0.8 =

7.0
– 0.8

d) 4 – 0.9 =

4.0
– 0.9

e) 3 – 0.25 =

3.00
– 0.25

f) 9 – 0.35 =

9.00
– 0.35

g) 6 – 0.61 =

6.00
– 0.61

h) 4 – 0.27 =

4.00
– 0.27

i) 3 – 0.18 =

3.00
– 0.18

j) 5 – 0.34 =

5.00
– 0.34

k) 2 – 0.83 =

2.00
– 0.83

l) 7 – 0.72 =

7.00
– 0.72

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Skill 9.11 Solving problems involving GST.

Note: Add the price and the GST to get the price including GST.

- Add the cents first.
- Convert cents to dollars where possible.
- Add the dollars next.
- Add the totals.

Conversion Fact - MONEY
100 cents = 1 dollar

Q. 10% GST must be added to a $21.90 CD. What is the price of the CD after adding $2.19 GST?

A. $21.90 + $2.19 =

90¢ + 19¢ = 109¢

109¢ = $ 1.09 +

$21.00 + $2.00 = $23.00

= **$24.09**

Cents:
90 + 19 = 109 cents
109 cents = 1 dollar and 9 cents
Dollars:
21 + 2 = 23 dollars
Totals:
$1.09 + $23.00 = $24.09

a) 10% GST must be added to a $13 book. What is the price of the book after adding $1.30 GST?

30¢ = 30¢ +

$13.00 + $1.00 = $14

$13.00 + $1.30 = $

b) 10% GST must be added to a $15.50 ring. What is the price of the ring after adding $1.55 GST?

+

$

c) The price of a tennis racquet is $45 including GST. If the price before GST is $40.91, what is the GST?

$

d) The price of a lipstick is $30 including GST. If the price before GST is $27.27, what is the GST?

$

e) The price of a USB stick is $24 including GST. If the price before GST is $21.82, what is the GST?

$

f) The price of a set of water colours is $120 including GST. If the price before GST is $109.09, what is the GST?

$

g) The price of a Lego set is $50 including GST. If the price before GST is $45.45, what is the GST?

$

h) The price of a show ticket is $135 including GST. If the price before GST is $122.73, what is the GST?

$

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Skill 9.12 Multiplying decimal numbers by powers of 10.

- To multiply by a power of 10, move the decimal point to the right one place for each 0.
- Remove the decimal point at the end of the number if no other digits follow.
- Remove all the zeros at the end of the decimal number if needed.
  Example: 15.6ØØ = 15.6

Q. $7.48 \times 10 =$ **A.** $7.48 \times 10 =$ (one zero, one place)
$= \mathbf{74.8}$

a) $5.3 \times 10 =$
$= 5.3 \times 10 =$ 53

b) $6.2 \times 10 =$
$=$ .....

c) $9.7 \times 10 =$
$=$ .....

d) $1.8 \times 10 =$
$=$ .....

e) $0.7 \times 10 =$
$=$ .....

f) $0.1 \times 10 =$
$=$ .....

g) $4.18 \times 10 =$
$=$ .....

h) $5.06 \times 10 =$
$=$ .....

i) $3.79 \times 10 =$
$=$ .....

j) $1.03 \times 10 =$
$=$ .....

k) $2.74 \times 10 =$
$=$ .....

l) $9.56 \times 10 =$
$=$ .....

m) $2.7 \times 100 =$ (two zeros, two places)
$= 2.70 \times 100 =$

n) $9.1 \times 100 =$
$=$ .....

o) $8.3 \times 100 =$
$=$ .....

p) $0.5 \times 100 =$
$=$ .....

q) $4.7 \times 100 =$
$=$ .....

r) $0.9 \times 100 =$
$=$ .....

s) $6.25 \times 100 =$
$=$ .....

t) $7.81 \times 100 =$
$=$ .....

u) $4.39 \times 100 =$
$=$ .....

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Skill 9.13 Multiplying decimal numbers by a single digit.

- Work from right to left.
- Count the total number of digits to the right of the decimal point in the question.
- Count over, from the right in the answer, the same number of digits and place the decimal point.

Q.

$$\begin{array}{r} 2.42 \\ \times \quad 4 \\ \hline \quad\quad \end{array}$$

A.

$$\begin{array}{r} {\scriptstyle 1} \\ 2.42 \\ \times \quad 4 \\ \hline 9\,68 \end{array}$$

$4 \times 2 = 8 \quad \Rightarrow 8$

$4 \times 4 = 16$

Write the 6 and carry the 1. $\Rightarrow 6$

$4 \times 2 = 8$ Add the 1 carry.

$8 + 1 = 9 \quad \Rightarrow 9$

$$\begin{array}{r} 2.42 \\ \times \quad 4 \\ \hline 9.68 \end{array}$$

(2 digits right of the decimal point)

(2 digits right of the decimal point)

Count the total number of digits to the right of the decimal point in the question. There are 2.

Count over 2 numbers from the right and place the decimal point in the answer.

a)

$$\begin{array}{r} 20.1 \\ \times \quad 3 \\ \hline 60.3 \end{array}$$

(1 digit right of the decimal point)

(1 digit right of the decimal point)

b)

$$\begin{array}{r} 21.2 \\ \times \quad 4 \\ \hline \quad\quad \end{array}$$

c)

$$\begin{array}{r} 12.3 \\ \times \quad 3 \\ \hline \quad\quad \end{array}$$

d)

$$\begin{array}{r} 34.2 \\ \times \quad 2 \\ \hline \quad\quad \end{array}$$

e)

$$\begin{array}{r} 24.1 \\ \times \quad 3 \\ \hline \quad\quad \end{array}$$

f)

$$\begin{array}{r} 12.6 \\ \times \quad 3 \\ \hline \quad\quad \end{array}$$

g)

$$\begin{array}{r} 22.4 \\ \times \quad 4 \\ \hline \quad\quad \end{array}$$

h)

$$\begin{array}{r} 16.4 \\ \times \quad 2 \\ \hline \quad\quad \end{array}$$

i)

$$\begin{array}{r} 1.03 \\ \times \quad 5 \\ \hline \quad\quad \end{array}$$

(2 digits right of the decimal point)

j)

$$\begin{array}{r} 1.52 \\ \times \quad 4 \\ \hline \quad\quad \end{array}$$

k)

$$\begin{array}{r} 2.51 \\ \times \quad 3 \\ \hline \quad\quad \end{array}$$

l)

$$\begin{array}{r} 1.23 \\ \times \quad 4 \\ \hline \quad\quad \end{array}$$

m)

$$\begin{array}{r} 2.53 \\ \times \quad 2 \\ \hline \quad\quad \end{array}$$

n)

$$\begin{array}{r} 3.26 \\ \times \quad 3 \\ \hline \quad\quad \end{array}$$

o)

$$\begin{array}{r} 4.03 \\ \times \quad 3 \\ \hline \quad\quad \end{array}$$

p)

$$\begin{array}{r} 5.01 \\ \times \quad 6 \\ \hline \quad\quad \end{array}$$

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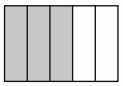
10. [Fractions]

Skill 10.1 Illustrating proper fractions.

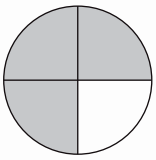
- Count the number of shaded parts.
- Count the total number of parts.
- Write the number of shaded parts over the total number of parts.

PROPER FRACTION



$\frac{3}{5}$ — numerator (the number of shaded parts); denominator (the number of total parts)

Q. What fraction of the circle is shaded?



A. $\frac{3}{4}$

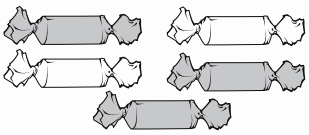
The circle is divided into 4 equal parts so the denominator of the fraction is 4.
Only 3 parts of the circle are shaded so the numerator is 3.
The fraction of the circle that is shaded is three fourths or $\frac{3}{4}$.

a) What fraction of the bar is shaded?

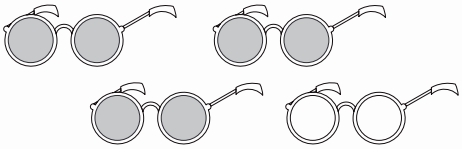
b) What fraction of the bar is shaded?

c) What fraction of the bar is shaded?

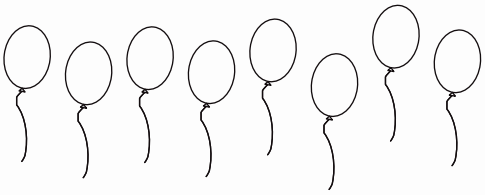
d) What fraction of this group of lollies is shaded?



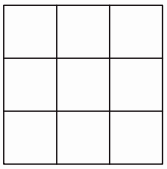
e) What fraction of this group of sunglasses is shaded?



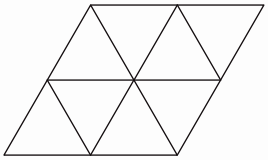
f) Shade in $\frac{5}{8}$ of this group of balloons.



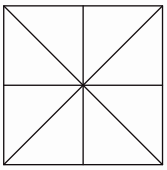
g) Shade in $\frac{4}{9}$ of this square.



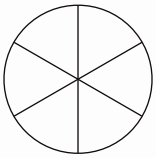
h) Shade in $\frac{3}{8}$ of this parallelogram.



i) Shade in $\frac{5}{8}$ of this square.



j) Shade in $\frac{1}{6}$ of this circle.



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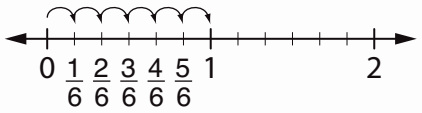
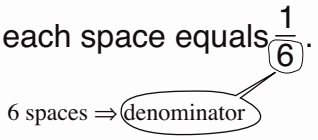
Skill 10.2 Reading a fraction on a number line.

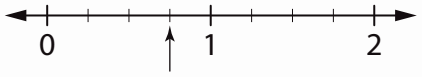
- Count the number of spaces between two consecutive whole numbers.
  The number of spaces tells you the value of the denominator.

  Example: If there are 6 spaces between the whole numbers, then each space equals $\frac{1}{6}$.



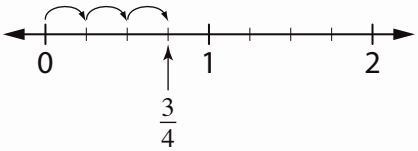


Q. Name the fraction shown by the arrow on the number line.

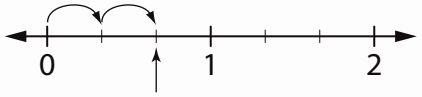


A. ***3/4***

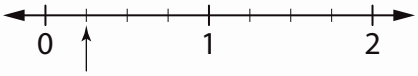
There are four spaces between 0 and 1.
Each space equals $\frac{1}{4}$.
The arrow points to $\frac{3}{4}$.



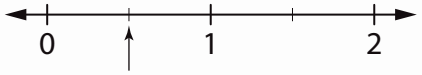
a) Name the fraction shown by the arrow on the number line.



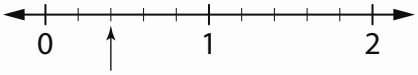
b) Name the fraction shown by the arrow on the number line.



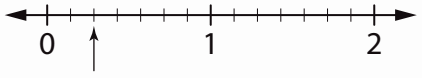
c) Name the fraction shown by the arrow on the number line.



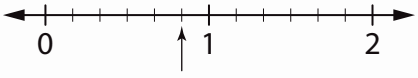
d) Name the fraction shown by the arrow on the number line.



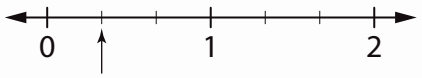
e) Name the fraction shown by the arrow on the number line.



f) Name the fraction shown by the arrow on the number line.

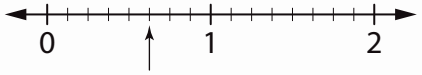


g) Name the fraction shown by the arrow on the number line.

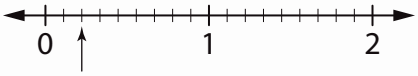


h) Name the fraction shown by the arrow on the number line.

i) Name the fraction shown by the arrow on the number line.



j) Name the fraction shown by the arrow on the number line.



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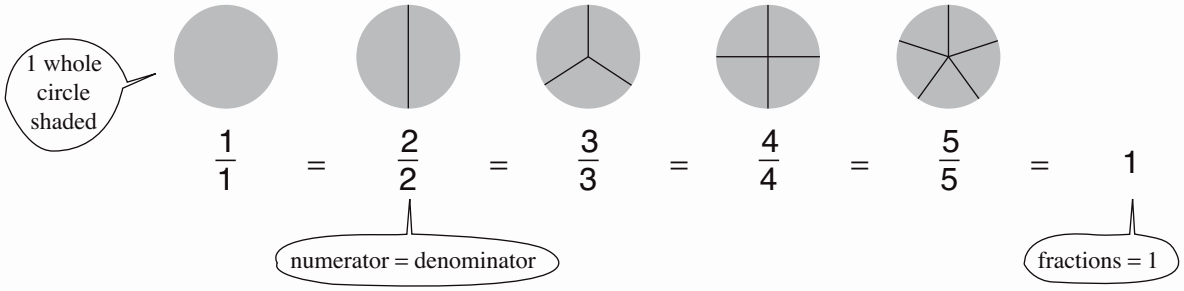
Skill 10.3 Writing 1 as a fraction.



Hint: A fraction equals 1 if the numerator is the same as the denominator.

Q. Which of the following equal 1?
A) $\frac{3}{3}$ B) $\frac{4}{3}$ C) $\frac{2}{3}$ D) $\frac{4}{4}$

A. ***A** and **D***

The only fractions in which the numerator is the same as the denominator are $\frac{3}{3}$ and $\frac{4}{4}$

$\frac{3}{3} = 1$ (three thirds make a whole)

$\frac{4}{4} = 1$ (four fourths or quarters make a whole)

a) Which of the following equal 1?
A) $\frac{3}{3}$ B) $\frac{1}{8}$ C) $\frac{8}{8}$ D) $\frac{3}{8}$

and

b) Which of the following equal 1?
A) $\frac{5}{2}$ B) $\frac{2}{2}$ C) $\frac{1}{2}$ D) $\frac{5}{5}$

and

c) Which of the following equal 1?
A) $\frac{6}{6}$ B) $\frac{4}{4}$ C) $\frac{5}{8}$ D) $\frac{4}{3}$

and

d) Which of the following equal 1?
A) $\frac{9}{7}$ B) $\frac{1}{9}$ C) $\frac{7}{7}$ D) $\frac{9}{9}$

and

e) Write a fraction equal to 1 that has a denominator of 8.

f) Write a fraction equal to 1 that has a denominator of 7.

g) Write a fraction equal to 1 that has a denominator of 5.

h) Write a fraction equal to 1 that has a denominator of 9.

i) Write a fraction equal to 1 that has a denominator of 12.

j) Write a fraction equal to 1 that has a denominator of 4.

k) Write a fraction equal to 1 that has a denominator of 15.

l) Write a fraction equal to 1 that has a denominator of 3.

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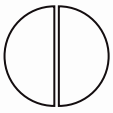
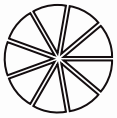
Skill 10.4 Finding the remaining fraction from a whole.

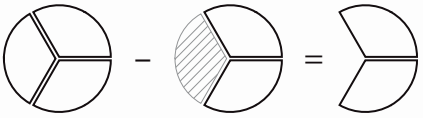
ONE WHOLE is made out of:

two halves	three thirds	four quarters	five fifths	six sixths	seven sevenths	eight eighths	nine ninths
							
$\frac{2}{2}$	$\frac{3}{3}$	$\frac{4}{4}$	$\frac{5}{5}$	$\frac{6}{6}$	$\frac{7}{7}$	$\frac{8}{8}$	$\frac{9}{9}$

- Subtract the fraction from the whole amount.

Q. If one third of the birthday cake was eaten, what fraction of the cake remains?

A. *one whole – one third =* $\frac{2}{3}$



Three thirds make the cake. If one third was eaten, there are two thirds left.

a) Alex has painted one half of the wall. What fraction of the wall is left to paint?

one whole - one half = ... $\frac{1}{2}$

b) Andrew has spent one sixth of his pocket money. What fraction of the money is left?

..... ☐

c) Three quarters of the lesson is over. What fraction of the lesson remains?

..... ☐

d) If three fifths of the show is over, what fraction of the performance is left?

..... ☐

e) If two sevenths of the students are boys, what fraction of the students are girls?

..... ☐

f) If two thirds of the birthday cake was eaten, what fraction of the cake remains?

..... ☐

g) Dad finished unpacking three eighths of the box. What fraction of the box is left to unpack?

..... ☐

h) Laura learnt seven tenths of the song on the piano. What fraction of the song is left to learn?

..... ☐

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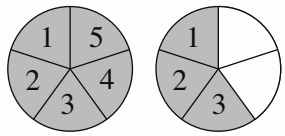
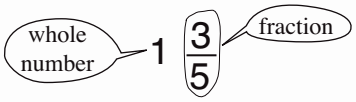
Skill 10.5 Recognising mixed numbers.



MIXED NUMBER



Recognising mixed numbers

To name the whole number:

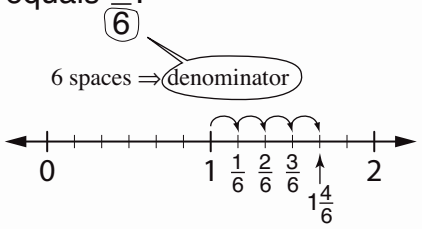
- Count the fully shaded shapes.

To name the fraction:

- Count the shaded parts of the last shape.
- Count the total parts of the last shape.
- Write the shaded parts over the total parts.

Reading mixed numbers on a number line

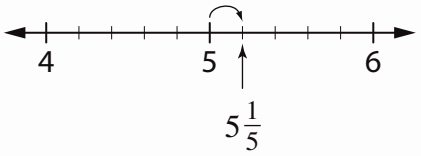
- Count the number of spaces between two consecutive whole numbers.
  The number of spaces tells you the value of the denominator.
  Example: If there are 6 spaces between the whole numbers, then each space equals $\frac{1}{6}$.



Q. Name the mixed number shown by the arrow on the number line.

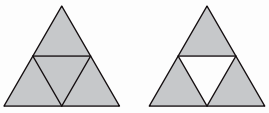
A. ***5 1/5***

There are five spaces between 5 and 6. Each space equals $\frac{1}{5}$.
The arrow points to $5\frac{1}{5}$.

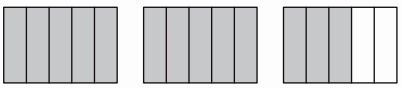


a) Name the mixed number represented by these shaded squares.

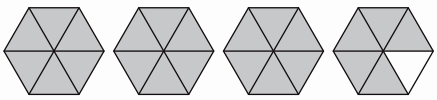
b) Name the mixed number represented by these shaded triangles.



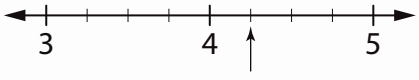
c) Name the mixed number represented by these shaded rectangles.



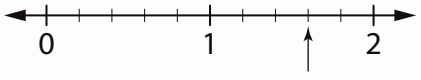
d) Name the mixed number represented by these shaded hexagons.



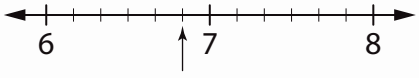
e) Name the mixed number shown by the arrow on the number line.



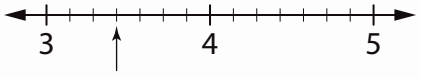
f) Name the mixed number shown by the arrow on the number line.



g) Name the mixed number shown by the arrow on the number line.



h) Name the mixed number shown by the arrow on the number line.



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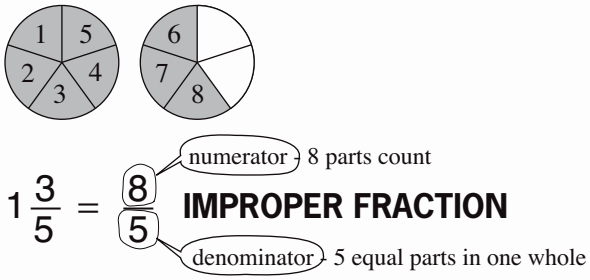
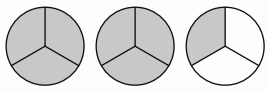
Skill 10.6 Converting mixed numbers to improper fractions.

- Consider the mixed number as two bits:
  - a whole number
  - a proper fraction
- Shade whole shapes to match the whole number.
- Partially shade the last shape to match the fraction.



Q. Shade the circles to show that $2\frac{1}{3} = \frac{7}{3}$

A.

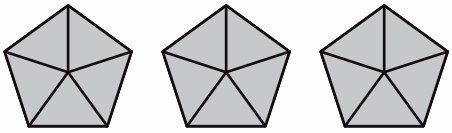


$2\frac{1}{3} = 1 + 1 + \frac{1}{3}$

$\frac{7}{3} = \frac{3}{3} + \frac{3}{3} + \frac{1}{3}$

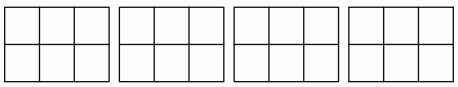
Shade two whole circles and a third of the remaining circle.
In total 7 thirds have been shaded.
This shows that $2\frac{1}{3} = \frac{7}{3}$

a) Shade the pentagons to show that $3 = \frac{15}{5}$

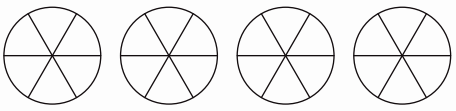


b) Shade the circles to show that $2\frac{2}{3} = \frac{8}{3}$

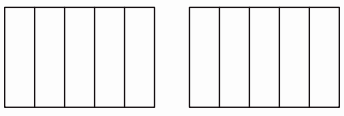
c) Shade the rectangles to show that $4 = \frac{24}{6}$



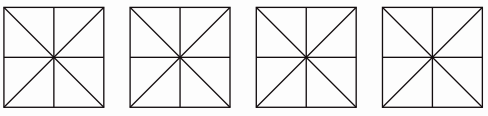
d) Shade the circles to show that $3\frac{1}{6} = \frac{19}{6}$



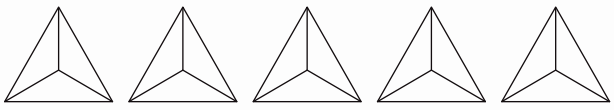
e) Shade the rectangles to show that $1\frac{3}{5} = \frac{8}{5}$



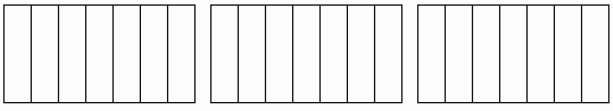
f) Shade the squares to show that $3\frac{5}{8} = \frac{29}{8}$



g) Shade the triangles to show that $4\frac{2}{3} = \frac{14}{3}$



h) Shade the rectangles to show that $2\frac{5}{7} = \frac{19}{7}$



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Skill 10.7 Modelling addition and subtraction of fractions with the same denominators, by using parts of a whole.

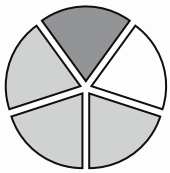
To add two fractions by using parts of a whole

- Colour the fraction bar to represent the second fraction.
- Count the number of shaded parts.
- Write this number as the top number of the result.
- Count the total number of parts.
- Write this number as the bottom number of the result.

To subtract two fractions by using parts of a whole

- Count the total number of light shaded parts.
- Write this number as the top number of the result.
- Count the total number of parts.
- Write this number as the bottom number of the result.

a) Complete the subtraction.

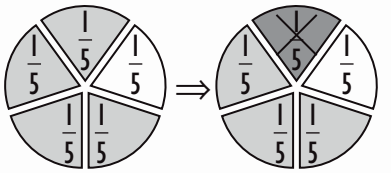


$\frac{4}{5}-\frac{1}{5}=$

A. $\frac{4}{5}-\frac{1}{5}=$

$=\frac{4}{5}-\frac{1}{5}=$

$=\frac{3}{5}$



$\frac{4}{5}$ $\frac{4}{5}-\frac{1}{5}=\frac{3}{5}$

a) Shade to complete the sum.

$\frac{3}{8}+\frac{2}{8}=$ ☐

b) Shade to complete the sum.

$\frac{3}{4}+\frac{1}{4}=$ ☐

c) Shade to complete the sum.

$\frac{1}{6}+\frac{3}{6}=$ ☐

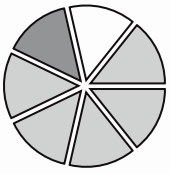
d) Shade to complete the sum.

$\frac{7}{10}+\frac{1}{10}=$ ☐

e) Complete the subtraction.

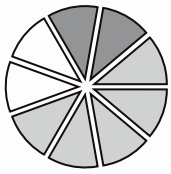
$\frac{5}{8}-\frac{2}{8}=$ ☐

f) Complete the subtraction.



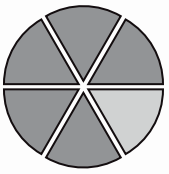
$\frac{6}{7}-\frac{1}{7}=$ ☐

g) Complete the subtraction.



$\frac{7}{9}-\frac{2}{9}=$ ☐

h) Complete the subtraction.



$\frac{6}{6}-\frac{5}{6}=$ ☐

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Skill 10.8 Comparing two fractions with the same denominators.

Using fraction bars

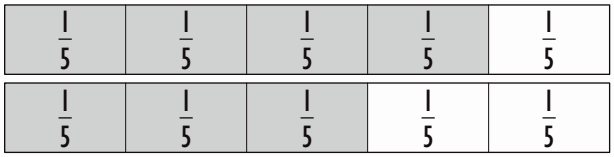
- Compare the size of the two shaded areas.
- Use < if the area showing the first fraction is smaller than the area showing the second fraction.
- Use = if the areas are equal.
- Use > if the area showing the first fraction is larger than the area showing the second fraction.

Using number lines

- Compare the position of the fractions on the number line.
- Use < if the first fraction is to the left of the second fraction on the number line.
- Use = if the two fractions are at the same point on the number line.
- Use > if the first fraction is to the right of the second fraction on the number line.

Hint: The fraction with the larger numerator is larger.

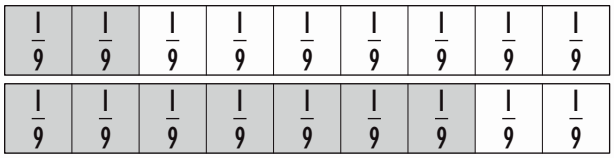
Q. Use <, = or > to make this true.



$\frac{4}{5}$ ☐ $\frac{3}{5}$

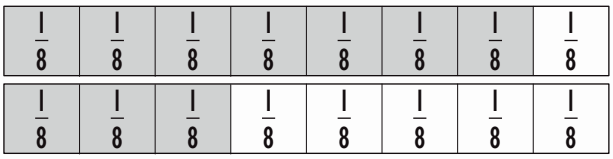
A. $\frac{4}{5} > \frac{3}{5}$ 4 is greater than 3.

a) Use <, = or > to make this true.



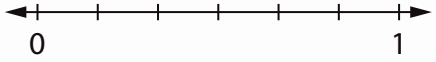
$\frac{2}{9}$ ☐ $\frac{7}{9}$

b) Use <, = or > to make this true.



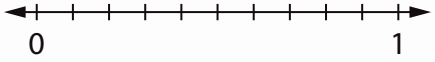
$\frac{7}{8}$ ☐ $\frac{3}{8}$

c) Show with arrows the fractions $\frac{4}{6}$ and $\frac{1}{6}$ on the number line.
Which fraction is greater?



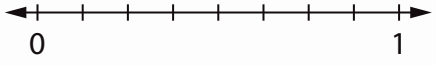
☐

d) Show with arrows the fractions $\frac{7}{10}$ and $\frac{5}{10}$ on the number line.
Which fraction is greater?



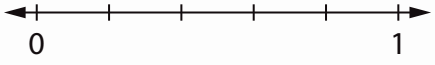
☐

e) Show with arrows the fractions $\frac{2}{8}$ and $\frac{7}{8}$ on the number line.
Which fraction is greater?



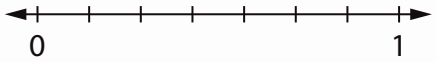
☐

f) Show with arrows the fractions $\frac{4}{5}$ and $\frac{5}{5}$ on the number line.
Which fraction is greater?



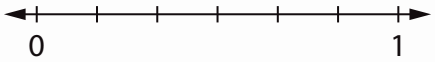
☐

g) Show with arrows the fractions $\frac{5}{7}$ and $\frac{1}{7}$ on the number line.
Which fraction is greater?



☐

h) Show with arrows the fractions $\frac{3}{6}$ and $\frac{5}{6}$ on the number line.
Which fraction is greater?



☐

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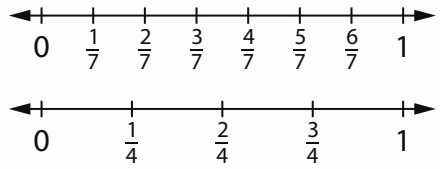
Skill 10.9 Comparing two fractions with the same numerators.

- Compare the position of the fractions on the number line.
- Use < if the first fraction is to the left of the second fraction on the number line.
- Use = if the two fractions are at the same point on the number line.
- Use > if the first fraction is to the right of the second fraction on the number line.

Hint: The fraction with the smaller denominator is larger.

<	is less than
=	is equal to
>	is greater than

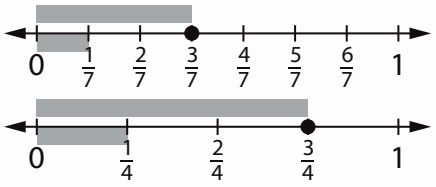
Q. Use <, = or > to make this true.



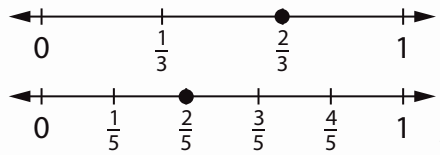
$\frac{3}{7}$ ☐ $\frac{3}{4}$

A. $\frac{3}{7} < \frac{3}{4}$

One seventh is smaller than one fourth. Therefore three sevenths is less than three fourths.

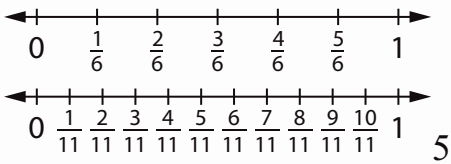


a) Use <, = or > to make this true.



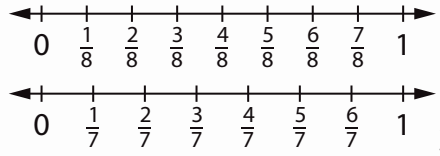
$\frac{2}{3}$ ☐ $\frac{2}{5}$

b) Use <, = or > to make this true.



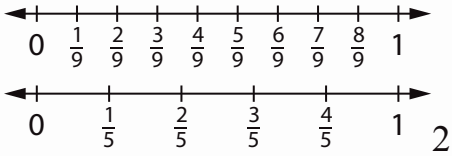
$\frac{5}{6}$ ☐ $\frac{5}{11}$

c) Use <, = or > to make this true.



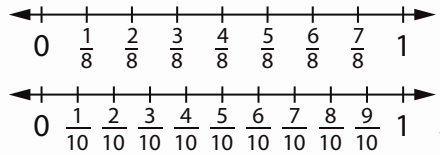
$\frac{3}{8}$ ☐ $\frac{3}{7}$

d) Use <, = or > to make this true.



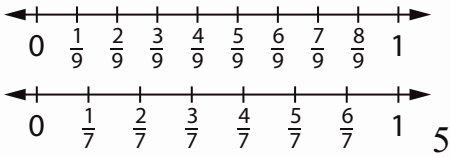
$\frac{2}{9}$ ☐ $\frac{2}{5}$

e) Use <, = or > to make this true.



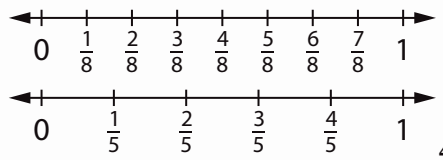
$\frac{7}{8}$ ☐ $\frac{7}{10}$

f) Use <, = or > to make this true.



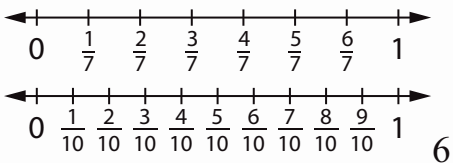
$\frac{5}{9}$ ☐ $\frac{5}{7}$

g) Use <, = or > to make this true.



$\frac{4}{8}$ ☐ $\frac{4}{5}$

h) Use <, = or > to make this true.



$\frac{6}{7}$ ☐ $\frac{6}{10}$

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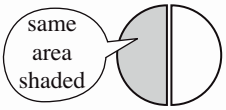
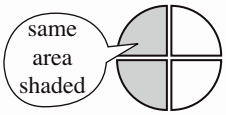
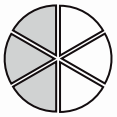
Skill 10.10 Completing equivalent fractions (1).



2 equal parts
1 part shaded
$\frac{1}{2}$ of the circle is shaded



4 equal parts
2 parts shaded
$\frac{2}{4}$ of the circle is shaded



6 equal parts
3 parts shaded
$\frac{3}{6}$ of the circle is shaded

8 equal parts
4 parts shaded
$\frac{4}{8}$ of the circle is shaded

The fractions $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$ and $\frac{4}{8}$ are all equivalent because they represent the same amount: $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$

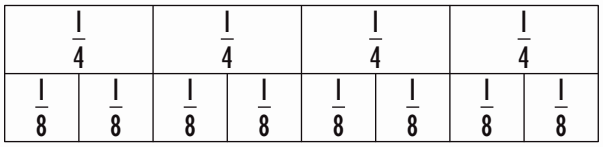
To find an equivalent fraction by drawing a diagram

- Draw two fraction bars one under the other.
- Divide each box into equal parts, as shown by the denominators.
- Shade both fraction bars to show the given fraction.
- Read the second fraction from the bottom fraction bar.

To find an equivalent fraction from a given diagram

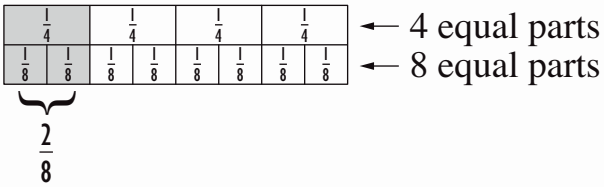
- Read the shaded fractions from both fraction bars.
- Complete the missing number in one of the fractions.

Q. Shade the bars to complete the equivalent fractions.

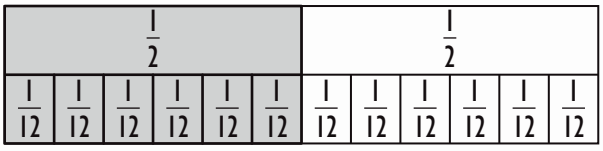


$\frac{1}{4} = \frac{\square}{8}$

A. $\frac{1}{4} = \frac{2}{8}$

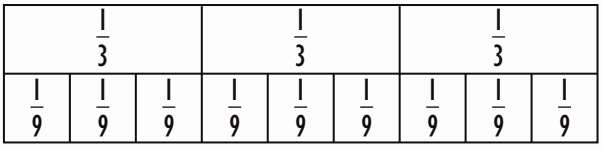


a) Shade the bars to complete the equivalent fractions.



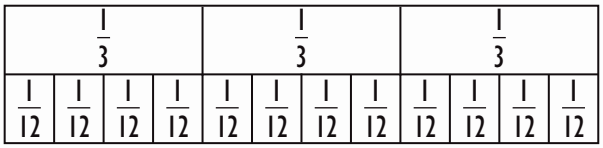
$\frac{1}{2} = \frac{\square}{12}$

b) Shade the bars to complete the equivalent fractions.



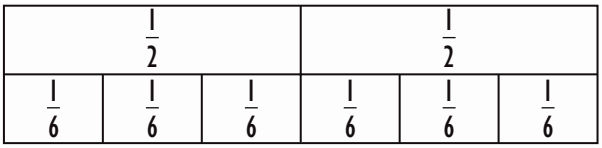
$\frac{2}{3} = \frac{\square}{9}$

c) Shade the bars to complete the equivalent fractions.



$\frac{1}{3} = \frac{\square}{12}$

d) Shade the bars to complete the equivalent fractions.



$\frac{1}{2} = \frac{\square}{6}$

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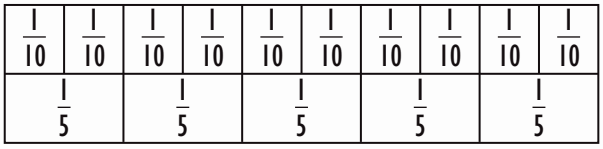
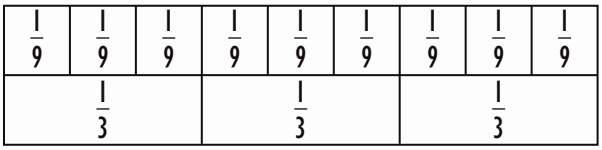
Skill 10.10 Completing equivalent fractions (2).

e) Shade the bars to complete the equivalent fractions.



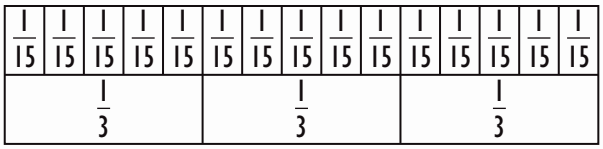
$$\frac{4}{10} = \frac{\square}{5}$$

f) Shade the bars to complete the equivalent fractions.



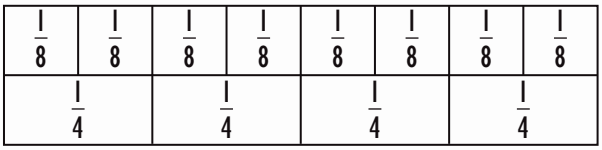
$$\frac{3}{9} = \frac{\square}{3}$$

g) Shade the bars to complete the equivalent fractions.



$$\frac{5}{15} = \frac{\square}{3}$$

h) Shade the bars to complete the equivalent fractions.



$$\frac{6}{8} = \frac{\square}{4}$$

i) Complete to form equivalent fractions:

$$\frac{4}{5} = \frac{16}{\square}$$

j) Complete to form equivalent fractions:

$$\frac{2}{3} = \frac{6}{\square}$$

k) Complete to form equivalent fractions:

$$\frac{1}{3} = \frac{\square}{9}$$

l) Complete to form equivalent fractions:

$$\frac{2}{6} = \frac{1}{\square}$$

m) Complete to form equivalent fractions:

$$\frac{1}{2} = \frac{\square}{8}$$

n) Complete to form equivalent fractions:

$$\frac{4}{10} = \frac{\square}{5}$$

o) Complete to form equivalent fractions:

$$\frac{2}{8} = \frac{1}{\square}$$

p) Complete to form equivalent fractions:

$$\frac{4}{12} = \frac{\square}{3}$$

q) Complete to form equivalent fractions:

$$\frac{6}{15} = \frac{\square}{5}$$

r) Complete to form equivalent fractions:

$$\frac{2}{7} = \frac{8}{\square}$$

s) Complete to form equivalent fractions:

$$\frac{2}{3} = \frac{\square}{18}$$

t) Complete to form equivalent fractions:

$$\frac{3}{10} = \frac{9}{\square}$$

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Skill 10.11 Comparing fractions (1).

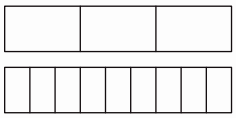
Using fraction bars

- Shade each fraction bar.
- Compare the shaded areas to decide which is the largest.
  Hint: The fraction with the largest shaded area is greater.

Using number lines

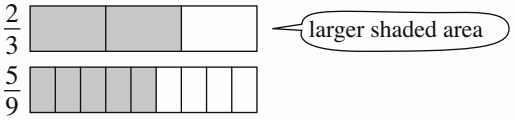
- Mark the positions of the fractions on the number line.
- Write the fraction whose position is to the right of the other fraction on the number line.

a) Shade the fraction bars to show $\frac{2}{3}$ and $\frac{5}{9}$. Which fraction is greater?



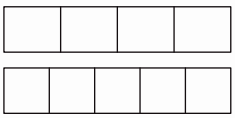
A. $\frac{2}{3}$

Shade two thirds of the first bar.
Shade five ninths of the second bar.
The fractions are close in value, however $\frac{2}{3}$ is greater than $\frac{5}{9}$.

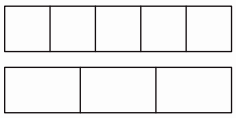


a) Shade the fraction bars to show $\frac{2}{3}$ and $\frac{3}{4}$. Which fraction is greater?

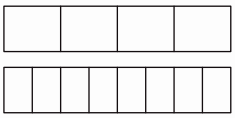
b) Shade the fraction bars to show $\frac{1}{4}$ and $\frac{2}{5}$. Which fraction is greater?



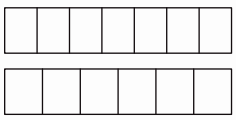
c) Shade the fraction bars to show $\frac{3}{5}$ and $\frac{2}{3}$. Which fraction is smaller?



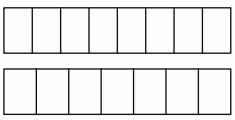
d) Shade the fraction bars to show $\frac{3}{4}$ and $\frac{7}{8}$. Which fraction is greater?



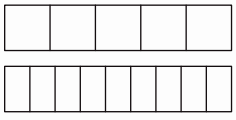
e) Shade the fraction bars to show $\frac{4}{7}$ and $\frac{5}{6}$. Which fraction is greater?



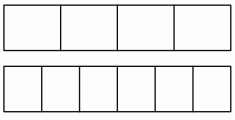
f) Shade the fraction bars to show $\frac{5}{8}$ and $\frac{4}{7}$. Which fraction is smaller?



g) Shade the fraction bars to show $\frac{3}{5}$ and $\frac{5}{9}$. Which fraction is greater?



h) Shade the fraction bars to show $\frac{3}{4}$ and $\frac{5}{6}$. Which fraction is smaller?



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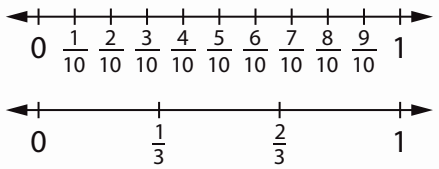
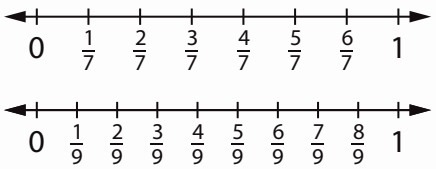
i)



Use <, = or > to make this statement true.

$\frac{3}{10} \square \frac{1}{3}$

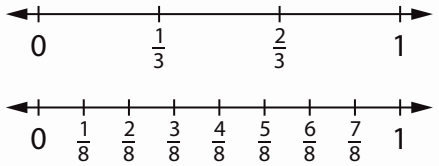
j)



Use <, = or > to make this statement true.

$\frac{5}{7} \square \frac{6}{9}$

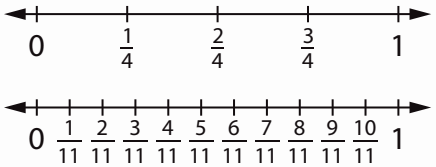
k)



Use <, = or > to make this statement true.

$\frac{2}{3} \square \frac{5}{8}$

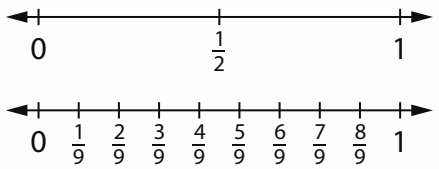
l)



Use <, = or > to make this statement true.

$\frac{3}{4} \square \frac{7}{11}$

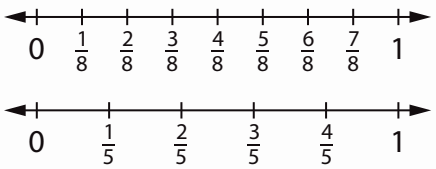
m)



Use <, = or > to make this statement true.

$\frac{1}{2} \square \frac{5}{9}$

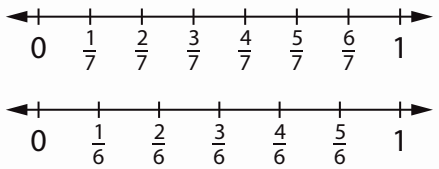
n)



Use <, = or > to make this statement true.

$\frac{4}{8} \square \frac{3}{5}$

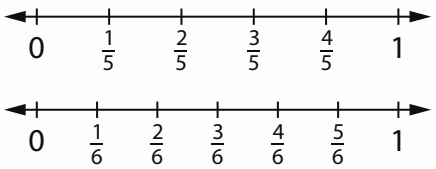
o)



Use <, = or > to make this statement true.

$\frac{3}{7} \square \frac{2}{6}$

p)



Use <, = or > to make this statement true.

$\frac{4}{5} \square \frac{5}{6}$

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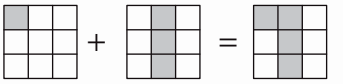
Skill 10.12 Adding fractions with the same denominators.

- Add the numerators (top numbers of the fractions).
  Note: Do not change the denominators.

Q. $\frac{1}{9}+\frac{3}{9}=$ **A.** ***4/9***

Add the fractions:
One ninth plus three ninths is four ninths.
Add only the top numbers.



one ninth + three ninths = four ninths

$\frac{1}{9} + \frac{3}{9} = \frac{4}{9}$

a) $\frac{1}{3}+\frac{1}{3}=$ ☐ **b)** $\frac{2}{7}+\frac{3}{7}=$ ☐ **c)** $\frac{2}{5}+\frac{2}{5}=$ ☐

d) $\frac{4}{9}+\frac{3}{9}=$ ☐ **e)** $\frac{1}{6}+\frac{4}{6}=$ ☐ **f)** $\frac{2}{4}+\frac{1}{4}=$ ☐

g) $\frac{1}{5}+\frac{3}{5}=$ ☐ **h)** $\frac{1}{8}+\frac{2}{8}=$ ☐ **i)** $\frac{2}{9}+\frac{2}{9}=$ ☐

j) $\frac{3}{8}+\frac{4}{8}=$ ☐ **k)** $\frac{3}{10}+\frac{4}{10}=$ ☐ **l)** $\frac{5}{12}+\frac{6}{12}=$ ☐

m) $\frac{1}{7}+\frac{5}{7}=$ ☐ **n)** $\frac{2}{9}+\frac{5}{9}=$ ☐ **o)** $\frac{1}{5}+\frac{1}{5}=$ ☐

p) $\frac{6}{13}+\frac{6}{13}=$ ☐ **q)** $\frac{7}{10}+\frac{2}{10}=$ ☐ **r)** $\frac{8}{11}+\frac{2}{11}=$ ☐

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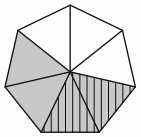
Skill 10.13 Subtracting fractions with the same denominators.

- Subtract the numerators (top numbers of the fractions).
  Note: Do not change the denominators.

Q. $\frac{4}{7} - \frac{2}{7} =$

A. $\frac{2}{7}$

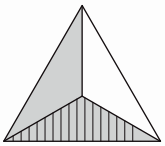
Subtract the fractions:
Four sevenths minus two sevenths is two sevenths.
Subtract only the top numbers.



four sevenths – two sevenths = two sevenths

$\frac{4}{7} - \frac{2}{7} = \frac{2}{7}$

a) $\frac{2}{3} - \frac{1}{3} =$ ☐



b) $\frac{4}{5} - \frac{1}{5} =$ ☐

c) $\frac{6}{9} - \frac{2}{9} =$ ☐

d) $\frac{6}{7} - \frac{3}{7} =$ ☐

e) $\frac{5}{8} - \frac{2}{8} =$ ☐

f) $\frac{3}{5} - \frac{2}{5} =$ ☐

g) $\frac{9}{10} - \frac{6}{10} =$ ☐

h) $\frac{8}{12} - \frac{3}{12} =$ ☐

i) $\frac{7}{11} - \frac{2}{11} =$ ☐

j) $\frac{11}{17} - \frac{1}{17} =$ ☐

k) $\frac{8}{15} - \frac{1}{15} =$ ☐

l) $\frac{9}{13} - \frac{5}{13} =$ ☐

m) $\frac{13}{15} - \frac{5}{15} =$ ☐

n) $\frac{13}{18} - \frac{2}{18} =$ ☐

o) $\frac{16}{20} - \frac{13}{20} =$ ☐

p) $\frac{4}{4} - \frac{1}{4} =$ ☐

q) $\frac{8}{9} - \frac{2}{9} =$ ☐

r) $\frac{5}{6} - \frac{2}{6} =$ ☐

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Skill 10.14 Simplifying fractions.

- Decide if the fraction can be simplified.
- Divide both the numerator and the denominator by the same number.
  Hint: If the numbers are both even then you can always start with dividing by 2.
  Example:

6 numerator (even)
8 denominator (even)

$\frac{6}{8} \overset{\div 2}{_{\div 2}} = \frac{3}{4}$

SIMPLIFYING FRACTIONS RULE
If both numbers, top (numerator) and bottom (denominator), can be divided by the same number then the fraction can be simplified.

- Continue dividing by any of the prime factors (2, 3, 5 ...) until the fraction can no longer be simplified.

Q. Simplify: $\frac{6}{10}$

A. $\frac{6}{10} \overset{\div 2}{_{\div 2}} = \frac{3}{5}$

Both 6 and 10 are even numbers.
They can be divided by 2.
The fraction can be simplified.

a) Simplify: $\frac{12}{18}$

$\frac{12}{18} \overset{\div 2}{_{\div 2}} = \frac{6}{9} \overset{\div 3}{_{\div 3}} =$ ☐

b) Simplify: $\frac{4}{6}$

..... ☐

c) Simplify: $\frac{9}{12}$

..... ☐

d) Simplify: $\frac{5}{10}$

..... ☐

e) Simplify: $\frac{3}{9}$

..... ☐

f) Simplify: $\frac{8}{14}$

..... ☐

g) Simplify: $\frac{10}{12}$

..... ☐

h) Simplify $\frac{9}{15}$

..... ☐

i) Simplify: $\frac{4}{20}$

..... ☐

j) Simplify: $\frac{15}{25}$

..... ☐

k) Simplify: $\frac{10}{25}$

..... ☐

l) Simplify: $\frac{20}{70}$

..... ☐

m) Which of the following fractions ***cannot*** be simplified?

A) $\frac{2}{15}$ B) $\frac{3}{15}$ C) $\frac{4}{15}$ D) $\frac{5}{15}$

and

n) Which of the following fractions ***cannot*** be simplified?

A) $\frac{4}{10}$ B) $\frac{6}{10}$ C) $\frac{7}{10}$ D) $\frac{9}{10}$

and

o) Which of the following fractions ***cannot*** be simplified?

A) $\frac{6}{18}$ B) $\frac{7}{18}$ C) $\frac{9}{18}$ D) $\frac{11}{18}$

and

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Skill 10.15 Finding a fraction of a whole number.

- First find one fraction of the number by dividing by the denominator.
- Then multiply the number of fractions you need by the result.

Example: Three fifths of 10?
First find one fifth of 10 by dividing 10 by 5. $10 \div 5 = 2$
Then find three fifths of 10 by mulyiplying 2 by 3. $2 \times 3 = 6$
So three fifths of 10 is 6.

Q. Eric kicked two thirds of his team's 12 goals. How many goals did he kick?

A. ***8***

Find one third of 12.
Divide 12 by 3. $12 \div 3 = 4$

Find two thirds of 12.
Multiplying 2 by 4. $2 \times 4 = 8$

a) Three fourths of the 28 students in the class are boys. How many boys are in the class?

one fourth of 28 = 28 ÷ 4 = 7

three fourths of 28 = 3 × 7 = ☐

b) Two fifths of the 50 children at the nursery had the flu. How many children had the flu?

one fifth of 50 =

two fifths of 50 = ☐

c) Ian scored five eighths of the 40 points on the test. How many points did he score?

one eighth of 40 =

☐

d) Five sixths of the 30 horses in the race jumped over the first hurdle. How many horses jumped the first hurdle?

☐

e) Of the 24 students in a class, one third are chosen for the school play.
How many students are chosen for the play?

☐

f) Of the 100 cakes at a party, seven tenths were eaten in the first hour.
How many cakes were eaten in the first hour?

☐

g) Of the 28 students in the class, two sevenths did not go to camp. How many students did not go to camp?

☐

h) Gina has finished reading five ninths of the 360 pages of her book. How many pages did Gina finish reading?

☐

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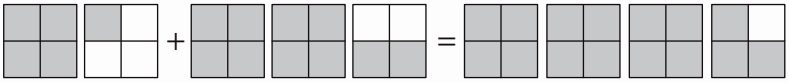
Skill 10.16 Adding mixed numbers with the same denominators.

- Add the whole numbers first.
- Then add the numerators (top numbers of the fractions).
  Note: Do not add the denominators (bottom numbers of the fractions).
- Write the result as a mixed number.

Q. $1\frac{1}{4}+2\frac{2}{4}=$

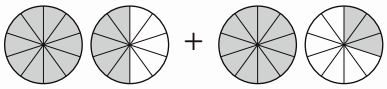
A. ***3 3/4***

Add the whole numbers first:
$1+2=3$
Add the fractions:
One fourth plus two fourths is three fourths.



$1\frac{1}{4}$ + $2\frac{2}{4}$ = $3\frac{3}{4}$

a) $1\frac{5}{10}+1\frac{3}{10}=$ ☐



b) $2\frac{3}{7}+3\frac{3}{7}=$ ☐

c) $4\frac{2}{8}+1\frac{5}{8}=$ ☐

d) $6\frac{3}{10}+2\frac{4}{10}=$ ☐

e) $3\frac{2}{5}+1\frac{1}{5}=$ ☐

f) $4\frac{1}{6}+3\frac{4}{6}=$ ☐

g) $2\frac{2}{9}+4\frac{3}{9}=$ ☐

h) $1\frac{5}{7}+3\frac{1}{7}=$ ☐

i) $2\frac{2}{11}+3\frac{5}{11}=$ ☐

j) $5\frac{2}{4}+3\frac{1}{4}=$ ☐

k) $2\frac{2}{9}+4\frac{3}{9}=$ ☐

l) $5\frac{3}{7}+3\frac{2}{7}=$ ☐

m) $1\frac{2}{8}+3\frac{5}{8}=$ ☐

n) $5\frac{8}{11}+2\frac{2}{11}=$ ☐

o) $3\frac{2}{6}+4\frac{1}{6}=$ ☐

p) $3\frac{4}{12}+3\frac{3}{12}=$ ☐

q) $4\frac{1}{14}+2\frac{8}{14}=$ ☐

r) $2\frac{3}{8}+6\frac{4}{8}=$ ☐

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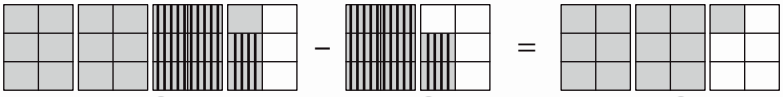
Skill 10.17 Subtracting mixed numbers.

- Subtract the whole numbers first.
  Hint: You may need to convert 1 whole number to an equivalent fraction.
  Example: $1 = \frac{5}{5}$ one whole equals five fifths
- Then subtract the numerators (top numbers of the fractions).
  Note: Do not subtract the denominators (bottom numbers of the fractions).

Q. $3\frac{3}{6} - 1\frac{2}{6} =$

A. ***2 1/6***

Subtract the whole numbers first:
$3 - 1 = 2$
Subtract the fractions:
Three sixths take away two sixths is one sixth.



$3\frac{3}{6} - 1\frac{2}{6} = 2\frac{1}{6}$

a) $3\frac{7}{10} - 1\frac{3}{10} =$ ☐

b) $5\frac{6}{7} - 2\frac{1}{7} =$ ☐

c) $4\frac{5}{8} - 1\frac{4}{8} =$ ☐

d) $6\frac{9}{10} - 3\frac{2}{10} =$ ☐

e) $7\frac{3}{5} - 5\frac{1}{5} =$ ☐

f) $3\frac{5}{6} - 2\frac{3}{6} =$ ☐

g) $8\frac{7}{9} - 6\frac{2}{9} =$ ☐

h) $6\frac{3}{7} - 2\frac{2}{7} =$ ☐

i) $5\frac{10}{11} - 3\frac{6}{11} =$ ☐

j) $5\frac{3}{4} - 4\frac{2}{4} =$ ☐

k) $4\frac{8}{9} - 2\frac{6}{9} =$ ☐

l) $7\frac{5}{7} - 3\frac{2}{7} =$ ☐

m) $3\frac{5}{6} - 2\frac{4}{6} =$ ☐

n) $2\frac{7}{8} - 1\frac{6}{8} =$ ☐

o) $5\frac{2}{3} - 1\frac{1}{3} =$ ☐

p) $6\frac{8}{12} - 3\frac{3}{12} =$ ☐

q) $5\frac{6}{7} - 3\frac{1}{7} =$ ☐

r) $8\frac{7}{15} - 5\frac{3}{15} =$ ☐

s) $3\frac{7}{8} - 1\frac{2}{8} =$ ☐

t) $5\frac{9}{11} - 2\frac{4}{11} =$ ☐

u) $4\frac{4}{6} - 3\frac{1}{6} =$ ☐

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11. [Decimals / Fractions]

Skill 11.1 Finding equivalent decimal place values.

To change from **smaller** units to **larger** units

- Divide by the conversion factor (because you need less).

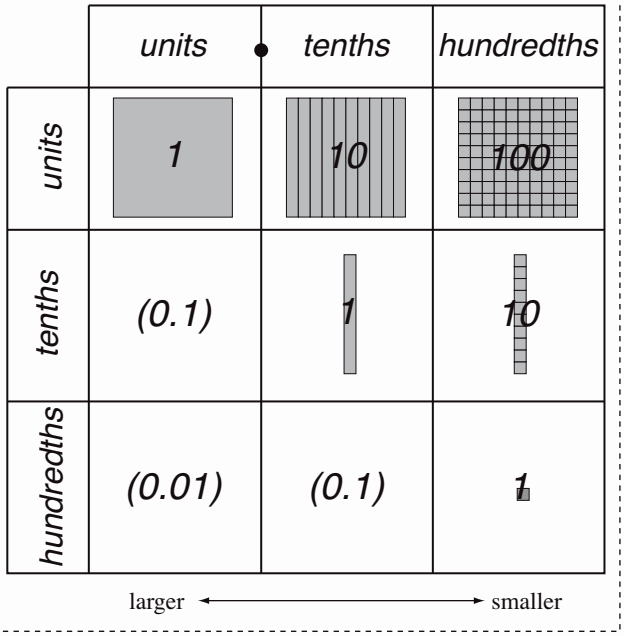
  Example: To change 40 hundredths to tenths
  ÷ by 10

To change from **larger** units to **smaller** units

- Multiply by the conversion factor (because you need more).

  Example: To change 4 units to tenths
  × by 10

  Hint: Conversion Factors
  1 unit = 10 tenths = 100 hundredths
  1 tenth = 10 hundredths



Q. four = ☐ hundredths

A. $4 \times 100 = \mathbf{400}$

Units are larger than hundredths so you need to multiply.
$4 \times 100 = 400$

a) 8 tenths = ☐ hundredths

larger to smaller so multiply by 10

$8 \times 10 = 80$

b) one = ☐ tenths

c) one = ☐ hundredths

d) six = ☐ tenths

e) seven = ☐ tenths

f) three = ☐ hundredths

g) 2 tenths = ☐ hundredths

h) 4 tenths = ☐ hundredths

i) five = ☐ tenths

j) six = ☐ hundredths

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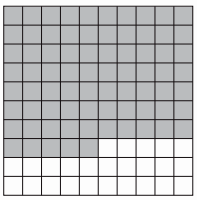
Skill 11.2 Expressing tenths and hundredths as fractions.

- Write the number of tenths as the number out of 10.
- Write the number of hundredths as the number out of 100.
- Write the number out of 10 or 100 as the top of the fraction (numerator).

Q. 75 hundredths =

□ out of 100 = $\frac{\square}{100}$

A. ***75*** *out of 100* = $\frac{75}{100}$



75 hundredths is the same as 75 out of 100 or $\frac{75}{100}$

a) 6 tenths =

6 out of 10 = $\frac{\square}{10}$

b) 3 tenths =

□ out of 10 = $\frac{\square}{10}$

c) 9 tenths =

□ out of 10 = $\frac{\square}{10}$

d) 5 tenths =

□ out of 10 = $\frac{\square}{10}$

e) 1 tenth =

□ out of 10 = $\frac{\square}{10}$

f) 7 tenths =

□ out of 10 = $\frac{\square}{10}$

g) 8 tenths =

□ out of 10 = $\frac{\square}{10}$

h) 3 tenths =

□ out of 10 = $\frac{\square}{10}$

i) 4 tenths =

□ out of 10 = $\frac{\square}{10}$

j) 38 hundredths =

□ out of 100 = $\frac{\square}{100}$

k) 12 hundredths =

□ out of 100 = $\frac{\square}{100}$

l) 6 hundredths =

□ out of 100 = $\frac{\square}{100}$

m) 19 hundredths =

□ out of 100 = $\frac{\square}{100}$

n) 9 hundredths =

□ out of 100 = $\frac{\square}{100}$

o) 76 hundredths =

□ out of 100 = $\frac{\square}{100}$

p) 2 hundredths =

□ out of 100 = $\frac{\square}{100}$

q) 44 hundredths =

□ out of 100 = $\frac{\square}{100}$

r) 93 hundredths =

□ out of 100 = $\frac{\square}{100}$

s) 1 hundredth =

□ out of 100 = $\frac{\square}{100}$

t) 47 hundredths =

□ out of 100 = $\frac{\square}{100}$

u) 29 hundredths =

□ out of 100 = $\frac{\square}{100}$

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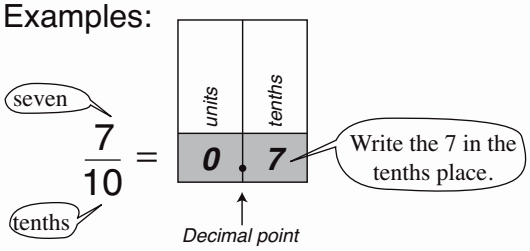
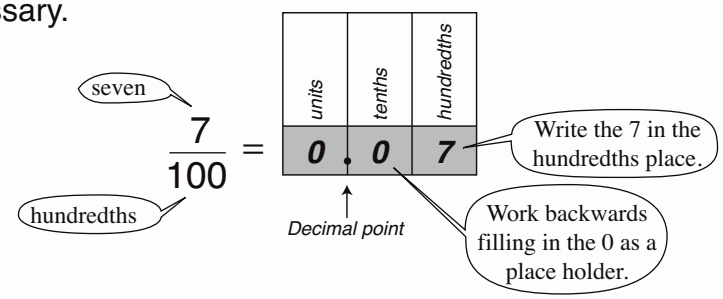
Skill 11.3 Writing a fraction as a decimal number.

When the denominator **is** a power of 10:

- Say the fraction out loud using tenths or hundredths.
- Write the last digit of the numerator in the place spoken of in the denominator.
- Fill in the numerator working backwards to the decimal point.
- Use zeros as place holders where necessary.

Examples:



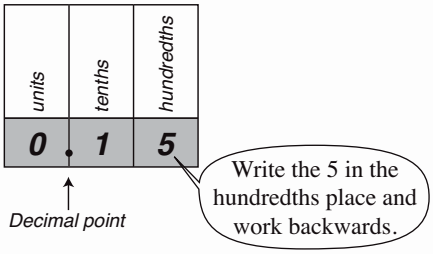


Hint: The number of zeros in the denominator shows the number of digits after the decimal point.

$\frac{7}{10} = 0.\underline{7}$ $\qquad$ $\frac{7}{100} = 0.\underline{0}\underline{7}$

Q. Write $\frac{15}{100}$ as a decimal. **A.** ***0.15***

Read as: fifteen hundredths



a) Which of these decimal numbers equals $\frac{5}{10}$?
A) 1.5 B) 1.05 C) 0.5

b) Which of these decimal numbers equals $\frac{2}{10}$?
A) 2 B) 0.2 C) 2.0

c) Which of these decimal numbers equals $\frac{35}{100}$?
A) 3.05 B) 3.5 C) 0.35

d) Write $\frac{6}{10}$ as a decimal.

e) Write $\frac{1}{10}$ as a decimal.

f) Write $\frac{8}{100}$ as a decimal.

g) Write $\frac{27}{100}$ as a decimal.

h) Write $\frac{50}{100}$ as a decimal.

i) Write $\frac{147}{1000}$ as a decimal.

j) Write $\frac{9}{100}$ as a decimal.

k) Write $\frac{13}{100}$ as a decimal.

l) Write $\frac{68}{1000}$ as a decimal.

m) Complete the table.

Decimal	Fraction
	$\frac{7}{10}$

n) Complete the table.

Decimal	Fraction
	$\frac{13}{100}$

o) Complete the table.

Decimal	Fraction
	$\frac{403}{1000}$

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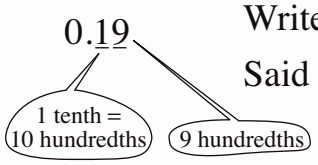
Skill 11.4 Writing a decimal number as a fraction.

- From left to right (ignoring zeros and the decimal point) write the digits as the numerator.
- Use the place value of the last digit of the decimal number to determine the size of the denominator. (see skill 11.3, page 75)

Q. Write 0.19 as a fraction.

A. $0.19 = \frac{19}{100}$



Write 19 at the top of the fraction.
The nine is in the hundredths place.
Write 100ths as the denominator.
Said as: $\frac{19}{100}$ "nineteen hundredths"

a) Write 0.5 as a fraction.

5 tenths

b) Write 0.9 as a fraction.

c) Write 0.7 as a fraction.

d) Which of these fractions equals 0.8?

A) $\frac{8}{10}$ B) $\frac{18}{100}$ C) $\frac{80}{10}$

e) Which of these fractions equals 0.13?

A) $\frac{13}{100}$ B) $\frac{3}{10}$ C) $\frac{31}{100}$

f) Which of these fractions equals 0.23?

A) $\frac{3}{10}$ B) $\frac{2}{100}$ C) $\frac{23}{100}$

g) Which of these fractions equals 0.7?

A) $\frac{70}{10}$ B) $\frac{700}{100}$ C) $\frac{7}{10}$

h) Which of these fractions equals 0.45?

A) $\frac{45}{100}$ B) $\frac{4}{10}$ C) $\frac{54}{100}$

i) Which of these fractions equals 0.05?

A) $\frac{5}{10}$ B) $\frac{5}{100}$ C) $\frac{50}{100}$

j) Write 0.3 as a fraction.

k) Write 0.07 as a fraction.

l) Write 0.41 as a fraction.

m) Write 0.17 as a fraction.

n) Write 0.006 as a fraction.

o) Write 0.057 as a fraction.

p) Complete the table.

Decimal	Fraction
0.43	

q) Complete the table.

Decimal	Fraction
0.06	

r) Complete the table.

Decimal	Fraction
0.052	

s) Complete the table.

Decimal	Fraction
0.9	

t) Complete the table.

Decimal	Fraction
0.24	

u) Complete the table.

Decimal	Fraction
0.125	

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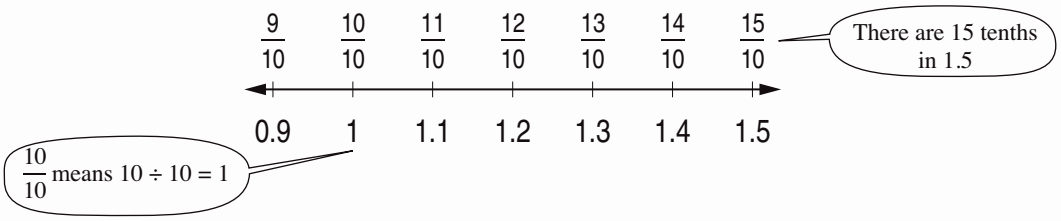
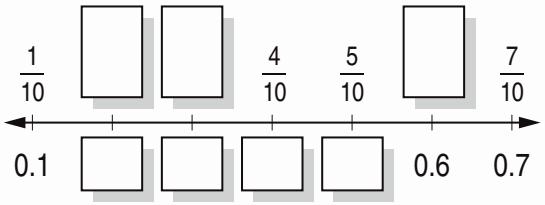
Skill 11.5 Converting between fractions and decimals using a number line.

FRACTIONS and DECIMALS on the NUMBER LINE

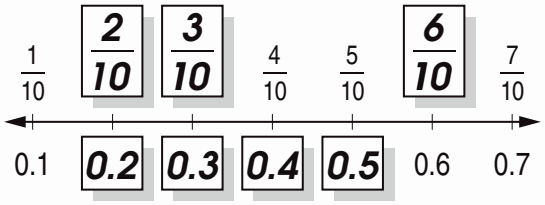


- Start from the left to complete the number line.
- Use the place value of the last digit of the decimal number to determine the size of the denominator of the fraction above. (see skill 11.3, page 75)

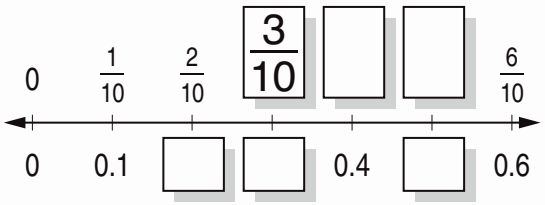
Q. Complete the number line.



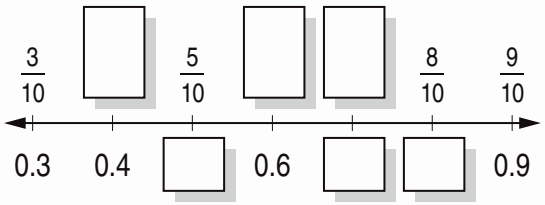
A.



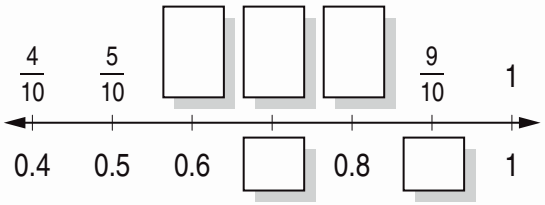
a) Complete the number line.



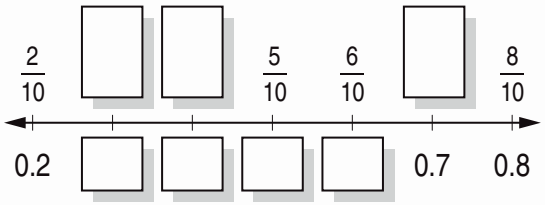
b) Complete the number line.



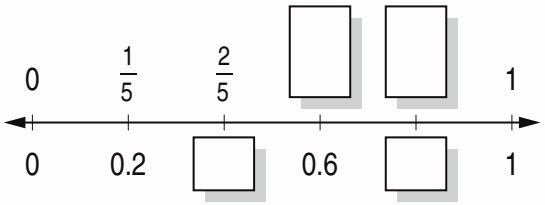
c) Complete the number line.



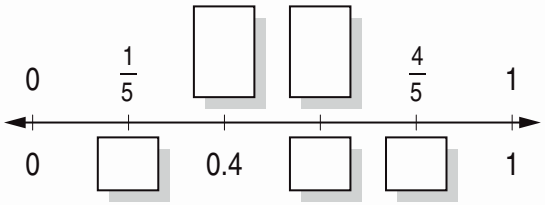
d) Complete the number line.



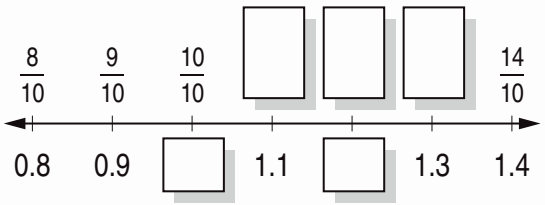
e) Complete the number line.



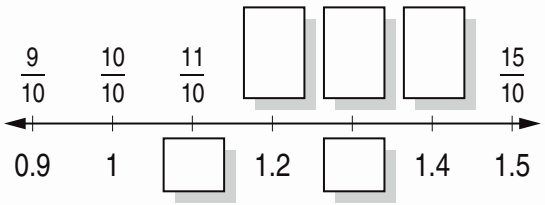
f) Complete the number line.



g) Complete the number line.



h) Complete the number line.



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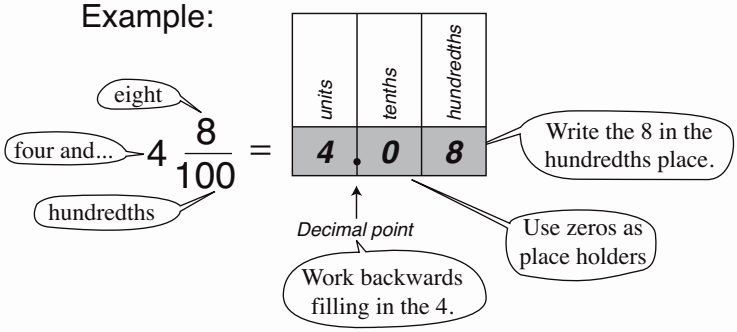
Skill 11.6 Writing a mixed number as a decimal number.

When the denominator **is** a power of 10:

- Write the whole number first.
- Write the decimal point.
- Write the fraction as a decimal number.
  (see skill 11.3, page 75)

Example:



Hint: The number of zeros in the denominator shows the number of digits after the decimal point. $\frac{16}{1000} = 0.0\underline{1}\underline{6}$

When the denominator **is not** a power of 10:

- Divide the numerator by the denominator.

$\frac{13}{5}$ = 13 ÷ 5 = 2.6

$5\overline{)13.0}$ (1, 3)

Hint: 13 = 13.0

Q. Write the mixed number $8\frac{24}{100}$ as a decimal.

A. ***8.24***

Write the whole number, 8 units.
Write the decimal point.
Write the numerator 24, with the last digit 4 in the hundredths place.
[No zero place holders are necessary.]

Read as: Eight and twenty-four hundredths

a) Write the mixed number $5\frac{7}{10}$ as a decimal.

b) Write the mixed number $2\frac{46}{100}$ as a decimal.

c) Write the mixed number $3\frac{9}{10}$ as a decimal.

d) Write the mixed number $3\frac{2}{100}$ as a decimal.

e) Write the mixed number $6\frac{3}{10}$ as a decimal.

f) Write the mixed number $3\frac{1}{2}$ as a decimal.

g) Write the mixed number $2\frac{1}{5}$ as a decimal.

h) Write the mixed number $4\frac{1}{2}$ as a decimal.

i) Write the mixed number $3\frac{3}{5}$ as a decimal.

j) Write the mixed number $1\frac{1}{4}$ as a decimal.

k) Write the mixed number $2\frac{4}{5}$ as a decimal.

l) Write the mixed number $6\frac{3}{4}$ as a decimal.

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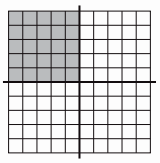
Skill 11.7 Converting fractions in word form to decimals.

- Use 1 × 10 grids to visualise whole numbers and tenths.

a half = 5 tenths = 0.5

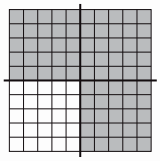
- Use 10 × 10 grids to visualise whole numbers and hundredths.



a quarter = 25 hundredths = 0.25

Q. Write as a decimal: three quarters.

A. *three quarters* =
= *75 hundredths*
= ***0.75***



a) Write as a decimal: one and a half

b) Write as a decimal: three and a half

c) Write as a decimal: eight and a half

d) Write as a decimal: one quarter

e) Write as a decimal: four and a quarter

f) Write as a decimal: seven and a quarter

g) Write as a decimal: five and three quarters

h) Write as a decimal: one and three quarters

i) Write as a decimal: six and three quarters

j) Write as a decimal: six and one tenth

k) Write as a decimal: two and three tenths

l) Write as a decimal: nine and seven tenths

m) Write as a decimal: two and one fifth

n) Write as a decimal: five and two fifths

o) Write as a decimal: four and three fifths

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Skill 11.8 Writing an improper fraction as a decimal.

When the denominator **is** a power of 10:

- Divide the numerator by 10, 100 or 1000 by moving the decimal point the same number of places to the left as there are zeros.
  Examples:

÷ by 10 (1 zero ⇒ 1 place left) $16.0 \Rightarrow 1.6$
÷ by 100 (2 zeros ⇒ 2 places left) $016.0 \Rightarrow 0.16$

Hints: Fractions are just divisions.
There is a decimal point and zeros which are not written, at the end of any whole number.
The number does not change: $16 = 16.0$

Example: $\frac{16}{10} = 16 \div 10$
$= 16.0 \div 10$
$= 16.0 \div 10$
$= 1.6$

When the denominator is **not** a power of 10:

- Multiply both the numerator and denominator by the same number to make the denominator a power of 10.
  Example:

$\frac{74}{50} = \frac{74}{50} \overset{\times 2}{_{\times 2}} = \frac{148}{100}$ (power of 10)

- Then divide by moving the decimal point.

Example: $\frac{148}{100} = 148 \div 100$
$= 148.0 \div 100$
$= 1.48$

April 11th 2018 Lesson

Q. Write the improper fraction $\frac{12}{5}$ as a decimal.

A. $\frac{12}{5} \overset{\times 2}{_{\times 2}} = \frac{24}{10}$
$= 24.0 \div 10$
$= 24.0 \div 10$
$= \mathbf{2.4}$

Multiply the denominator and the numerator by 2 to make the denominator a power of 10.

a) Write the improper fraction $\frac{27}{10}$ as a decimal.

$27 \div 10$

$27. \div 10 =$ ☐

b) Write the improper fraction $\frac{15}{10}$ as a decimal.

☐

c) Write the improper fraction $\frac{38}{10}$ as a decimal.

☐

d) Write the improper fraction $\frac{136}{100}$ as a decimal.

☐

e) Write the improper fraction $\frac{245}{100}$ as a decimal.

☐

f) Write the improper fraction $\frac{8}{5}$ as a decimal.

☐

g) Write the improper fraction $\frac{11}{2}$ as a decimal.

☐

h) Write the improper fraction $\frac{9}{2}$ as a decimal.

☐

i) Write the improper fraction $\frac{9}{5}$ as a decimal.

☐

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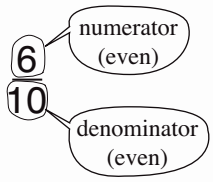
Skill 11.9 Writing a decimal number as a fraction in simplest form.

- Write the decimal as a fraction with a power of 10 as the denominator.
- Decide if the fraction can be simplified.
  If both numbers, top (numerator) and bottom (denominator), can be divided by the same number then the fraction can be simplified.
  Hint: If the numbers are both even then you can start with dividing by 2.



- Divide both the numerator and the denominator by the same number.

$$\frac{6}{10}\ \begin{matrix}\div 2\\ \div 2\end{matrix} = \frac{3}{5}$$

Q. Write 0.02 as a fraction in simplest form.

A. $0.02 = \frac{2}{100}$ ← Write 0.02 as a fraction over 100.

$\frac{2}{100}\ \begin{matrix}\div 2\\ \div 2\end{matrix} = \frac{\mathbf{1}}{\mathbf{50}}$ ← Divide the numerator and the denominator by 2.

a) Write 0.4 as a fraction in simplest form.

$= \frac{4}{10}\ \begin{matrix}\div 2\\ \div 2\end{matrix}$ ..... ☐

b) Write 0.75 as a fraction in simplest form.

= ..... ☐

c) Write 0.8 as a fraction in simplest form.

= ..... ☐

d) Write 0.2 as a fraction in simplest form.

= ..... ☐

e) Write 0.15 as a fraction in simplest form.

= ..... ☐

f) Write 0.36 as a fraction in simplest form.

= ..... ☐

g) Write 0.5 as a fraction in simplest form.

= ..... ☐

h) Write 0.45 as a fraction in simplest form.

= ..... ☐

i) Write 0.06 as a fraction in simplest form.

= ..... ☐

j) Write 0.62 as a fraction in simplest form.

= ..... ☐

k) Write 0.88 as a fraction in simplest form.

= ..... ☐

l) Write 0.12 as a fraction in simplest form.

= ..... ☐

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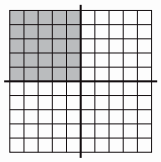
Skill 11.10 Converting between fractions, decimals and percentages by using diagrams (1).

Fraction as Percentage

- Find the equivalent fraction which has a denominator of 100.

  Hint: Percent means "fraction of one hundred".

  Example: One quarter = 25 out of 100



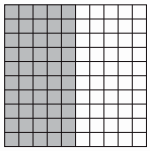
$= \frac{25}{100}$

$= \mathbf{25\%}$

Decimal as percentage

- Move the decimal point 2 places to the right.
- Use zeros as place holders to write the decimal.
- Add the percentage sign.

  Example: 0.5 = 0.5000 = **50%**



Percentage as Fraction

Hint: Percent means "fraction of one hundred".

Examples: 50% = 50 out of 100

$= \frac{50}{100}$

$= \mathbf{\frac{1}{2}}$

Examples: 75% = 75 out of 100

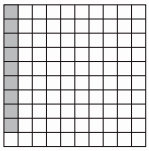
$= \frac{75}{100}$

$= \mathbf{\frac{3}{4}}$

Percentage as decimal

- Remove the percent sign.
- Place the decimal point after the number.
- Move the decimal point 2 places to the left.
- Use zeros as place holders to write the decimal.

  Example: 9% = 9.00 = **0.09**

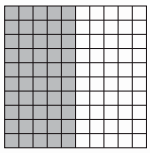


Q. Write 50% in decimal form.

A. *50%*
= 050.0
= 050.0
= 0.5

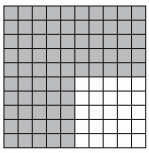
Remove the % sign.
Place the decimal point and add zeros either side of the number.
Move the decimal point 2 places to the left.

a) One half is what percentage?



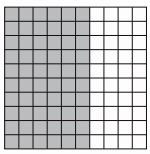
%

b) Three quarters is what percentage?



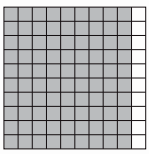
%

c) Six tenths is what percentage?



%

d) Nine tenths is what percentage?



%

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Skill 11.10 Converting between fractions, decimals and percentages by using diagrams (1).

e) Write 10% in decimal form.

$\overset{\curvearrowright}{0}10.0 =$ .....

f) Write 25% in decimal form.

.....

g) Write 75% in decimal form.

.....

h) Write 15% in decimal form.

.....

i) Write 0.4 as a percentage.

..... %

j) Write 0.6 as a percentage.

..... %

k) Write 0.25 as a percentage.

..... %

l) Write 0.45 as a percentage.

..... %

m) Write 25% as a fraction.

.....

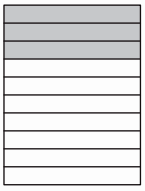
n) Write 75% as a fraction.

.....

o) Write 50% as a fraction.

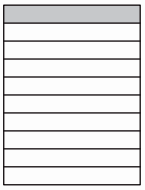
.....

p) Write 30% as a fraction.



.....

q) Write 10% as a fraction.



.....

r) Write 20% as a fraction.

.....

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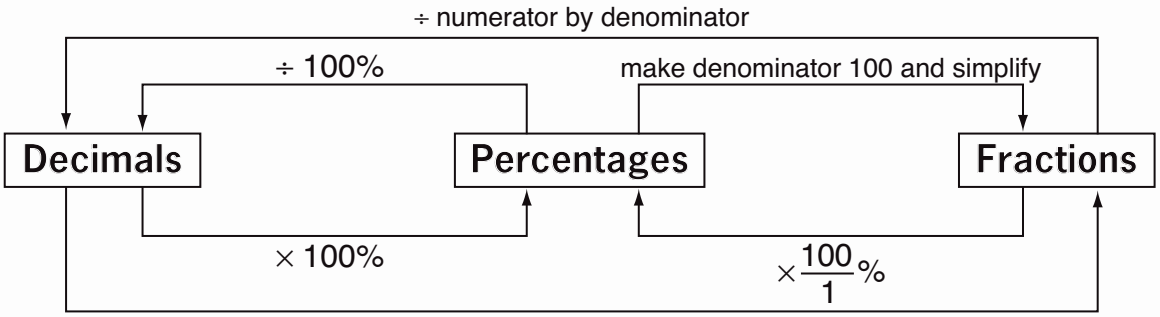
Skill 11.11 Converting between decimals, fractions and percentages.

- Convert between decimals, fractions and percentages.
(see skill 11.9, page 81 and skill 11.10 page 82)



Q. Complete the table:

Decimal	Fraction	Percentage
	$\frac{6}{10}$ OR $\frac{60}{100}$	

A.

$\frac{6}{10} = 6 \div 10$
$= \mathbf{0.6}$ — Decimal

$\frac{6}{10} = \frac{60}{100}$
$= 60$ out of 100
$= \mathbf{60\%}$ — Percentage

Decimal	Fraction	Percentage
0.6	$\frac{6}{10}$ OR $\frac{60}{100}$	**60%**

a) Complete the table:

Decimal	Fraction	Percentage
0.5	$\frac{50}{100}$ OR $\frac{1}{2}$	

0.5 = ...

b) Complete the table:

Decimal	Fraction	Percentage
	$\frac{45}{100}$	

.....

c) Complete the table:

Decimal	Fraction	Percentage
	$\frac{51}{100}$	

.....

d) Complete the table:

Decimal	Fraction	Percentage
		85%

0.85 = ...

e) Complete the table:

Decimal	Fraction	Percentage
0.9		

.....

f) Complete the table:

Decimal	Fraction	Percentage
		23%

.....

g) Complete the table:

Decimal	Fraction	Percentage
0.2		

0.2 = ...

h) Complete the table:

Decimal	Fraction	Percentage
	$\frac{75}{100}$	

.....

i) Complete the table:

Decimal	Fraction	Percentage
	$\frac{4}{5}$	

.....

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12. [Place Value]

Skill 12.1 Understanding the place value of a digit in a number (1).

- Compare the position of the digit to the position of the decimal point.
  Hint: There is a decimal point which is not written, at the end of any whole number.

Place value	thousands	hundreds	tens	units	tenths	hundredths	thousandths
	1	0	2	5 .	7	6	3

Q. In the number 5893 which of the digits 5, 8, 9 or 3 lies in the hundreds column?

A. *8*

The digit three places to the left of the decimal point is in the hundreds place.
So 8 is in the hundreds column.

a) Name the place of the underlined digit in the number 79<u>8</u>. [Hint: Is it units, tens or hundreds?]

b) Name the place of the underlined digit in the number 2<u>8</u>4. [Hint: Is it units, tens or hundreds?]

c) Name the place of the underlined digit in the number <u>4</u>97. [Hint: Is it units, tens or hundreds?]

d) Name the place of the underlined digit in the number <u>9</u>25. [Hint: Is it units, tens or hundreds?]

e) In the number 210 which of the digits 2, 1 or 0 lies in the tens column?

f) In the number 3472 which of the digits 3, 4, 7 or 2 lies in the hundreds column?

g) In the number 2006 which of the digits 2, 0 or 6 lies in the thousands column?

h) In the number 2301 which of the digits 2, 3, 0 or 1 lies in the units column?

i) In the number 3447 which of the digits 3, 4 or 7 lies in the thousands column?

j) In the number 564.2 which of the digits 5, 6, 4 or 2 lies in the units column?

k) In the number 7210 which of the digits 7, 2, 1 or 0 lies in the hundreds column?

l) In the number 15.26 which of the digits 1, 5, 2 or 6 lies in the hundredths column?

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Skill 12.1 Understanding the place value of a digit in a number (2).

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

m) In the number 5491 which of the digits 5, 4, 9 or 1 lies in the tens column?

n) In the number 45.73 which of the digits 4, 5, 7 or 3 lies in the tenths column?

o) In the number 42 006 which of the digits 4, 2, 0 or 6 lies in the thousands column?

p) In the number 21.80 which of the digits 2, 1, 8 or 0 lies in the units column?

q) In the number 1.025 which of the digits 1, 0, 2 or 5 lies in the hundredths column?

r) In the number 78.92 which of the digits 7, 8, 9 or 2 lies in the tenths column?

s) Which digit in 6578 is in the same place as the 1 in 415?

t) Which digit in 4087 is in the same place as the 1 in 165?

u) Which digit in 12 376 is in the same place as the 4 in 348?

v) Which digit in 38.25 is in the same place as the 4 in 1.47?

w) Which digit in 5937 is in the same place as the 2 in 208?

x) Which digit in 456.2 is in the same place as the 6 in 63.79?

y) Which digit in 109.2 is in the same place as the 6 in 0.61?

z) Which digit in 3.457 is in the same place as the 2 in 41.32?

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Skill 12.2 Finding the value of a digit in a number.

- Compare the position of the digit to that of the decimal point.
  Hint: There is a decimal point which is not written, at the end of any whole number.

Place value	thousands	hundreds	tens	units	tenths	hundredths	thousandths
Value	2000	600	70	5	$\frac{8}{10}$	$\frac{3}{100}$	$\frac{4}{1000}$
	2	***6***	***7***	***5***	***8***	***3***	***4***

Decimal point

Q. In which number does the digit 3 have a greater value?
A) 97 300
B) 13 900

A. ***B***
Check the position of the digit 3.
In 97 300 the 3 is in the hundreds place.
In 13 900 the 3 is in the thousands place.
So 3 has greater value in 13 900.

a) What is the value of the digit 5 in the number 4567?

b) What is the value of the digit 7 in the number 271?

c) What is the value of the digit 6 in the number 39.6?

d) What is the value of the digit 3 in the number 1.032?

e) What is the value of the digit 4 in the number 14.06?

f) What is the value of the digit 8 in the number 0.08?

g) In which number does the digit 8 have a smaller value?
A) 987
B) 823

h) In which number does the digit 3 have a greater value?
A) 6713
B) 439

i) In which number does the digit 5 have a greater value?
A) 529
B) 3657

j) In which number does the digit 4 have a smaller value?
A) 420
B) 6247

k) In which number does the digit 7 have a greater value?
A) 14 700
B) 27 400

l) In which number does the digit 3 have a smaller value?
A) 820.37
B) 4.138

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Skill 12.3 Comparing whole numbers.

- Compare the size of the digits in the same place, one at a time.
- Work from left to right across each number.

Q. Which number is greater?
1346 or 1364?

A. ***1364***

Thousands:
Both numbers have the digit 1 in the thousands place.

Hundreds:
Both numbers have the digit 3 in the hundreds place.

Tens:
In the tens place 6 is greater than 4.
So 1364 is greater than 1346.

a) 535 > 553
True or false?

b) 364 < 463
True or false?

c) 677 < 766
True or false?

d) 221 > 212
True or false?

e) 4014 > 4104
True or false?

f) 5646 < 6546
True or false?

g) 59 054 < 59 504
True or false?

h) 32 323 > 32 332
True or false?

i) Which number is smaller?
232 or 223

j) Which number is smaller?
125 or 152

k) Which number is greater?
788 or 778

l) Which number is smaller?
7557 or 7575

m) Which number is greater?
2113 or 2131

n) Which number is smaller?
7437 or 7374

o) Which number is smaller?
13 094 or 13 904

p) Which number is greater?
40 454 or 40 554

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Skill 12.4 Ordering whole numbers.

- Compare the size of the digits in the same place, one at a time.
- Work from left to right across each number.

Q. Place in order from largest to smallest:
300, 298, 308, 302, 309

A. ***309, 308, 302, 300, 298***

Hundreds:
300 is larger than 200.

Tens:
All four numbers starting with 3 have zero in the tens place.

Units:
The four numbers starting with 3 have the digits 0, 8, 2 and 9 in the units place. Ordering from largest to smallest gives 9, 8, 2, and 0.

So far in order we have 309, 308, 302, 300. Then place 298.

a) Place in order from largest to smallest:
25, 75, 22, 72, 57

b) Place in order from smallest to largest:
78, 87, 83, 37, 77, 38

c) Place in order from largest to smallest:
12, 42, 24, 14, 22, 44

d) Place in order from smallest to largest:
46, 54, 34, 55, 45, 35

e) Place in order from largest to smallest:
768, 786, 776, 787, 777

f) Place in order from smallest to largest:
456, 546, 465, 564, 556

g) Place in order from largest to smallest:
3001, 3020, 3030, 2300

h) Place in order from smallest to largest:
1011, 1101, 1001, 1111

i) Place in order from largest to smallest:
9015, 9501, 9105, 9510

j) Place in order from smallest to largest:
4606, 4066, 6046, 4640

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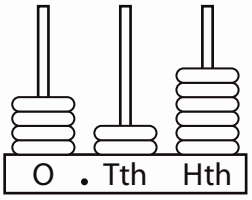
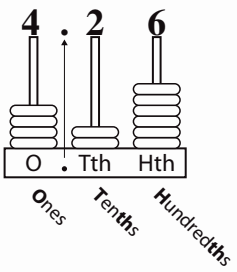
Skill 12.5 Writing decimal numbers illustrated by an abacus showing place values.

- Count the discs in each column.
- Put the decimal place in position.
- Write the digits in the appropriate places to form a number.

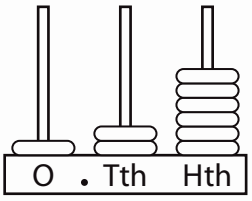
Q. Write the decimal number.



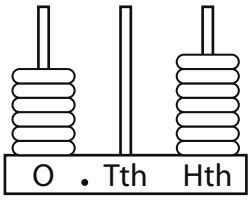
A. ***4.26***



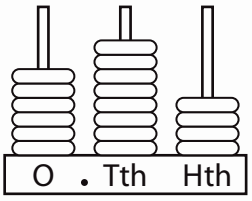
a) Write the decimal number.



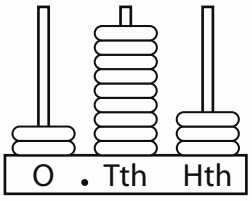
b) Write the decimal number.



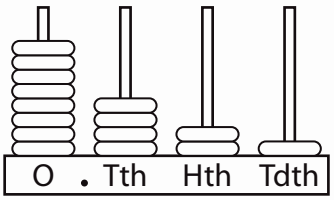
c) Write the decimal number.



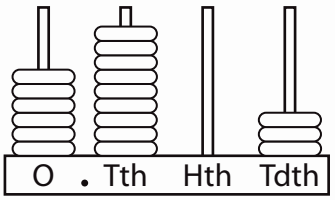
d) Write the decimal number.



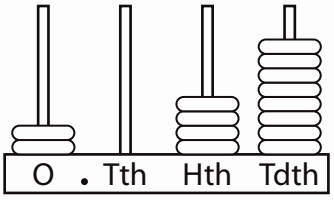
e) Write the decimal number.



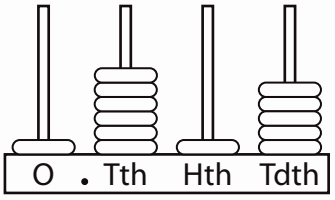
f) Write the decimal number.



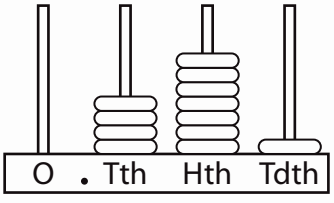
g) Write the decimal number.



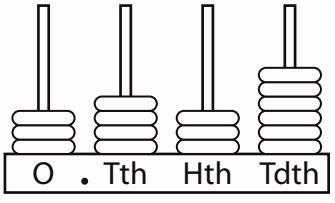
h) Write the decimal number.



i) Write the decimal number.



j) Write the decimal number.



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Skill 12.6 Comparing decimal numbers.

- Line up the decimal numbers at their decimal points.
- Compare digits in their same place values, starting from the left.

a) Which number is greater?
4.30 or 4.03

A. ***4.30***

Units:
They are both 4.

Tenths:
3 is greater than 0. OR $3 > 0$

Therefore 4.30 is greater than 4.03

a) $3.6 < 3.07$
True or false?

A. ***false***

Remember '<' means 'less than'.
Units:
They are both 3.

Tenths:
6 is greater than 0. OR $6 > 0$

Therefore 3.6 is not less than 3.07 and the statement is false.

a) Which number is greater?
6.38 or 6.3

b) Which number is smaller?
15.4 or 15.42

c) Which number is greater?
2.2 or 2.22

d) Which number is smaller?
13.88 or 13.78

e) Which number is greater?
12.23 or 12.32

f) Which number is smaller?
1.7 or 1.07

g) Which number is smaller?
13.094 or 13.9

h) Which number is greater?
0.859 or 0.895

i) $4.2 > 4.22$
True or false?

j) $1.5 < 1.05$
True or false?

k) $389.9 < 400$
True or false?

l) $24.3 > 24.33$
True or false?

m) $3109.24 < 3109.42$
True or false?

n) $0.606 > 0.66$
True or false?

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Skill 12.7 Ordering decimal numbers.

- Line up the decimal numbers at their decimal points.
- Compare digits in their same place values, starting from the left.

Q. Place in order from largest to smallest:
9.8, 8.9, 8.8, 9, 9.9

A. ***9.9, 9.8, 9, 8.9, 8.8***

Units:
9 is larger than 8.

Tenths:
When the number is whole like the 9 then think of it as 9.0
The numbers starting with 9 have 8, 0 and 9 in the tenths place. Ordering from largest to smallest, gives 9, 8, 0.
So far in order we have 9.9, 9.8, 9, then place 8.9 and 8.8

a) Place in order from smallest to largest:
3.5, 3.3, 5.5, 5.3, 3

b) Place in order from largest to smallest:
1.2, 2.2, 1.1, 2.1, 2.01

c) Place in order from smallest to largest:
6.7, 7.7, 6.6, 6, 7.6

d) Place in order from largest to smallest:
4.9, 9.4, 9, 4.4, 9.9

e) Place in order from largest to smallest:
42.0, 40.2, 42.4, 40.4, 44.2

f) Place in order from smallest to largest:
5.55, 5.05, 5.5, 5, 0.55

g) Place in order from smallest to largest:
3.41, 4, 3.43, 3.04, 4.13

h) Place in order from largest to smallest:
2.63, 3.62, 6.32, 3.6, 2.62

i) Place in order from largest to smallest:
6.8, 8.06, 6.08, 8, 8.6

j) Place in order from smallest to largest:
7.44, 4.74, 7.47, 4.77, 7.77

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Skill 12.8 Rounding whole numbers to a given place.

- If the digit to the right of the place is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the requested place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the requested place.
- Keep the number of digits in the answer the same as in the question by using zeros to fill the vacated spaces.

ROUNDING RULE
< 5 Round down
≥ 5 Round up

Q. Round 448 to the nearest ten.

A. ***450***

The digit to the right of the tens place is 8 so round up.
Add 1 to the 4 in the tens place.
Use a zero in the units place.

a) Round 57 to the nearest ten.

b) Round 72 to the nearest ten.

c) Round 366 to the nearest ten.

d) Round 691 to the nearest ten.

e) Round 804 to the nearest ten.

f) Round 3149 to the nearest ten.

g) Round 772 to the nearest hundred.

h) Round 209 to the nearest hundred.

i) Round 455 to the nearest hundred.

j) Round 2481 to the nearest hundred.

k) Round 2315 to the nearest hundred.

l) Round 5482 to the nearest hundred.

m) Round 1782 to the nearest hundred.

n) Round 4543 to the nearest hundred.

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Skill 12.9 Rounding decimal numbers to the nearest whole number.

- If the digit to the right of the decimal point is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the units place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the units place.
- Leave off all digits after the decimal point and the decimal point.

ROUNDING RULE
< 5 Round down
≥ 5 Round up

Q. Round 18.2 to the nearest whole number.

A. ***18***

The digit to the right of the decimal point is 2.
Round down by keeping the 8 in the units place unchanged.

a) Round 3.8 to the nearest whole number.

3.8 — 8 ≥ 5 round up by adding 1 to 3

b) Round 9.6 to the nearest whole number.

c) Round 4.2 to the nearest whole number.

d) Round 6.1 to the nearest whole number.

e) Round 15.7 to the nearest whole number.

f) Round 14.5 to the nearest whole number.

g) Round 13.4 to the nearest whole number.

h) Round 11.3 to the nearest whole number.

i) Round 72.8 to the nearest whole number.

j) Round 41.23 to the nearest whole number.

k) Round 30.51 to the nearest whole number.

l) Round 29.56 to the nearest whole number.

m) Round 48.25 to the nearest whole number.

n) Round 28.99 to the nearest whole number.

o) Round 59.5 to the nearest whole number.

p) Round 6.09 to the nearest whole number.

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Skill 12.10 Estimating outcomes by rounding to the nearest 10 or 100.

- If the digit to the right of the requested place is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the requested place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the requested place.
- Keep the number of digits in the answer the same as in the question by using zeros to fill the vacated spaces.

ROUNDING RULE

< 5 Round down
≥ 5 Round up

≈ approximately equals

Q. Estimate the difference between 418 and 103 by rounding to the nearest ten before subtracting.

A. *418 – 103*
≈ *420 – 100*
= ***320***

Round 418 up to 420 and 103 down to 100. Subtract these answers to estimate the difference.

a) Estimate the product of 28 and 53 by rounding to the nearest ten before multiplying.

28×53

$\approx 30 \times 50 =$ ☐

b) Estimate the sum of 71 and 29 by rounding to the nearest ten before adding.

..... ≈ ..... = ☐

c) Estimate the sum of 123 and 49 by rounding to the nearest ten before adding.

..... ≈ ..... = ☐

d) Estimate the sum of 48 and 31 by rounding to the nearest ten before adding.

..... ≈ ..... = ☐

e) Estimate the difference between 888 and 214 by rounding to the nearest hundred before subtracting.

..... ≈ ..... = ☐

f) Estimate the difference between 452 and 249 by rounding to the nearest ten before subtracting.

..... ≈ ..... = ☐

g) Estimate the product of 38 and 64 by rounding to the nearest ten before multiplying.

..... ≈ ..... = ☐

h) Estimate the product of 36 and 29 by rounding to the nearest ten before multiplying.

..... ≈ ..... = ☐

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Skill 12.11 Rounding decimal numbers to a given place.

- If the digit to the right of the place is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the requested place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the requested place.
- Leave off all the digits after the requested place.

ROUNDING RULE
< 5 Round down
≥ 5 Round up

Q. Round 34.21 to the nearest tenth.

A. ***34.2***

34.2<u>1</u>
The digit to the right of the tenths is 1.
1 < 5 so round down.
Keep the 2 in the tenths place unchanged.

a) Round 3.89 to the nearest tenth.

3.8<u>9</u> — 9 ≥ 5 round up by adding 1 to 8

b) Round 4.51 to the nearest tenth.

c) Round 6.34 to the nearest tenth.

d) Round 27.85 to the nearest tenth.

e) Round 15.76 to the nearest tenth.

f) Round 45.08 to the nearest tenth.

g) Round 7.99 to the nearest tenth.

h) Round 1.03 to the nearest tenth.

i) Round 3.786 to the nearest hundredth.

j) Round 9.109 to the nearest hundredth.

k) Round 7.254 to the nearest hundredth.

l) Round 2.581 to the nearest hundredth.

m) Round 3.046 to the nearest hundredth.

n) Round 8.965 to the nearest hundredth.

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Skill 12.12 Estimating outcomes by rounding decimals to whole numbers.

- If the digit to the right of the decimal point is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the units place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the units place.
- Leave off all digits after the decimal point.

ROUNDING RULE

< 5 Round down
≥ 5 Round up

≈ approximately equals

Q. Estimate the total cost by rounding to the nearest dollar:
$15.25 + $3.10 + $4.80 + $6.95

A. *$15.25 + $3.10 + $4.80 + $6.95*
≈ *$15 + $3 + $5 + $7*
= ***$30***

Round each dollar value, then add to estimate the total cost.

a) Estimate the sum of 5.4 and 8.7 by rounding to the nearest whole number before adding.

5.4 + 8.7

≈ 5 + 9 = ☐

b) Estimate the difference between 9.3 and 6.8 by rounding to the nearest whole number before subtracting.

≈ ..... = ☐

c) Estimate the difference between 22.8 and 12.9 by rounding to the nearest whole number before subtracting.

≈ ..... = ☐

d) Estimate the sum of 7.6 and 6.2 by rounding to the nearest whole number before adding.

≈ ..... = ☐

e) Estimate the perimeter of a rectangular yard with a length of 4.7 m and a width of 8.2 m by rounding to the nearest metre.

≈ ..... = ☐ m

f) Estimate the difference between 6.7 and 2.03 by rounding to the nearest whole number before subtracting.

≈ ..... = ☐

g) Estimate the total cost by rounding to the nearest dollar:
$10.30 + $5.15 + $8.95 + $6.25

≈ ..... = $ ☐

h) Estimate the total cost by rounding to the nearest dollar:
$24.95 + $9.85 + $3.15 + $12.35

≈ ..... = $ ☐

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13. [Operations]

Skill 13.1 Using the commutative property for addition.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

COMMUTATIVE PROPERTY for +

$2 + 5 = 7$

$5 + 2 = 7$

You can add numbers in any order and not change the outcome.

SO $2 + 5 = 5 + 2$

Q. $6 + 3 = 3 + 6$
True or false?

A. ***true***

Solve both sides of the equation and compare the results.
$6 + 3 = 9$
$3 + 6 = 9$
The results are the same.

a) $10 - 4 = 4 - 10$
True or false?

$10 - 4 = 6$ but

$4 - 10 \neq 6$ false

b) $4 + 5 = 5 + 4$
True or false?

c) $7 + 9 = 9 + 7$
True or false?

d) $9 - 3 = 3 - 9$
True or false?

e) $2 + 9 = 9 + 2$
True or false?

f) $8 - 1 = 1 - 8$
True or false?

g) $\square + 2 = 2 + 8$

h) $9 + 6 = \square + 9$

i) $4 + 1 = \square + 4$

j) $\square + 5 = 5 + 2$

k) $\square + 7 = 7 + 5$

l) $3 + 9 = \square + 3$

m) $\square + 13 = 13 + 6$

n) $17 + 10 = \square + 17$

o) $11 + 19 = \square + 11$

p) $\square + 22 = 22 + 14$

q) $\square + 17 = 17 + 12$

r) $15 + 18 = \square + 15$

s) $13 + \square = 31 + 13$

t) $\square + 16 = 16 + 28$

u) $27 + \square = 7 + 27$

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Skill 13.2 Using the commutative property for multiplication.

COMMUTATIVE PROPERTY for ×

$2 \times 5 = 10$

$5 \times 2 = 10$

You can multiply numbers in any order and not change the outcome.

SO $2 \times 5 = 5 \times 2$

Q. $\square \times 5 = 5 \times 9$ **A.** *9*

Ask: "What number multiplied by 5 equals 5 multiplied by 9?"

Answer: $9 \times 5 = 5 \times 9$

a) $10 \div 2 = 2 \div 10$
True or false?

$10 \div 2 = 5$ but

$2 \div 10 \neq 5$ ☐

b) $4 \times 5 = 5 \times 4$
True or false?

.....

..... ☐

c) $7 \times 9 = 9 \times 7$
True or false?

.....

..... ☐

d) $9 \div 3 = 3 \div 9$
True or false?

.....

..... ☐

e) $6 \times 7 = 7 \times 6$
True or false?

.....

..... ☐

f) $12 \div 4 = 4 \div 12$
True or false?

.....

..... ☐

g) $\square \times 2 = 2 \times 8$

h) $\square \times 5 = 5 \times 2$

i) $4 \times 1 = \square \times 4$

j) $9 \times 6 = \square \times 9$

k) $\square \times 4 = 4 \times 12$

l) $19 \times 10 = \square \times 19$

m) $11 \times 3 = \square \times 11$

n) $\square \times 6 = 6 \times 18$

o) $\square \times 13 = 13 \times 12$

p) $7 \times 18 = \square \times 7$

q) $\square \times 24 = 24 \times 17$

r) $13 \times 15 = \square \times 13$

s) $\square \times 5 = 5 \times 4$

t) $11 \times \square = 10 \times 11$

u) $\square \times 16 = 16 \times 7$

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Skill 13.3 Recognising the identity element for addition.

IDENTITY ELEMENT for + is ZERO

$14 + 0 = 14$

The sum of zero and any number is that number.

Q. $\square + 2 = 2$

A. ***0*** Ask: "What number added to 2 makes 2?"
Answer: $0 + 2 = 2$

a) $10 + 0 = 10$
True or false?

b) $6 + 0 = 0$
True or false?

c) $0 + 7 = 7$
True or false?

d) $0 + 8 = 8$
True or false?

e) $3 - 0 = 0$
True or false?

f) $9 - 0 = 9$
True or false?

g) $\square + 0 = 8$

h) $\square + 0 = 5$

i) $3 + 0 = \square$

j) $9 + \square = 9$

k) $\square + 4 = 4$

l) $1 + 0 = \square$

m) $7 + \square = 7$

n) $2 - \square = 0$

o) $5 - \square = 5$

p) Which expression equals 7?
A) $0 + 7$
B) 0×7
C) $0 - 7$

q) Which expression equals 8?
A) 0×8
B) $0 - 8$
C) $0 + 8$

r) Which expression equals 5?
A) $1 + 5$
B) 1×5
C) $1 - 5$

s) Which expression equals 3?
A) $3 - 0$
B) $0 - 3$
C) 3×0

t) Which expression equals 4?
A) $1 + 4$
B) $1 - 4$
C) 1×4

u) Which expression equals 6?
A) 6×0
B) $0 - 6$
C) $6 + 0$

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Skill 13.4 Recognising the identity element for multiplication.

IDENTITY ELEMENT for × is ONE

$14 \times 1 = 14$

The product of one and any number is that number.

Q. $\square \times 8 = 8$

A. *1*

Ask: "What number multiplied by 8 makes 8?"

Answer: $1 \times 8 = 8$

Q. Which expression equals 13?

A) $1 + 13$
B) 1×13
C) $1 \div 13$

A. *B*

Solve all expressions and then compare the results.

A) $1 + 13 \neq 13$
B) $1 \times 13 = 13$
C) $1 \div 13 \neq 13$

a) $6 \times 1 = 6$
True or false? ☐

b) $1 \times 4 = 4$
True or false? ☐

c) $1 \times 1 = 2$
True or false? ☐

d) $9 \times 1 = 9$
True or false? ☐

e) $15 \div 1 = 1$
True or false? ☐

f) $3 \div 1 = 3$
True or false? ☐

g) $\square \times 1 = 2$

h) $\square \times 1 = 7$

i) $4 \times 1 = \square$

j) $5 \times \square = 5$

k) $4 \div \square = 4$

l) $8 \div \square = 1$

m) Which expression equals 4?

A) 1×4
B) $1 + 4$
C) $1 \div 4$

☐

n) Which expression equals 5?

A) $1 + 5$
B) $1 \div 5$
C) 1×5

☐

o) Which expression equals 12?

A) $1 + 12$
B) $1 \div 12$
C) 1×12

☐

p) Which expression equals 6?

A) $1 \div 6$
B) $1 - 6$
C) 1×6

☐

q) Which expression equals 10?

A) $1 \div 10$
B) 10×1
C) $10 + 1$

☐

r) Which expression equals 17?

A) 17×17
B) $17 \div 1$
C) $1 + 17$

☐

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Skill 13.5 Using 'order of operations' involving + and/or – and × and/or ÷

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

Only + and/or –

- Add (+) and/or subtract (–) from left to right.

Only × and/or ÷

- Multiply (×) and/or divide (÷) from left to right.

Q. $8 - 2 - 5 + 6 =$

A. $8 - 2 - 5 + 6 =$
$= 6 - 5 + 6$
$= 1 + 6$
$= \mathbf{7}$

Start with 8 and subtract 2.
The result is 6.
Then subtract 5 from 6.
The result is 1.
Finally add 6 to the 1.

a) $8 + 2 + 4 =$
$= 10 + 4 =$ ☐

b) $6 + 5 - 3 =$
$=$ ..... $=$ ☐

c) $14 - 7 - 6 =$
$=$ ..... $=$ ☐

d) $7 - 5 + 9 =$
$=$ ..... $=$ ☐

e) $19 - 8 + 1 =$
$=$ ..... $=$ ☐

f) $16 - 2 + 5 =$
$=$ ..... $=$ ☐

g) $4 + 6 + 3 =$
$=$ ..... $=$ ☐

h) $13 - 7 - 4 =$
$=$ ..... $=$ ☐

i) $5 + 8 - 9 =$
$=$ ..... $=$ ☐

j) $6 + 5 + 1 - 2 =$
$= 11 + 1 - 2$
$= 12 - 2 =$ ☐

k) $8 - 4 + 3 + 2 =$
$=$ .....
$=$ ..... $=$ ☐

l) $9 + 7 - 5 - 1 =$
$=$ .....
$=$ ..... $=$ ☐

m) $7 + 3 + 5 - 6 =$
$=$ .....
$=$ ..... $=$ ☐

n) $5 - 2 + 7 - 5 =$
$=$ .....
$=$ ..... $=$ ☐

o) $9 - 3 - 2 - 1 =$
$=$ .....
$=$ ..... $=$ ☐

p) $2 \times 5 \times 3 =$
$= 10 \times 3 =$ ☐

q) $5 \times 3 \div 3 =$
$=$ ..... $=$ ☐

r) $16 \div 4 \div 2 =$
$=$ ..... $=$ ☐

s) $5 \times 4 \div 4 =$
$=$ ..... $=$ ☐

t) $18 \div 6 \div 3 =$
$=$ ..... $=$ ☐

u) $7 \times 2 \div 7 =$
$=$ ..... $=$ ☐

v) $4 \times 2 \times 2 =$
$=$ ..... $=$ ☐

w) $2 \times 9 \div 6 =$
$=$ ..... $=$ ☐

x) $20 \div 5 \div 2 =$
$=$ ..... $=$ ☐

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Skill 13.6 Identifying inverse operations + / – and × / ÷

INVERSE OPERATIONS + and –

$+ 5 - 5 = 0$ — Subtraction of a number undoes addition of that same number.

Example: $17 + 5 - 5 = 17 + 0 = 17$
because adding 5 and then subtracting 5 gives 0.

INVERSE OPERATIONS × and ÷

$\times 8 \div 8 = 1$ — Division by a number undoes multiplication by that same number.

Example: $6 \times 8 \div 8 = 6 \times 1 = 6$
because multiplying by 8 and then dividing by 8 gives 1.

- Keep the number unchanged when it is followed by two inverse operations applied to the same number.

Q. $24 + 9 - 9 =$

A. $24 + 9 - 9 =$
$= 24 + 0$
$= \mathbf{24}$

Subtracting 9 undoes adding 9
OR
+ 9 and – 9 cancel each other.
24 remains unchanged.

a) $43 + 12 - 12 =$ (cancel each other)
$= 43 + 0 =$ ☐

b) $31 - 6 + 6 =$
$= \ldots\ldots =$ ☐

c) $17 + 3 - 3 =$
$= \ldots\ldots =$ ☐

d) $15 + 8 - 8 =$
$= \ldots\ldots =$ ☐

e) $23 - 19 + 19 =$
$= \ldots\ldots =$ ☐

f) $24 - 7 + 7 =$
$= \ldots\ldots =$ ☐

g) $20 + 13 - 13 =$
$= \ldots\ldots =$ ☐

h) $18 - 9 + 9 =$
$= \ldots\ldots =$ ☐

i) $21 - 10 + 10 =$
$= \ldots\ldots =$ ☐

j) $20 \div 4 \times 4 =$ (cancel each other)
$= 20 \div 1 =$ ☐

k) $14 \times 2 \div 2 =$
$= \ldots\ldots =$ ☐

l) $25 \div 5 \times 5 =$
$= \ldots\ldots =$ ☐

m) $16 \times 4 \div 4 =$
$= \ldots\ldots =$ ☐

n) $45 \times 2 \div 2 =$
$= \ldots\ldots =$ ☐

o) $32 \div 8 \times 8 =$
$= \ldots\ldots =$ ☐

p) $9 \times 7 \div 7 =$
$= \ldots\ldots =$ ☐

q) $18 \times 3 \div 3 =$
$= \ldots\ldots =$ ☐

r) $24 \div 6 \times 6 =$
$= \ldots\ldots =$ ☐

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Skill 13.7 Using 'order of operations' involving single × or ÷ and + or –

- Use the order of operations rules: First multiply (×) or divide (÷).
  Finally add (+) or subtract (–).

Q. $6 + 12 \div 3 =$

A. $6 + 12 \div 3 =$ (first divide)
$= 6 + 4$ (then work from left to right)
$= \mathbf{10}$

First do 12 divided by 3.
The result is 4.
Then add 6 and 4.

a) $21 \div 3 - 2 =$
$= 7 - 2$ ..... $=$ ☐

b) $4 + 3 \times 3 =$
$=$ ..... $=$ ☐

c) $6 \times 2 + 8 =$
$=$ ..... $=$ ☐

d) $15 \div 5 - 2 =$
$=$ ..... $=$ ☐

e) $2 \times 5 - 4 =$
$=$ ..... $=$ ☐

f) $6 + 3 \times 5 =$
$=$ ..... $=$ ☐

g) $6 + 9 \div 3 =$
$=$ ..... $=$ ☐

h) $18 \div 2 + 4 =$
$=$ ..... $=$ ☐

i) $3 \times 4 + 7 =$
$=$ ..... $=$ ☐

j) $13 - 3 \times 3 =$
$=$ ..... $=$ ☐

k) $4 \times 4 - 7 =$
$=$ ..... $=$ ☐

l) $15 - 10 \div 5 =$
$=$ ..... $=$ ☐

m) $21 \div 7 - 1 =$
$=$ ..... $=$ ☐

n) $8 + 12 \div 4 =$
$=$ ..... $=$ ☐

o) $15 - 5 \times 2 =$
$=$ ..... $=$ ☐

p) $18 - 12 \div 2 =$
$=$ ..... $=$ ☐

q) $16 \div 4 + 4 =$
$=$ ..... $=$ ☐

r) $18 \div 6 - 3 =$
$=$ ..... $=$ ☐

s) $8 + 28 \div 4 =$
$=$ ..... $=$ ☐

t) $9 \times 6 - 3 =$
$=$ ..... $=$ ☐

u) $24 - 12 \div 4 =$
$=$ ..... $=$ ☐

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Skill 13.8 Using 'order of operations' involving brackets ( )

- Use the order of operations rules: First evaluate inside the brackets.
  Then multiply (×) and/or divide (÷) from left to right.
  Finally add (+) and/or subtract (–) from left to right.

Q. $9 + 12 \div (9 - 5) =$

A. $9 + 12 \div (9 - 5) =$
$= 9 + 12 \div 4$ (first brackets)
$= 9 + 3$ (then divide)
$= \mathbf{12}$ (then work from left to right)

Simplify inside the brackets and subtract 5 from 9.
The result is 4.
Then divide 12 by 4.
The result is 3.
Finally add 9 and 3.

a) $7 \times (4 - 2) =$
$= 7 \times 2$ ..... $=$ ☐

b) $9 - (4 + 3) =$
$=$ ..... $=$ ☐

c) $7 - (5 - 2) =$
$=$ ..... $=$ ☐

d) $10 - (9 - 2) =$
$=$ ..... $=$ ☐

e) $(4 + 4) \times 3 =$
$=$ ..... $=$ ☐

f) $15 \div (5 - 2) =$
$=$ ..... $=$ ☐

g) $7 \times (6 - 2) =$
$=$ ..... $=$ ☐

h) $(18 + 6) \div 3 =$
$=$ ..... $=$ ☐

i) $28 \div (1 + 6) =$
$=$ ..... $=$ ☐

j) $5 \times (11 - 8) =$
$=$ ..... $=$ ☐

k) $(13 - 7) \div 2 =$
$=$ ..... $=$ ☐

l) $42 \div (5 + 2) =$
$=$ ..... $=$ ☐

m) $(12 - 7) \times 4 =$
$=$ ..... $=$ ☐

n) $(5 + 8) \times 2 =$
$=$ ..... $=$ ☐

o) $(12 - 9) \times 5 =$
$=$ ..... $=$ ☐

p) $8 + (5 + 1) \div 2 =$
$= 8 + 6 \div 2$ .....
$= 8 + 3$ ..... $=$ ☐

q) $14 - 6 - (5 + 3) =$
$=$ .....
$=$ ..... $=$ ☐

r) $15 \div 3 - (2 + 2) =$
$=$ .....
$=$ ..... $=$ ☐

s) $9 + (7 - 4) \times 3 =$
$=$ .....
$=$ ..... $=$ ☐

t) $18 \div (9 - 3) + 2 =$
$=$ .....
$=$ ..... $=$ ☐

u) $9 + 3 \times (8 - 4) =$
$=$ .....
$=$ ..... $=$ ☐

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14. [Exploring Numbers]

Skill 14.1 Expressing word numbers in numerals.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

Rule 1: Leave a space, or put a comma, between the thousands and the hundreds.
2: Write a zero in any place that is left empty between other digits.

Q. Express in numerals:
Eighteen thousand, seven hundred and two.

A. ***18 702***

Places				
Tens of thousands	Thousands	Hundreds	Tens	Units
1	*8*	*7*	*0*	*2*

The digits 1 and 8, 7 and 2 will be in the number.
Numbers read from left to right so start with 18 thousand. The last digit of this number goes in the thousands position.
The seven goes in the hundreds position.
There is no ten, so put a 0.
Write 2 as the unit.

a) Express in numerals:
Six thousand, three hundred and fifty-four.

b) Express in numerals:
Two hundred and eighteen.

c) Express in numerals:
Nine hundred and twenty-seven.

d) Express in numerals:
Eight thousand, four hundred and six.

e) Express in numerals:
Three thousand and thirteen.

f) Express in numerals:
Seven thousand and eight.

g) Express in numerals:
Four hundred and forty.

h) Express in numerals:
Two thousand and twenty-two.

i) Express in numerals:
Eighty thousand.

j) Express in numerals:
Seventy thousand, nine hundred.

k) Express in numerals:
Sixteen thousand, two hundred and three.

l) Express in numerals:
Ninety-six thousand.

m) Express in numerals:
Four hundred thousand.

n) Express in numerals:
Five hundred thousand and one.

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Skill 14.2 Writing 2-digit numbers in words.

General Rules for writing a number in words

Rule 1: Consider one digit at a time starting from the left.

2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.

Exceptions for 2-digit numbers

Multiples of 10 have their own words:

10 ten	20 twenty	30 thirty	40 forty	50 fifty
60 sixty	70 seventy	80 eighty	90 ninety	

For the numbers 11 to 19 use:

11 eleven	12 twelve	13 thirteen	14 fourteen	15 fifteen
16 sixteen	17 seventeen	18 eighteen	19 nineteen	

For all numbers 21 to 99 use a hyphen (-) to separate the word for the tens from the word for the units.

Q. Write the number 27 in words.

A. ***twenty-seven***

Places				
Tens of thousands	Thousands	Hundreds	Tens	Units
			2	***7***

Starting from the left the 2 is in the tens position. As a multiple of 10 it has its own word and is written as 'twenty'.
The next digit 7 is written as 'seven'.
27 is between 21 and 99, so it has a hyphen '-' when written in words.

a) Write the number 35 in words.

b) Write the number 82 in words.

c) Write the number 69 in words.

d) Write the number 16 in words.

e) Write the number 23 in words.

f) Write the number 74 in words.

g) Write the number 11 in words.

h) Write the number 48 in words.

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Skill 14.3 Writing 3-digit numbers in words.

Rule 1: Consider one digit at a time starting from the left.
2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.
3: Always write 'hundred' not 'hundreds'.
4: Place the word 'and' after the word 'hundred' if other values follow.
AND Consider the rules for 2-digit numbers on page 108.

Q. Write the number 943 in words.

A. ***nine hundred and forty-three***

Places				
Tens of thousands	Thousands	Hundreds	Tens	Units
		9	*4*	*3*

Start from the left. The 9 is in the hundreds position so write 'nine hundred'. Include 'and' as other values follow.
The next digit is 4. It is in the tens position so it is written as 'forty'.
The 3 is a unit and written as 'three'.
43 is between 21 and 99, so it has a hyphen '-' when written in words.

a) Write the number 610 in words.

b) Write the number 800 in words.

c) Write the number 400 in words.

d) Write the number 160 in words.

e) Write the number 290 in words.

f) Write the number 738 in words.

g) Write the number 657 in words.

h) Write the number 901 in words.

i) Write the number 306 in words.

j) Write the number 582 in words.

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Skill 14.4 Writing 4-digit numbers in words.

Rule 1: Consider one digit at a time starting from the left.
2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.
3: Always write 'thousand' not 'thousands' and 'hundred' not 'hundreds'.
4: Place the word 'and' after the word 'thousand' if there are no hundreds.
5: Place the word 'and' after the word 'hundred' if other values follow.
AND Consider the rules for 2-digit numbers on page 108.

Q. Write the number 2610 in words.

A. ***two thousand, six hundred and ten***

	Places			
Tens of thousands	Thousands	Hundreds	Tens	Units
	2	***6***	***1***	***0***

Start from the left. The 2 is in the thousands position so write 'two thousand'.
The 6 is in the hundreds position so write 'six hundred'. Include 'and' as other values follow.
The next two digits are 1 and 0 in the tens and units places. They are written as 'ten'.

a) Write the number 3018 in words.

b) Write the number 6000 in words.

c) Write the number 4300 in words.

d) Write the number 7500 in words.

e) Write the number 8070 in words.

f) Write the number 9090 in words.

g) Write the number 5002 in words.

h) Write the number 4006 in words.

i) Write the number 2059 in words.

j) Write the number 3021 in words.

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Skill 14.5 Finding and ordering odd and even numbers.

Q. Write the largest odd, 4 digit number that includes the digits 2, 3, 5 and 6.

A. ***6523***

Consider the requirements one by one.
Use all 4 digits.
The largest number requires that the largest digits go first ⇒ 6532
An odd number means the last digit must not be divisible by 2.
Swap the order of the last two digits
⇒ 6523

a) What is the largest odd number less than 16?

b) What is the largest odd number less than 8?

c) What is the smallest even number greater than 13?

d) Write the smallest even, 3 digit number that includes the digits 2, 5 and 8.

e) Write the largest odd, 3 digit number that includes the digits 1, 2 and 9.

f) Write the smallest odd, 3 digit number that includes the digits 3, 5 and 9.

g) Write the smallest even, 4 digit number that includes the digits 1, 3, 4 and 6.

h) Write the largest odd, 4 digit number that includes the digits 2, 3, 8 and 9.

i) Write the smallest odd, 4 digit number that includes the digits 5, 6, 7 and 8.

j) Write in order from largest to smallest the odd numbers between 10 and 16.

k) Write in order from smallest to largest the odd numbers between 4 and 10.

l) Write in order from largest to smallest the even numbers between 7 and 15.

m) Write in order from smallest to largest the even numbers between 23 and 31.

n) Write in order from smallest to largest the odd numbers between 24 and 34.

o) Write in order from largest to smallest the even numbers between 29 and 19.

p) Using the digits 1, 5, 6 and 9 write an even number between 9150 and 9200.

q) Using the digits 1, 3, 4 and 5 write an odd number between 5300 and 5350.

r) Using the digits 2, 3, 7 and 8 write an even number between 8700 and 8750.

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Skill 14.6 Finding the multiples of a number.

- Count by the number, i.e. add the number to itself continuously.

OR

- Multiply the number by 1, then 2, 3, 4, 5, etc. to get the multiples in order.

Q. Complete the next two multiples of 7.

7, 14, 21, __ , __

A. *7, 14, 21,* ***28, 35***

Add 7 to the previous number.
21 + 7 = 28
28 + 7 = 35

a) Complete the next two multiples of 2.

2, 4, 6, 8, 10, __ , __

b) Complete the next two multiples of 3.

3, 6, 9, 12, __ , __

c) Complete the next two multiples of 11.

11, 22, 33, __ , __

d) Complete the next two multiples of 8.

8, 16, 24, __ , __

e) Complete the next two multiples of 4.

12, 16, 20, __ , __

f) Complete the next two multiples of 7.

21, 28, 35, __ , __

g) Complete the next two multiples of 5.

65, 70, 75, __ , __

h) Complete the next two multiples of 3.

18, 21, 24, __ , __

i) Complete the next two multiples of 10.

80, 90, 100, __ , __

j) Complete the next two multiples of 9.

27, 36, 45, __ , __

k) Complete the next two multiples of 7.

49, 56, 63, __ , __

l) Complete the next two multiples of 12.

36, 48, 60, __ , __

m) Complete the next two multiples of 6.

36, 42, 48, __ , __

n) Complete the next two multiples of 12.

84, 96, 108, __ , __

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Skill 14.7 Finding the factors of a number.

- To decide if a number is a factor of another number the first number must divide evenly into the second number, with no remainder.
  Hint: A number always has at least 2 factors, 1 and the number itself.
- Use trial and error. Be systematic.
  Divide 2 into the number. If 2 divides evenly then 2 and the result are factors of the number.
  Divide 3 into the number. If 3 divides evenly then 3 and the result are factors of the number.
  Divide 4 into the number. If 4 divides evenly then 4 and the result are factors of the number.
- Continue until all possibilities are exhausted.

Q. Which number is ***not*** a factor of 42?
3, 4 or 6

A. ***4***

Divide each number into 42.
$42 \div 3 = 14$
$42 \div 4 = 10$ remainder 2
$42 \div 6 = 7$
4 does not divide evenly into 42 so 4 is not a factor of 42.

a) Which number is a factor of 15?
3, 4 or 7

b) Which number is ***not*** a factor of 14?
2, 6 or 7

c) Which number is ***not*** a factor of 18?
3, 4 or 6

d) Which number is a factor of 25?
5, 6 or 7

e) Which number is a factor of 36?
5, 6 or 7

f) Which number is ***not*** a factor of 40?
8, 9 or 10

g) Which number is ***not*** a factor of 60?
10, 11 or 12

h) Which number is ***not*** a factor of 48?
6, 7 or 8

i) Which list has only factors of 35?
A) 1, 3, 5, 35
B) 1, 5, 7, 35

j) Which list has only factors of 22?
A) 1, 2, 4, 12,
B) 1, 2, 11, 22

k) Which list has only factors of 30?
A) 1, 3, 5, 15
B) 1, 10, 20, 30

l) Which list has only factors of 28?
A) 1, 4, 7, 14, 28
B) 1, 2, 3, 8, 28

m) Which of the numbers 2, 3, 4, 5 and 10 are factors of 2016?

n) Which of the numbers 3, 4, 5, 7 and 9 are factors of 2025?

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Skill 14.8 Finding prime and composite numbers.

Q. Which number is ***not*** a prime number?
2, 3, 4 or 5

A. ***4***
List the factors of each number.
2: 1, 2
3: 1, 3
4: 1, 2, 4
5: 1, 5
Only 4 has more factors than 1 and the number.

Q. List the composite numbers between 11 and 17.

A. ***12, 14, 15, 16***
Consider each number one at a time. The only prime number is 13 so all others are composite.

a) Which of the following is ***not*** a composite number?
4, 5 or 6

b) Which of the following is a composite number?
2, 8 or 11

c) Which of the following is a prime number?
12, 15, 16 or 19

d) Which of the following is a composite number?
11, 12 or 13

e) Which of the following is a prime number?
6, 7, 8 or 9

f) Which of the following is ***not*** a prime number?
23, 27 or 29

g) Which of the following is a prime number?
31, 32, 33, 34, 35, 36

h) Which of the following is ***not*** a prime number?
41, 43, 45, 47

i) List the composite numbers between 2 and 7.

j) List the prime numbers between 8 and 15.

k) List the composite numbers between 7 and 13.

l) List the prime numbers between 16 and 25.

m) List the composite numbers between 13 and 23.

n) List the prime numbers between 26 and 36.

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Skill 14.9 Writing 5-digit numbers in words.

Rule 1: Consider one digit at a time starting from the left.
2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.
3: Always group the tens of thousands digit to the thousands digit using the 2-digit rules.
4: Always write 'thousand' not 'thousands' and 'hundred' not 'hundreds'.
5: Place the word 'and' after the word 'thousand' if there are no hundreds.
6: Place the word 'and' after the word 'hundred' if other values follow.
AND Consider the rules for 2-digit numbers on page 108.

Q. Write the number 15 078 in words.

A. ***fifteen thousand and seventy-eight***

Places				
Tens of thousands	Thousands	Hundreds	Tens	Units
1	*5*	*0*	*7*	*8*

Start from the left. The 1 is in the tens of thousands position and the 5 is in the thousands position so consider them together. Write 'fifteen thousand'. Include 'and' as there are no hundreds. The next digit is 7. It is in the tens position so it is written as 'seventy'. The 8 is a unit and written as 'eight'. 78 is between 21 and 99, so it has a hyphen '-' when written in words.

a) Write the number 27 006 in words.

b) Write the number 13 000 in words.

c) Write the number 60 000 in words.

d) Write the number 79 000 in words.

e) Write the number 45 000 in words.

f) Write the number 21 001 in words.

g) Write the number 18 004 in words.

h) Write the number 10 016 in words.

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Skill 14.10 Writing 6-digit numbers in words.

Rule 1: Consider one digit at a time starting from the left.
2: First write the word for the digit (unless it is a 0).
Next write the place of the digit.
3: Always group the hundreds of thousands digit and the tens of thousands digit to the thousands digit using the 2-digit and 3-digit rules.
4: Always write 'thousand' not 'thousands' and 'hundred' not 'hundreds'.
5: Place the word 'and' after the word 'thousand' if there are no hundreds.
6: Place the word 'and' after the word 'hundred' if other values follow.

AND Consider the rules for 2-digit numbers on page 108.

Q. Write the number 950 073 in words.

A. ***nine hundred and fifty thousand and seventy-three***

Places					
Hundreds of thousands	Tens of thousands	Thousands	Hundreds	Tens	Units
9	***5***	***0***	***0***	***7***	***3***

Start from the left. The 9 is in the hundreds of thousands position, the 5 is in the tens of thousands position and the 0 in the thousands position so consider them together. Write 'nine hundred and fifty thousand'.
Include 'and' as there are no hundreds.
The next digit is 7. It is in the tens position so it is written as 'seventy'.
The 3 is a unit and written as 'three'.
73 is between 21 and 99, so it has a hyphen '-' when written in words.

a) Write the number 100 030 in words.

b) Write the number 400 000 in words.

c) Write the number 600 000 in words.

d) Write the number 800 050 in words.

e) Write the number 200 080 in words.

f) Write the number 530 014 in words.

g) Write the number 730 004 in words.

h) Write the number 200 001 in words.

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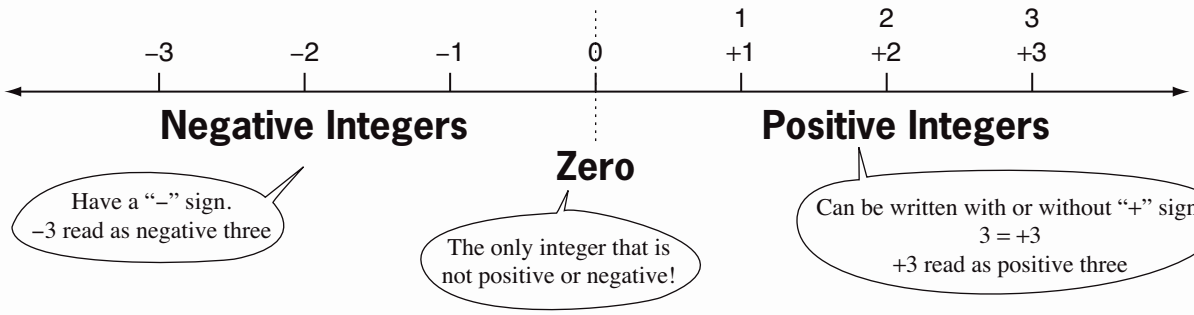
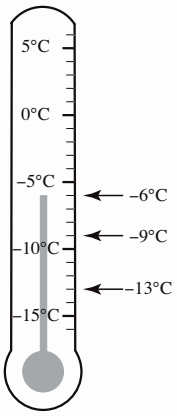
Skill 14.11 Comparing integers.



Q. Which temperature is higher?

A) 9°C below zero
B) 6°C below zero
C) 13°C below zero

A. ***B***



Consider each temperature as they would appear on a thermometer.
+ means above zero
– means below zero
Hotter temperatures are higher so –6°C or 6°C below zero is the highest of the three shown.

a) Which golf score is closest to par for the round?

A) 4 under par
B) 8 under par

b) Which scuba diver is closest to the ocean floor?

A) 13 feet below sea level
B) 16 feet below sea level

c) Which time period is the most recent?

A) 135 - 195 million years ago (Jurassic)
B) 195 - 225 million years ago (Triassic)

d) Which elevation is higher?

A) 52 ft below sea level (Lake Eyre - Australia)
B) 282 ft below sea level (DeathValley - USA)

e) Which temperature is colder?

A) 4°F above zero
B) 5°F below zero

f) Which year is most recent?

A) 20 B.C. (before Christ)
B) 8 A.D. (year of the Lord)

g) Who won the 2013 US Open?
[Hint: The lowest score wins in golf.]

A) R. McIlroy with +6
B) B. DeChambeau with –6
C) S. J. Im with +9

h) In which month does the firm perform best?

A) April: –$200,000
B) May: –$220,000
C) June: –$202,000

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Skill 14.12 Recognising positive and negative integers.

- Consider the words used with the numbers.
  Positive integers would be associated with words like: above, after, deposit, over, gain, A.D.
  Negative integers would be associated with words like: below, before, withdraw, under, loss, B.C.
  Hint: Consider zero to be ground level. Above ground is positive. Below ground is negative.

Q. Write as a positive or negative number:
three hundred metres below sea level

A. ***−300*** Write the number in digits. Considering the preposition 'below' use a negative sign.

a) Write as a positive or negative number:
a deposit of twenty dollars

b) Write as a positive or negative number:
on the seventh floor

c) Write as a positive or negative number:
sixteen degrees below zero

d) Write as a positive or negative number:
ten seconds after take-off

e) Write as a positive or negative number:
forty-two years B.C.
(before Christ)

f) Write as a positive or negative number:
eight hundred metres above sea level

g) Write as a positive or negative number:
a score of eleven over par in golf

h) Write as a positive or negative number:
a gridiron player gaining four yards

i) Write as a positive or negative number:
a withdrawal of six dollars

j) Write as a positive or negative number:
second floor underground

k) Write as a positive or negative number:
a deposit of twenty-five dollars

l) Write as a positive or negative number:
a score of four under par in golf

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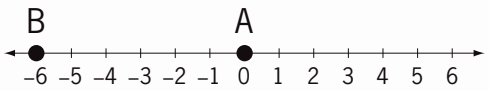
Skill 14.13 Reading integers on a number line.

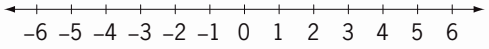
- Locate zero on the scale.
- Identify negative integers (–) or less than (<) zero and positive integers (+) or greater than (>) zero.

Q. What integers are shown at points A and B?

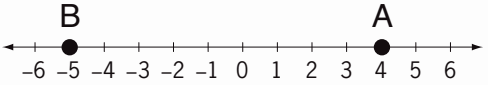


A. $A = 0$
$B = -6$

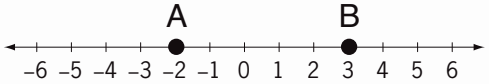
Q. Mark the following integers on the number line:
A at +4 and B at –5



A.

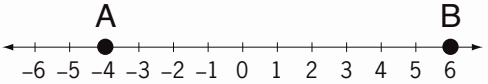


a) What integers are shown at points A and B?



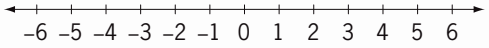
A = B =

b) What integers are shown at points A and B?

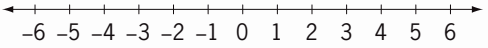


A = B =

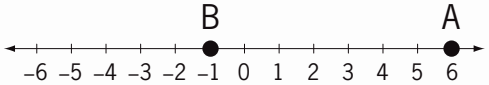
c) Mark the following integers on the number line:
A at 0 and B at –5



d) Mark the following integers on the number line:
A at –1 and B at 5

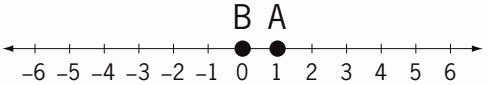


e) What integers are shown at points A and B?



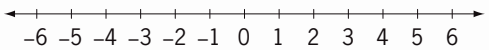
A = B =

f) What integers are shown at points A and B?

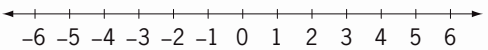


A = B =

g) Mark the following integers on the number line:
A at +2 and B at –4



h) Mark the following integers on the number line:
A at –3 and B at +3



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15. [Number Patterns / Equations]

Skill 15.1 Completing number patterns by adding the same number.

- Find the number used to get from term to term.
- Find the operation used to get from term to term.

  Hint: Every number pattern is created by a rule involving numbers and operations.

Q. 1, 7, 13, 19, 25, __ , __

A. *1, 7, 13, 19, 25,* ***31*** *,* ***37***

+6 +6 +6 +6 +6 +6

Ask: "Are the numbers increasing or decreasing?"
"How can you get from 1 to 7?"

Answer: To get from 1 to 7, add 6.
To get from 7 to 13, add 6.
To get from 13 to 19, add 6, etc.
So the rule of the pattern is:
"Add 6 to the previous number."
Apply this rule to the last given number.
25 + 6 = 31
31 + 6 = 37

a) 5, 9, 13, 17, 21, __ , __

+4 +4 +4 +4 +4 +4

b) 9, 14, 19, 24, 29, __ , __

c) 8, 11, 14, 17, 20, __ , __

d) 6, 16, 26, 36, 46, __ , __

e) 3, 10, 17, 24, 31, __ , __

f) 5, 14, 23, 32, 41, __ , __

g) 5, 11, 17, 23, 29, __ , __

h) 10, 17, 24, 31, 38, __ , __

i) 44, 46, 48, 50, 52, __ , __

j) 7, 15, 23, 31, 39, __ , __

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Skill 15.2 Solving equations involving addition (+)

- Rewrite the addition as an equivalent subtraction.
  Hint: 3 + 8 = 11 can also be written as 11 – 8 = 3 OR 11 – 3 = 8

OR

- Guess the value of the missing number that will make the equation true.
  (Both sides of the number sentence must be equal).
- Fill in this value in the equation and check the sum.
  Hint: If the total on the left hand side of the equation is not enough then add a larger number.
  If the total on the left hand side of the equation is too great then add a smaller number.
- Keep guessing and checking until the number sentence is true.

Q. $\square + 7 = 16$

A. *? + 7 = 16*
16 – 7 = ?
9 = ?
*so ? = **9***

The addition can be written as an equivalent subtraction.
The unknown number is 9.

OR *? + 7 = 16*
10 + 7 = 17
***9** + 7 = 16*

Guess 10.
Adding 10 gives a sum of 17 - too big so guess a smaller number.
Guess 9.
Check again.

a) $8 + \square = 27$
27 - 8 = ?
.....

b) $12 + \square = 18$
.....

c) $5 + \square = 13$
.....

d) $\square + 12 = 30$
.....

e) $\square + 9 = 21$
.....

f) $\square + 16 = 25$
.....

g) $17 + \square = 25$
.....

h) $14 + \square = 29$
.....

i) $26 + \square = 43$
.....

j) $\square + 15 = 28$
.....

k) $\square + 13 = 23$
.....

l) $\square + 16 = 30$
.....

m) $\square + 24 = 48$
.....

n) $18 + \square = 40$
.....

o) $13 + \square = 53$
.....

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Skill 15.3 Completing number patterns by subtracting the same number.

- Find the number used to get from term to term.
- Find the operation used to get from term to term.

  Hint: Every number pattern is created by a rule involving numbers and operations.

Q. 59, 50, 41, 32, 23, ___ , ___

A. 59, 50, 41, 32, 23, ***14***, ***5***

−9 −9 −9 −9 −9 −9

Ask: "Are the numbers increasing or decreasing?"
"How can you get from 59 to 50?"

Answer: To get from 59 to 50, subtract 9.
To get from 50 to 41, subtract 9.
To get from 41 to 32, subtract 9, etc.
So the rule of the pattern is:
"Subtract 9 from the previous number."
Apply this rule to the last given number.
23 – 9 = 14
14 – 9 = 5

a) 45, 38, 31, 24, 17, ___ , ___

−7 −7 −7 −7 −7 −7

b) 16, 14, 12, 10, 8, ___ , ___

....

c) 42, 36, 30, 24, 18, ___ , ___

....

d) 33, 28, 23, 18, 13, ___ , ___

....

e) 51, 43, 35, 27, 19, ___ , ___

....

f) 51, 47, 43, 39, 35, ___ , ___

....

g) 39, 36, 33, 30, ___ , ___

....

h) 108, 99, 90, 81, ___ , ___

....

i) 77, 67, 57, 47, ___ , ___

....

j) 42, 38, 34, 30, ___ , ___

....

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Skill 15.4 Solving equations involving subtraction (–)

- Rewrite the subtraction as an equivalent addition or subtraction.
  Hints: 12 – 7 = 5 can also be written as 5 + 7 = 12 OR 12 – 5 = 7

OR

- Guess the value of the missing number that will make the equation true.
  (Both sides of the number sentence must be equal).
- Fill in this value in the equation and check the subtraction.
  Hints: If the total on the left hand side of the equation is not enough then subtract a smaller number.
  If the total on the left hand side of the equation is too great then subtract a larger number.
- Keep guessing and checking until the number sentence is true.

Q. 21 – ☐ = 14

A. *21 – ? = 14*
21 – 14 = ?
7 = ?
*so ? = **7***

The subtraction can be written as another equivalent subtraction.
The unknown number is 7.

OR *21 – ? = 14*
21 – 5 = 16
*21 – **7** = 14*

Guess 5.
Subtracting 5 gives a result of 16 - too big, so guess a larger number.
Guess 7.
Check again.

a) ☐ – 7 = 16
16 + 7 = ?
.....

b) ☐ – 9 = 7
.....

c) ☐ – 6 = 14
.....

d) 17 – ☐ = 13
.....

e) 25 – ☐ = 18
.....

f) 30 – ☐ = 21
.....

g) 19 – ☐ = 5
.....

h) 18 – ☐ = 11
.....

i) 33 – ☐ = 15
.....

j) ☐ – 8 = 24
.....

k) ☐ – 15 = 21
.....

l) ☐ – 12 = 35
.....

m) ☐ – 10 = 17
.....

n) ☐ – 23 = 22
.....

o) ☐ – 31 = 16
.....

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Skill 15.5 Completing number patterns by multiplying by the same number.

- Find the number used to get from term to term.
- Find the operation used to get from term to term.

  Hint: Every number pattern is created by a rule involving numbers and operations.

Q. 1, 5, 25, 125, __ , __

A. *1, 5, 25, 125,* ***625*** , ***3125***

×5 ×5 ×5 ×5 ×5

Ask: "Are the numbers increasing or decreasing?"
"How can you get from 1 to 5?"

Answer: To get from 1 to 5, multiply by 5.
To get from 5 to 25, multiply by 5.
To get from 25 to 125, multiply by 5.
So the rule of the pattern is:
"Multiply the previous number by 5."
Apply this rule to the last given number.
$125 \times 5 = 625$
$625 \times 5 = 3125$

a) 2, 8, 32, 128, __ , __

×4 ×4 ×4 ×4 ×4

b) 1, 2, 4, 8, __ , __

c) 1, 3, 9, 27, __ , __

d) 9, 18, 36, 72, __ , __

e) 15, 30, 60, 120, __ , __

f) 2, 6, 18, 54, __ , __

g) 1, 4, 16, 64, __ , __

h) 3, 30, 300, 3000, __ , __

i) 2, 10, 50, __ , __

j) 4, 20, 100, 500, __ , __

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Skill 15.6 Completing number patterns by dividing by the same number.

- Find the number used to get from term to term.
- Find the operation used to get from term to term.

  Hint: Every number pattern is created by a rule involving numbers and operations.

Q. 243, 81, 27, 9, __ , __

A. *243, 81, 27, 9, **3**, **1***

÷3 ÷3 ÷3 ÷3 ÷3

Ask: "Are the numbers increasing or decreasing?"
"How can you get from 243 to 81?"

Answer: To get from 243 to 81, divide by 3.
To get from 81 to 27, divide by 3.
To get from 27 to 9, divide by 3.
So the rule of the pattern is:
"Divide the previous number by 3."
Apply this rule to the last given number.
$9 \div 3 = 3$
$3 \div 3 = 1$

a) 64, 32, 16, 8, __ , __

÷2 ÷2 ÷2 ÷2 ÷2

b) 224, 112, 56, 28, __ , __

c) 4096, 1024, 256, 64, __ , __

d) 3750, 750, 150, __ , __

e) 972, 324, 108, 36, __ , __

f) 1215, 405, 135, 45, __ , __

g) 486, 162, 54, 18, __ , __

h) 60 000, 6000, 600, __ , __

i) 25 000, 5000, 1000, 200, __ , __

j) 2048, 512, 128, 32, __ , __

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Skill 15.7 Solving equations involving multiplication (×)

- Rewrite the multiplication as an equivalent division.
  Hint: $3 \times 8 = 24$ can also be written as $24 \div 8 = 3$ OR $24 \div 3 = 8$

OR

- Guess the value of the missing number that will make the equation true.
  (Both sides of the number sentence must be equal).
- Fill in this value in the equation and check the multiplication.
  Hints: If the total on the left hand side of the equation is not enough then multiply by a larger number.
  If the total on the left hand side of the equation is too great then multiply by a smaller number.
- Keep guessing and checking until the number sentence is true.

Q. $\square \times 7 = 63$

A. $? \times 7 = 63$
$63 \div 7 = ?$
$9 = ?$
so $? = \mathbf{9}$

The multiplication can be written as an equivalent division.
The unknown number is 9.

OR $? \times 7 = 63$
$8 \times 7 = 56$
$\mathbf{9} \times 7 = 63$

Guess 8.
Multiplying by 8 gives a result of 56 - not enough, so guess a larger number.
Guess 9.
Check again.

a) $8 \times \square = 40$
$40 \div 8 = ?$

b) $6 \times \square = 48$

c) $4 \times \square = 36$

d) $\square \times 7 = 56$

e) $\square \times 6 = 42$

f) $\square \times 9 = 54$

g) $9 \times \square = 81$

h) $7 \times \square = 77$

i) $5 \times \square = 50$

j) $\square \times 12 = 120$

k) $\square \times 20 = 60$

l) $\square \times 11 = 44$

m) $\square \times 6 = 72$

n) $\square \times 10 = 200$

o) $\square \times 15 = 60$

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Skill 15.8 Completing number patterns by using changing values in the rule.

- Find the number used to get from term to term.
- Find the operation used to get from term to term.

Hint: Every number pattern is created by a rule involving numbers and operations. Counting numbers, even numbers and odd numbers have patterns themselves that will create changing numbers in the rule.

Q. 50, 49, 46, 41, 34, __ , __

A. *50, 49, 46, 41, 34,* ***25*** , ***14***

−1 −3 −5 −7 −9 −11

Ask: "Are the numbers increasing or decreasing?"
"How can you get from 50 to 49?"

Answer: To get from 50 to 49, subtract 1.
To get from 49 to 46, subtract 3.
To get from 46 to 41, subtract 5, etc.
So the rule of the pattern is:
"Subtract consecutive odd numbers from the previous number."
Apply this rule to the last given number.
34 − 9 = 25
25 − 11 = 14

a) 15, 15, 16, 18, 21, __ , __

+0 +1 +2 +3 +4 +5

b) 2, 4, 8, 14, 22, __ , __

c) 42, 30, 20, 12, 6, __ , __

d) 2, 5, 11, 20, 32, __ , __

e) 21, 20, 18, 15, 11, __ , __

f) 2, 9, 15, 20, 24, __ , __

g) 3, 4, 7, 12, 19, __ , __

h) 5, 15, 24, 32, 39, __ , __

i) 48, 46, 42, 36, 28, __ , __

j) 41, 40, 37, 32, 25, __ , __

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Skill 15.9 Completing number patterns involving decimals and fractions.

- Find the number used to get from term to term.
- Find the operation used to get from term to term.

  Hint: Every number pattern is created by a rule involving numbers and operations.

Q. 3, 5.5, 8, 10.5, 13, ___ , ___

A. *3, 5.5, 8, 10.5, 13,* ***15.5*** *,* ***18***

+2.5 +2.5 +2.5 +2.5 +2.5 +2.5

To get from 3 to 5.5, add 2.5
To get from 5.5 to 8, add 2.5
To get from 8 to 10.5, add 2.5, etc.
So the rule of the pattern is:
"Add 2.5 to the previous number."
Apply this rule to the last given number.
13 + 2.5 = 15.5
15.5 + 2.5 = 18

a) 7, 6.2, 5.4, 4.6, 3.8, ___ , ___

–0.8 –0.8 –0.8 –0.8 –0.8 –0.8

b) 2, 3.5, 5, 6.5, 8, ___ , ___

c) 4.3, 4.9, 5.5, 6.1, 6.7, ___ , ___

d) 5.2, 4.8, 4.4, 4, 3.6, ___ , ___

e) 3, 4.2, 5.4, 6.6, 7.8, ___ , ___

f) 10, 9.5, 9, 8.5, 8, ___ , ___

g) $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7},$ ___ , ___

h) $\frac{29}{6}, \frac{26}{6}, \frac{23}{6}, \frac{20}{6},$ ___ , ___

i) $\frac{62}{12}, \frac{57}{12}, \frac{52}{12}, \frac{47}{12},$ ___ , ___

j) $\frac{31}{4}, \frac{27}{4}, \frac{23}{4}, \frac{19}{4},$ ___ , ___

k) $2\frac{2}{9}, 2\frac{3}{9}, 2\frac{4}{9}, 2\frac{5}{9},$ ___ , ___

l) $3\frac{1}{8}, 3\frac{2}{8}, 3\frac{3}{8}, 3\frac{4}{8},$ ___ , ___

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Skill 15.10 Solving equations involving 'of'.

EITHER

- Guess the value of the missing number that will make the equation true.
- To check, divide this guess by the denominator of the fraction.
  Hints: If the total on the left hand side of the equation is not enough then use a larger number.
  If the total on the left hand side of the equation is too great then use a smaller number.
- Keep guessing and checking until the equation is true.

OR

- Multiply the answer by the denominator of the fraction.

'OF' is another way of saying **'×'**

MULTIPLYING BY FRACTIONS

$\frac{1}{2}$ of $8 = \frac{1}{2} \times 8 = 8 \div 2 = 4$

Multiplying by $\frac{1}{2}$ means dividing by 2.

AND Multiplying by $\frac{1}{3}$ means dividing by 3 etc.

Q. $\frac{1}{2}$ of $\square = 18$

A.

? ÷ 2 = 18	Guess 40
40 ÷ 2 = 20	Too large, so guess a smaller number.
? ÷ 2 = 18	Guess 36
36 ÷ 2 = 18	Correct.

so *? =* ***36***

OR *18 × 2 =* ***36***

a) $\frac{1}{4}$ of $\square = 6$

$6 \times 4 = ?$

$24 = ?$

b) $\frac{1}{2}$ of $\square = 9$

c) $\frac{1}{2}$ of $\square = 12$

d) $\frac{1}{3}$ of $\square = 10$

e) $\frac{1}{4}$ of $\square = 7$

f) $\frac{1}{3}$ of $\square = 12$

g) $\frac{1}{5}$ of $\square = 8$

h) $\frac{1}{6}$ of $\square = 11$

i) $\frac{1}{9}$ of $\square = 10$

j) $\frac{1}{2}$ of $\square = 16$

k) $\frac{1}{2}$ of $\square = 21$

l) $\frac{1}{4}$ of $\square = 20$

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16. [Units of Measurement]

Skill 16.1 Selecting the appropriate units of measurement.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

- Compare the size, mass or capacity to that of common objects (tennis court, bag of flour or carton of milk).
- Consider any standard units you know, chosen because they are sensible and accurate.
  Example: Carpenters measure wood lengths in millimetres.
  Height of a person is measured in centimetres.
  Mountains are measured in metres.

Q. Choose the appropriate units: grams, kilograms or tonnes.
"The total amount of salt a healthy person should eat each day is 6..."

A. ***grams***

The weight of the nutritional elements of food are usually measured in grams or milligrams.
Compare the amount of salt to known amounts of a single unit e.g.
1 kilogram of sugar or a 1 tonne truck.

a) Choose the appropriate units: millilitres, litres or megalitres.
"A water tap that drips every second would, each year, waste 10 000..."

b) Choose the appropriate units: millilitres, litres or megalitres.
"The capacity of one cup is about 250..."

c) Choose the appropriate units: centimetres, metres or kilometres.
"The highest peak in Antarctica is Mt Vinson with a height of 5140...

d) Choose the appropriate units: grams, kilograms or tonnes.
"The heaviest animal, the blue whale, weighs about 90..."

e) Choose the appropriate units: centimetres, metres or kilometres.
"From the Snowy Mountains to the Southern Ocean, the Murray River has a length of 2530...

f) Choose the appropriate units: centimetres, metres or kilometres.
"The world's tallest waterfall is Angel Falls in Venezuela measuring 979..."

g) Choose the appropriate units: millilitres, litres or megalitres.
"The amount of juice in an average lemon is about 35..."

h) Choose the appropriate units: grams, kilograms or tonnes.
"The average amount of rubbish produced by every Australian each year is 1..."

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Q. How many of these objects are likely to have a capacity less than 1 litre?

- A soap dispenser ☐
- A bath ☐
- A perfume bottle ☐
- A hand basin ☐

A. ***2***

Compare the capacity of each object to that of a standard object that you know e.g. 1 litre of milk.

Only the soap dispenser and perfume bottle would be likely to have a capacity of less than 1 litre.

a) How many of these objects are likely to have a capacity greater than 1 litre?

- A human mouth ☐
- A soft drink can ☐
- A bird bath ☑
- A salt shaker ☐

☐

b) How many of these objects are likely to have a mass less than 1 kilogram?

- A dozen eggs ☐
- A block of chocolate ☐
- A loaf of bread ☐
- A box of washing powder ☐

☐

c) How many of these objects are likely to have an area more than 1 square metre?

- An open book ☐
- A doona ☐
- A cinema screen ☐
- A bath mat ☐

☐

d) How many of these objects are likely to have a temperature greater than 30 degrees Celsius?

- A lake ☐
- A person ☐
- A furnace ☐
- A cellar ☐

☐

e) How many of these objects are likely to have a mass less than 1 tonne?

- An ocean liner ☐
- A helium balloon ☐
- A Great Dane ☐
- A motorbike ☐

☐

f) How many of these places are likely to have an area less than 1 hectare?

- Tooronga Zoo ☐
- Kakadu National Park ☐
- Centre court - Wimbledon ☐
- Melbourne Cricket Ground ☐

☐

g) How many of these objects are likely to have a temperature less than 30 degrees Celsius?

- A salad ☐
- An ice cream ☐
- A bowl of soup ☐
- A glass of tap water ☐

☐

h) How many of these objects are likely to have a capacity less than 1 litre?

- A cattle trough ☐
- A toilet cistern ☐
- A baby's bottle ☐
- A wheel barrow ☐

☐

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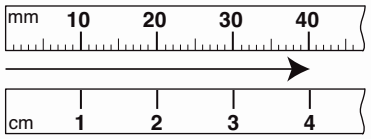
Skill 16.3 Converting units of length (1).

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

Conversion Facts - LENGTH

1 km = 1000 m = 100 000 cm = 1 000 000 mm
1 m = 100 cm = 1000 mm
= 1 cm = 10 mm



To change from **smaller** units to **larger** units

- Divide by the conversion factor (because you need less).

Example: To change 40 mm to cm
÷ by 10

To change from **larger** units to **smaller** units

- Multiply by the conversion factor (because you need more).

Example: To change 4 cm to mm
× by 10

Q. Which is greater?
600 cm or 50 000 mm

A. *600 cm × 10*
= 6000 mm
***50 000 mm** is greater*

Decide which unit to convert.
To convert cm to mm, multiply by 10.

a) Convert to metres:

1000 cm = ☐ m

100 cm = 1 m so 1000 ÷ 100 = ...

b) Convert to centimetres:

100 mm = ☐ cm

.....

c) Convert to metres:

3 km = ☐ m

.....

d) Convert to millimetres:

60 cm = ☐ mm

.....

e) Convert to metres:

1500 cm = ☐ m

.....

f) Convert to millimetres:

10 m = ☐ mm

.....

g) Convert to kilometres:

8000 m = ☐ km

.....

h) Convert to centimetres:

900 mm = ☐ cm

.....

i) Convert to millimetres:

2.4 cm = ☐ mm

.....

j) Convert to metres:

3.75 km = ☐ m

.....

k) Convert to centimetres:

1.9 m = ☐ cm

.....

l) Convert to millimetres:

1.36 m = ☐ mm

.....

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Skill 16.3 Converting units of length (2).

m) Express in metres:

500 cm + 3 m = ☐ m

n) Express in millimetres:

4 cm + 200 mm = ☐ mm

o) Express in metres:

7 km + 3100 m = ☐ m

p) Express in metres:

6.15 km + 400 m = ☐ m

q) Express in kilometres:

12 km + 6000 m = ☐ km

r) Express in centimetres:

4.5 m + 30 cm = ☐ cm

s) Which is greater?

2 km or 1500 m ☐

t) Which is greater?

4000 cm or 3 m ☐

u) Which is greater?

21 cm or 900 mm ☐

v) Which is greater?

30 cm or 3000 mm ☐

w) Circle the longest distance.

convert all units to metres

60 m **6 km** **60 000 cm**

6 km = 6000 m

60 000 cm = 600 m

x) Circle the shortest distance.

3 m **20 000 mm** **1000 cm**

y) Circle the shortest distance.

2 km **200 m** **2000 cm**

z) Circle the longest distance.

3000 m **2 km** **10 000 cm**

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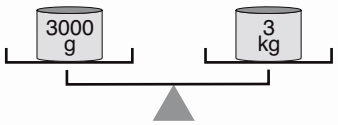
Skill 16.4 Converting units of mass (1).

Yellow 1 1 2 2 3 4 4
Red 1 1 2 2 3 3 4 4

Conversion Facts - MASS

1 tonne = 1000 kg = 1 000 000 g

1 kg = 1000 g



To change from **smaller** units to **larger** units

- Divide by the conversion factor (because you need less).

Example: To change 3000 g to kg
÷ by 1000

To change from **larger** units to **smaller** units

- Multiply by the conversion factor (because you need more).

Example: To change 3 kg into g
× by 1000

Q. Express in grams:

4 g + 3 kg = ____ g

A. *4 g + 3 kg =*
= 4 g + 3000 g
*= **3004** g*

To convert kg to g, multiply by 1000.
3 kg ⇒
3 × 1000 = 3000 g

a) Convert to grams:

20 kg = ____ g

1 kg = 1000 g so 20 × 1000 = ...

b) Convert to kilograms:

1 t = ____ kg

.....

c) Convert to tonnes:

13 000 kg = ____ t

.....

d) Convert to grams:

4 kg = ____ g

.....

e) Convert to grams:

1 kg = ____ g

.....

f) Convert to kilograms:

3 t = ____ kg

.....

g) Convert to tonnes:

70 000 kg = ____ t

.....

h) Convert to kilograms:

22 000 g = ____ kg

.....

i) Convert to grams:

0.5 kg = ____ g

.....

j) Convert to kilograms:

2.3 t = ____ kg

.....

k) Convert to grams:

4.6 kg = ____ g

.....

l) Convert to kilograms:

0.9 t = ____ kg

.....

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m) Express in grams:

3 kg + 150 g = ☐ g

n) Express in kilograms:

1 t + 420 kg = ☐ kg

o) Express in grams:

3 g + 4 kg = ☐ g

p) Express in tonnes:

7 t + 1000 kg = ☐ t

q) Express in grams:

6.9 kg + 300 g = ☐ g

r) Express in kilograms:

0.8 t + 2000 kg = ☐ kg

s) Which is greater?

19 kg or 2000 g ☐

t) Which is greater?

2 t or 800 kg ☐

u) Which is greater?

3 t or 6000 kg ☐

v) Which is greater?

900 g or 3 kg ☐

w) Circle the greatest mass.

convert all units to kilograms

20 kg 2 t 2000 g

2 t = 2000 kg

2000 g = 2 kg

x) Circle the smallest mass.

3000 kg 30 t 30 000 g

y) Circle the smallest mass.

13 000 g 0.5 t 750 kg

z) Circle the greatest mass.

4 t 400 000 g 40 000 kg

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Skill 16.5 Converting units of capacity (1).

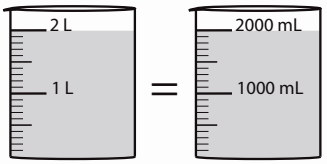
Yellow 1 1 2 2 3 4 4
Red 1 1 2 2 3 3 4 4

Conversion Facts - CAPACITY

1 ML (megalitre) = 1 000 kL = 1 000 000 L

1 kL = 1000 L

1 L = 1000 mL (millilitre)



To change from **smaller** units to **larger** units

- Divide by the conversion factor (because you need less).

Example: To change 2000 mL to L
÷ by 1000

To change from **larger** units to **smaller** units

- Multiply by the conversion factor (because you need more).

Example: To change 2 L to mL
× by 1000

Q. Circle the smallest capacity.

6000 mL 5 L 600 mL

A. *5 L × 1000 = 5000 mL*

The smallest capacity is 600 mL.

6000 mL 5 L (600 mL)

Change each amount to the same unit (mL).
To convert L to mL, multiply by 1000.

a) Convert to litres:

20 000 mL = ☐ L

1000 mL = 1 L so 20 000 ÷ 1000 = ...

b) Convert to millilitres:

1 L = ☐ mL

.....

c) Convert to litres:

5000 mL = ☐ L

.....

d) Convert to litres:

3 000 000 mL = ☐ L

.....

e) Convert to litres:

78 000 mL = ☐ L

.....

f) Convert to millilitres:

2.6 L = ☐ mL

.....

g) Convert to millilitres:

5.8 L = ☐ mL

.....

h) Convert to millilitres:

0.7 L = ☐ mL

.....

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Skill 16.5 Converting units of capacity (2).

Yellow 1 1 2 2 3 4 4
Red 1 1 2 2 3 3 4 4

i) Express in litres:

12 L + 2000 mL = ☐ L

j) Express in millilitres:

800 mL + 3.2 L = ☐ mL

k) Express in litres:

5000 mL + 6 L = ☐ L

l) Express in millilitres:

1.7 L + 200 mL = ☐ mL

m) Which is greater?

40 000 mL or 4 L ☐

n) Which is greater?

100 L or 10 000 mL ☐

o) Which is greater?

6000 mL or 12 L ☐

p) Which is greater?

5.2 L or 10 000 mL ☐

q) Circle the greatest capacity.

convert all units to millilitres

60 000 mL 50 L 7.5 L

50 L = 50 000 mL

7.5 L = 7500 mL

r) Circle the smallest capacity.

1000 mL 9 L 900 mL

s) Circle the smallest capacity.

4000 mL 3.5 L 40 L

t) Circle the greatest capacity.

28 L 2800 mL 3000 mL

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Skill 16.6 Solving problems involving units of measurement.

Q. One lap of the oval fountain in Hyde Park, London is 21 000 cm. How many metres is this?

A. *21 000 ÷ 100* = ***210*** *m*

To convert cm to m divide by 100.

a) How many metres above sea level is Arthurs Seat, the highest point on Victoria's Mornington Peninsula, if it is 300 times the height of a 100 cm person?

$100 \times 300 = 30\,000$ cm

30 000 ÷ 100 = ____ m

b) How many basketballs, each with a mass of 620 g, can be taken by the coach on to the plane if there is only two and a half kilograms allowed?

= ____

c) How many 250 mL cups are necessary to fill a 3 L vase?

= ____

d) A half flush of a toilet uses 6 L of water. How many millilitres is this?

= ____ mL

e) An average orange has a mass of 200 g. How many oranges would you expect to find in a 3 kg bag?

= ____

f) Charlie's average stride length is 80 cm. At this rate, how many steps would he take to walk the 400 m?

= ____

g) How many 200 mL jugs of water are necessary to fill up a 2 L bottle?

= ____

h) One lap of an athletics track is 400 m long. How many laps of the oval must an athlete complete to run 2 km?

= ____

i) How many metres above ground is Uluru if it is 136 times the height of a 250 cm tree?

= ____ m

j) A 50¢ piece is about 32 mm wide. How many 50¢ pieces, end to end, would you need to run the length of a table that is 512 cm long?

= ____

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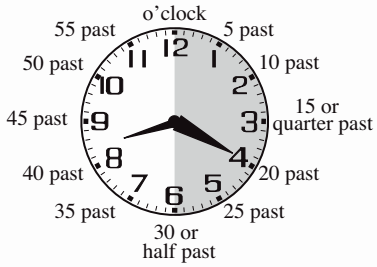
17. [Time]

Skill 17.1 Expressing the time in words.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

TIME - Past
Big hand between 12 and 6

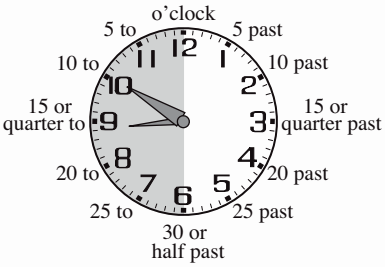


"Twenty **PAST** eight"

"a quarter **PAST** eight"

"half **PAST** ten"

TIME - To
Big hand between 6 and 12



"Ten **TO** nine" OR "eight fifty"

"a quarter **TO** two"

Hours (h)
Smaller hand
1 number = 1 h
1 lap = 12 h

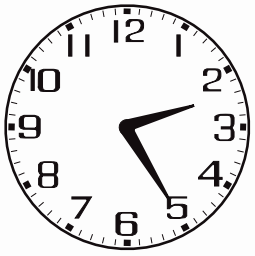
Minutes (min)
Bigger hand
1 mark = 1 min
1 number = 5 min
1 lap = 1 h = 60 min

Q. Write the time in words.

A. ***Five to five***
or ***Four fifty-five***

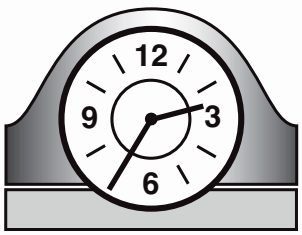
The big hand has turned 55 minutes.
It is nearly back to the o'clock.
The little hand is almost, but not quite up to the five.

a) Write the time in words.

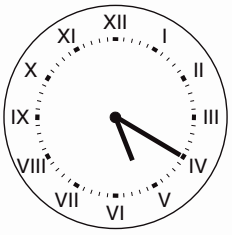


b) Write the time in words.

c) Write the time in words.



d) Write the time in words.



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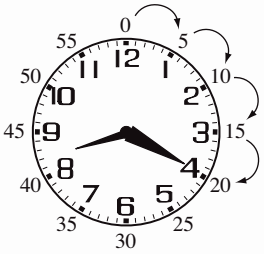
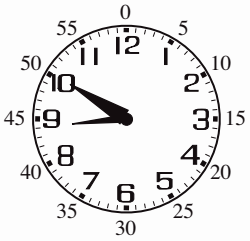
Skill 17.2 Expressing the time in digital form.

- Write the hours first. The smaller hand will be exactly on or just past a number.
- Then put the symbol ":"
- Count clockwise by 5's from 12 (or 0 minutes) to the bigger hand. Write the minutes.

Example: The clocks show **8:20** *(eight twenty)* and **8:50** *(eight fifty)*

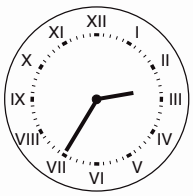




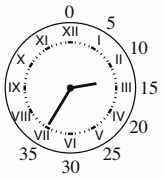
Hours (h)
Smaller hand
1 number = 1 h
1 lap = 12 h

Minutes (min)
Bigger hand
1 mark = 1 min
1 number = 5 min
1 lap = 1 h = 60 min

Q. Write the time in digital form.

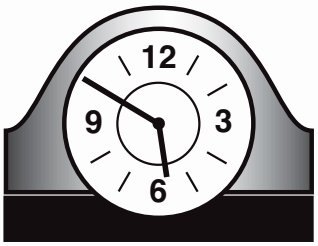


A. ***2:35***



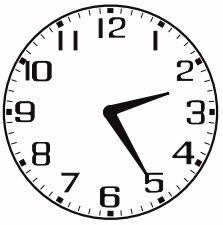
Counting from 12, the big hand has turned 35 minutes.
The little hand is just past 2 or midway between the 2 (II) and the 3 (III).

a) Write the time in digital form.



:

b) Write the time in digital form.



:

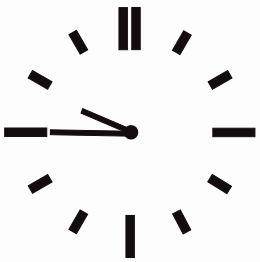
c) Write the time in digital form.

:

d) Write the time in digital form.

:

e) Write the time in digital form.



:

f) Write the time in digital form.

:

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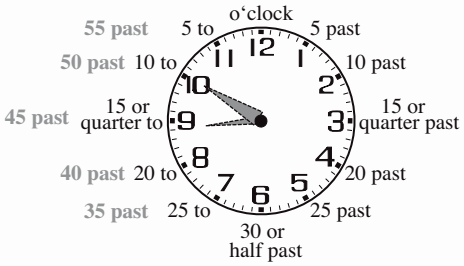
Skill 17.3 Showing the time on an analogue clock.

Drawing the **minute** (min) hand.

- If the time says **"past"**:
  Count clockwise by 5's, pointing as you go, the clock numbers starting with 12.
  Example: *"twenty past eight"* 8:20
- Draw the big hand pointing to 4.
- If the time says **"to"**:
  Count anti-clockwise by 5's, pointing as you go, the clock numbers starting with 12.
  Example: *"ten to nine"*
- Draw the big hand pointing to 10.
- If the time given is digital:
  Count clockwise by 5's from 12 (or 0 min)
  Example: *"eight twenty"* 8:20 or
  "eight fifty" 8:50

Drawing the **hour** (h) hand.

- If the time says **"past"**:
  Draw the smaller hand after the hour.
- If the time says **"to"**:
  Draw the smaller hand before the hour.
- If the time given is digital:
  Draw the hour hand on or past the hour and moving toward the next number.
  Example: *"eight fifty"* 8:50



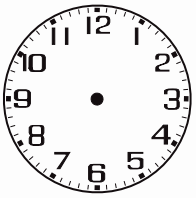
Q. Draw hands on the clock to show that the time is quarter past eight.

A.

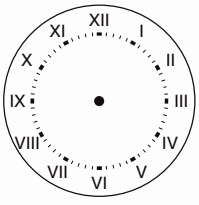
One quarter of 60 is 15. So the big hand is at 15 minutes past.
Counting by 5's the big hand is pointing to the 3. The little hand is quarter of the way past the eight and toward the nine.

a) Draw hands on the clock to show that the time is 7:40.

b) Draw hands on the clock to show that the time is half past ten.

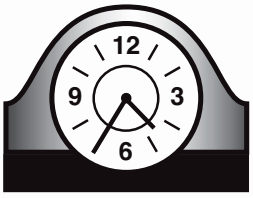


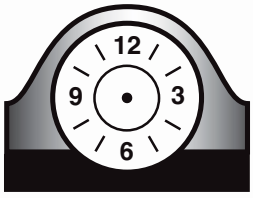
c) Draw hands on the clock to show that the time is 6:05.



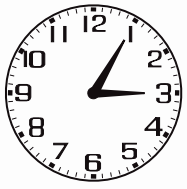
d) Draw hands on the watch to show that the time is 5:20.

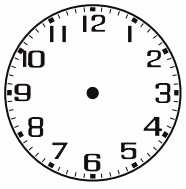
e) Draw hands on the second clock to show that the time is 2 hours and 10 minutes later.





f) Draw hands on the second clock to show that the time is 4 hours and 15 minutes earlier.





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Skill 17.4 Converting units of time.

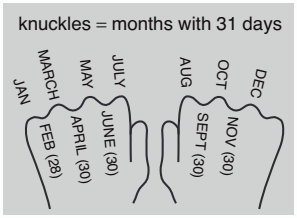
Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

Conversion Facts - TIME

1 century = 100 years
1 decade = 10 years
1 year = 12 months = 52 weeks = 365 days
1 leap year = 366 days
1 fortnight = 2 weeks
1 week = 7 days
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds

Days in the month:

30 days have September
April
June
and November.



All the rest have 31
except for February alone which has
28 days clear and 29 in each leap year.

Q. Convert to minutes:

$3\frac{1}{2}$ hours = [min]

A. $3\ h \times 60 = 180\ min$
$\frac{1}{2}\ hr = 30\ min$
$180 + 30$
$= \mathbf{210}\ min$

To convert hours to minutes, multiply by 60. Add the minutes.

a) Convert to years:

3 decades = [30 years]

1 decade = 10 years so $3 \times 10 =$ .....

b) Convert to days:

24 hours = [day]

.....

c) Convert to days:

Month of May = [days]

.....

d) Convert to minutes:

$1\frac{1}{4}$ hours = [min]

.....

e) Convert to weeks:

4 fortnights = [weeks]

.....

f) Convert to seconds:

$2\frac{1}{2}$ min = [s]

.....

g) Convert to years:

5 centuries = [years]

.....

h) Convert to hours:

180 minutes = [h]

.....

i) Convert to days:

2 years = [days]

.....

j) Convert to days:

8 weeks = [days]

.....

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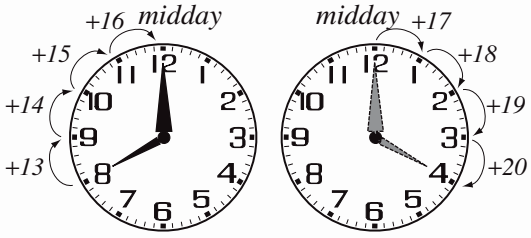
Skill 17.5 Calculating periods of time (1).

TIME OF DAY

Morning	-	sunrise	to	midday
Afternoon	-	midday	to	6 pm
Evening	-	6 pm	to	bedtime
Night	-	sunset	to	sunrise

Rule 1: After 60 minutes go to the next hour.
Rule 2: After 12 hours go to the same time but use, am instead of pm or pm instead of am
Example: It is 11:00 am. In another twelve hours it will be 11:00 pm.
Rule 3: After 24 hours go to the same time but the next day. (Similar for 48 and 72 hours also.)
Rule 4: Change from am to pm when you pass midday.
Rule 5: Change from pm to am when you pass midnight.

Q. It is 8:00 pm. In another 20 hours will it be morning or afternoon?



A. ***afternoon***

Break 20 hours up into 12 + 4 + 4 h.
12 hours after 8:00 pm is 8:00 am.
Add the remaining 8 hours by adding 4 hours to get to midday and then 4 more hours to get to 4:00 pm.

a) It is 1:00 pm on Monday. In another 40 hours what day will it be?

.....

b) It is 9:30 pm on Saturday. In another 36 hours what day will it be?

.....

c) It is 7:00 am. In another 50 hours will it be morning or afternoon?

.....

d) It is 3:00 pm. In another 20 hours will it be morning or afternoon?

.....

e) It is 1:30 am. What was the time 2 hours and 20 minutes before this?

..... :

f) It is 3:00 pm. In another 10 hours what time will it be?

..... :

g) It is 18:00. In another 10 hours what time will it be?
[Use the 24-hour clock.]

.....

h) It is 17:15. What was the time 2 hours and 20 minutes before this?
[Use the 24-hour clock.]

.....

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Skill 17.5 Calculating periods of time (2).

i) The Australian F1 Grand Prix starts at 2:00 pm. At what time will it finish if it goes for 1 hour and 25 minutes?

..... :

j) Clarke woke at 6:30 am after 10 hours sleep. At what time did Clarke go to sleep?

..... :

k) The movie started at 3:40 pm and played for 105 minutes. At what time did the movie finish?

..... :

l) Samantha was in a queue for 3 hours and 55 minutes and purchased concert tickets at 5:20 pm. At what time did she join the queue?

..... :

m) A fruit cake requires 75 minutes baking time. It is 11:10 am when the mix is put in the oven. At what time will the cake be cooked?

..... :

n) It is now 9:25 am. Fred has an appointment in 4 hours and 35 minutes time. At what time is Fred's appointment?

..... :

o) Queen's Bohemian Rhapsody plays for nearly 6 minutes. If the song finishes when the clock strikes 10:00 pm, at what time did it start?

..... :

p) The women's world record for the 3000 m is 8:06.11. The youth world record for girls over the same distance is 8:36.45. How much faster are the women?

..... s

q) The movie 'A Hitchhiker's Guide to the Galaxy' runs for 110 minutes. If the movie finishes at 1:20 pm, at what time does it start?

..... :

r) Up to 2020, the longest ever Davis Cup tennis match went for 7 hours and 2 minutes. How much longer was the Wimbledon match that lasted 11 hours and 5 minutes?

..... h min

s) You get on the bus at 10:30 am. The trip is expected to take 2 hours and 50 minutes. At what time should you arrive?

..... :

t) Joseph spends 1 hour and 20 minutes swimming each morning. He starts at 6:15 am. At what time does Joseph finish?

..... :

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Skill 17.6 Comparing periods of time.

- Convert all times to the same unit. (see skill 17.4, page 144)
- Compare the times.

Q. Circle the longest time.

2 h 2100 s 210 min

A. *2 h = 120 min*
2100 s = 35 min
210 min = 210 min

Convert to minutes.

2 h 2100 s (210 min)

a) Circle the longest time.

1 weekend 96 h 3 days

1 weekend = 2 days

96 hours = 4 days

b) Circle the longest time.

3 months 100 days 15 weeks

c) Circle the shortest time.

1 fortnight 4 weeks 12 days

d) Circle the longest time.

15 months 1 year 245 days

e) Circle the shortest time.

250 mins 1500 s 4 h

f) Circle the shortest time.

quarter of an hour 10 mins 500 s

g) Circle the longest time.

1000 h 2 weeks 9 days

h) Circle the longest time.

2.5 h 300 min 2000 s

i) Circle the longest time.

6000 s 106 min $1\frac{1}{2}$ h

j) Circle the shortest time.

2500 min 2 days 50 h

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Q. According to the schedule, what is the longest amount of time the Yarraville Library is open for in any one day?

Yarraville Library
Opening Hours

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Closed	10am - 1pm	10am - 1pm	2pm - 5pm	2pm - 5pm	10pm - 12noon	Closed

A. ***3 hours***

Check the number of open hours for each day.
10 am until 1 pm is 3 hours.
2 pm until 5 pm is 3 hours.

a) How much time do you spend watching TV if you watch 'Jakers' through to the end of 'Roller Coaster'?

ABC

3:30	**Play School** (R) 81786
3:55	**Todd World** (R) 8467250
4:10	**Jakers!** (R) 133298
4:35	**Basil Brush** 7752328
5:00	**Roller Coaster**
6:05	**Doctor Who** (R,S) 9597415
6:30	**Beat The Chef** (S) 8434
7:00	**News** (S) 637

You watch from 4:10 to 6:05. There are 50 min from 4:10 until 5:00 and 1 h and 5 min after that.

h min

b) What train would you need to catch from Central station to be at Bondi station by 5:15 am?

Eastern Suburbs & Illawarra Line *to Bondi Junction Weekdays*			
Redfern	4:39 am	4:49 am	5:04 am
Central	4:42 am	4:52 am	5:07 am
Town Hall	4:44 am	4:54 am	5:09 am
Martin Place	4:46 am	4:56 am	5:11 am
Kings Cross	4:48 am	4:58 am	5:13 am
Edgecliff	4:50 am	5:00 am	5:15 am
Bondi Junction	4:53 am	5:03 am	5:18 am

:

c) According to the schedule, what day is it if the Footscray Library is opening at 1 pm?

Footscray Library
Opening Hours

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
10am - 8pm	10am - 8pm	10am - 8pm	10am - 8pm	10am - 8pm	1pm - 5pm	2pm - 5pm

d) According to the session times, in what state am I if my showing of 'Bewitched' ends at 11:42 am?

Bewitched (PG) 102 mins
Rockingham (WA) **10:00 am**
Brisbane Regent (QLD) **10:15 am**
George St Cinemas (NSW) **10:30 am**

e) Using 12 hour am/pm time, when is the 6:45 pm flight from Melbourne scheduled to arrive in Mildura on the 2nd of August, 2021?

Flights Out: Melbourne to Mildura - Friday 2 Aug 2021					
Time	From	**Time**	To	Flight	Duration
08:35	Melbourne	**09:40**	Mildura	QF2078	1h 5m
13:50	Melbourne	**15:05**	Mildura	QF2082	1h 15m
15:10	Melbourne	**16:15**	Mildura	QF2084	1h 5m
18:45	Melbourne	**19:50**	Mildura	QF2086	1h 5m

f) What is the actual time of arrival at Dean Street if the 8:30 am bus from Wodonga is running 7 minutes late?

Mylon's Wodonga/Albury Bus Timetable (am)										
Hovell St **Wodonga**	7:05	7:30	8:00	8:30	9:15	9:45	10:15	10:45	11:15	11:45
Dean St **Albury**	7:20	7:40	8:10	8:45	9:30	10:00	10:30	11:00	11:30	12:00

:

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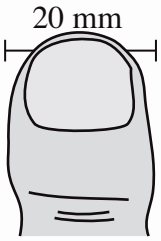
18. [Measuring]

Skill 18.1 Estimating length.

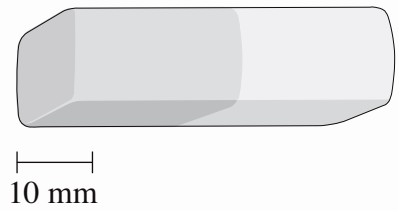
Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

EITHER
- Compare the length of the object to a known length.
  Example: The line segments shown.

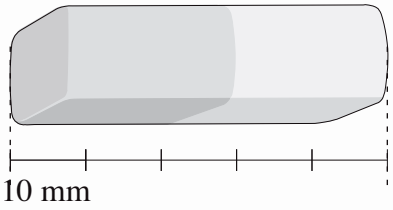
OR
- Measure the length against an everyday object.
  Example: Your thumb.



Q. Estimate the length of the eraser.

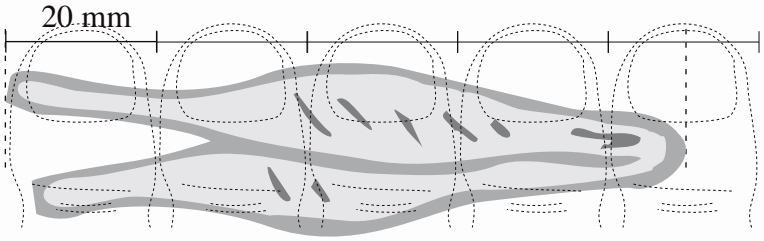


A. ***50 mm***



The eraser looks to be about five times the length of the 10 mm line. A reasonable estimate would be 50 mm.

a) Estimate the length of the tweezers.



mm

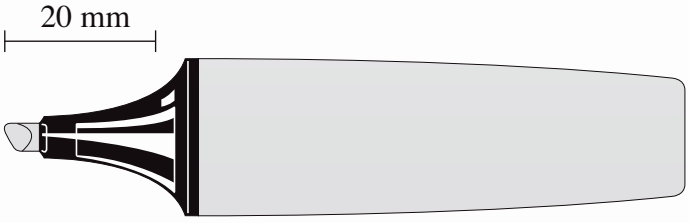
b) Estimate the length of the postage stamp.

cm

c) Estimate the length of the lipstick.

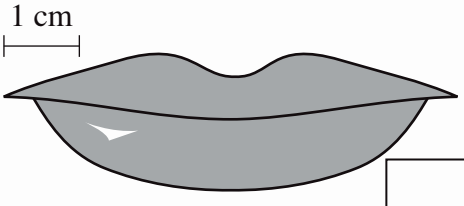
mm

d) Estimate the length of the hi-liter.



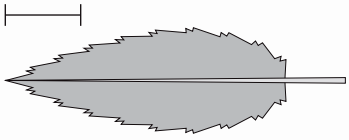
mm

e) Estimate the length of the lips.



cm

f) Estimate the length of the leaf.



mm

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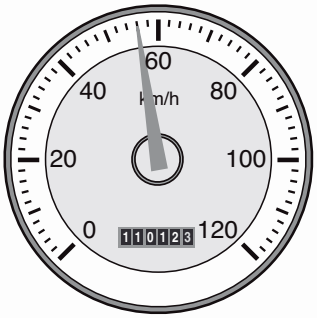
Skill 18.2 Reading and using scales.

- Determine the value of each mark and...

EITHER
- Start at zero and count by that amount, pointing to each mark as you go.

OR
- Count on from a known point.

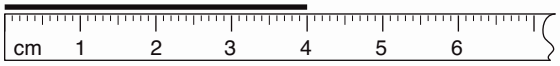
Q. At what speed is the car travelling?



A. ***56 km/h***

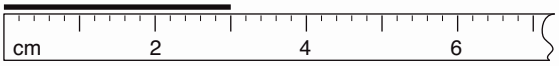
The darker calibrations mark every 20 km.
The arrow is between 40 and 60 but after 50 km.
The lighter calibrations mark every 2 km. The arrow is at 3 marks after 50.
Counting 2, 4 to 6.
The car is travelling at 56 km/h.

a) Using the ruler, measure the length of the line.



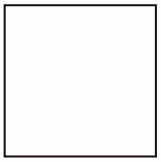
cm

b) Using the ruler, measure the length of the line.



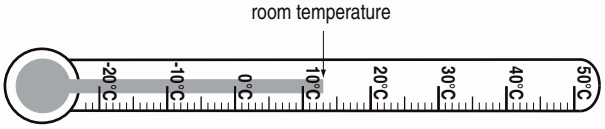
cm

c) Using a ruler, measure the length of a side of the square in millimetres.



mm

d) According to the thermometer what is the temperature of the room?

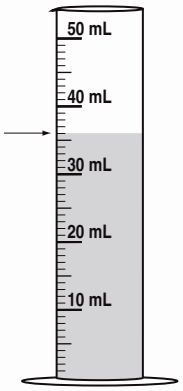


°C

e) At what speed is the car travelling?

km/h

f) How much water is in the measuring cylinder?



mL

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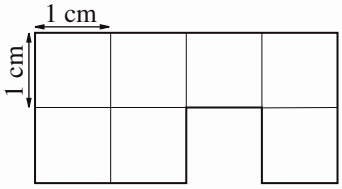
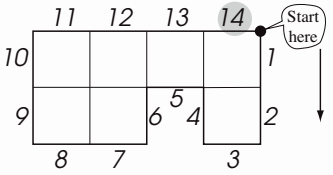
Skill 18.3 Calculating the perimeter of a shape using a grid.

Q. Find the perimeter of the shape.



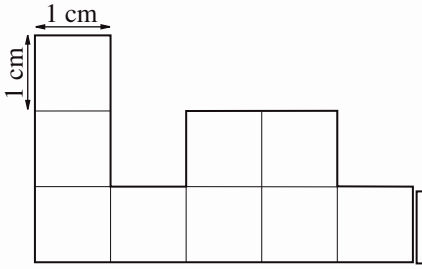
A. ***14 cm***



Each grid length measures 1 cm.
Mark a starting point.
Count the number of grid lengths around the outside of the shape.
There are 14 lengths or centimetres.

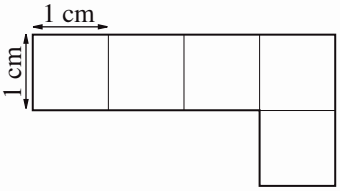
Find the perimeter of these shapes.

a)



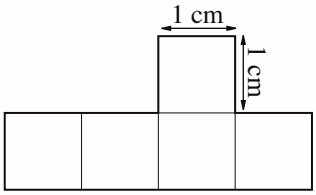
cm

b)



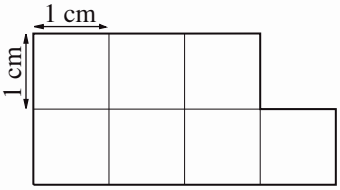
cm

c)



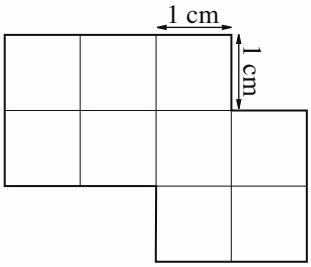
cm

d)



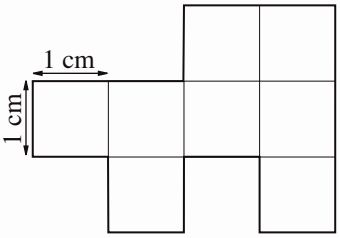
cm

e)



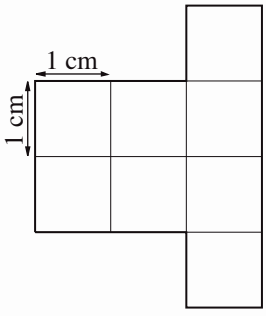
cm

f)



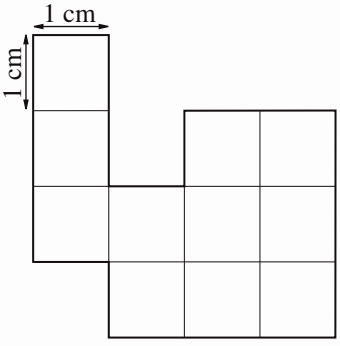
cm

g)



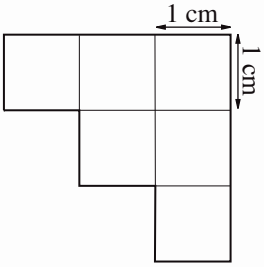
cm

h)



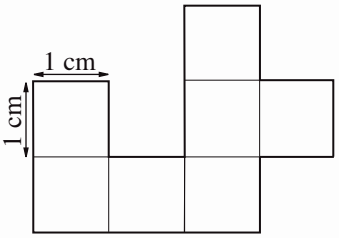
cm

i)



cm

j)



cm

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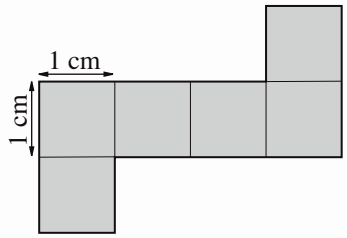
Skill 18.4 Calculating the area of a shape by counting squares (1).

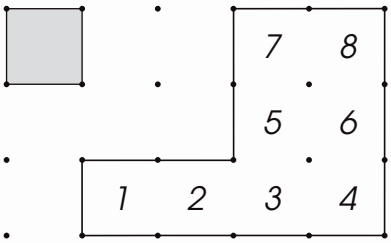
- Count the number of squares of a certain size that are needed to cover the shape.

Q. Find the area of this shape.

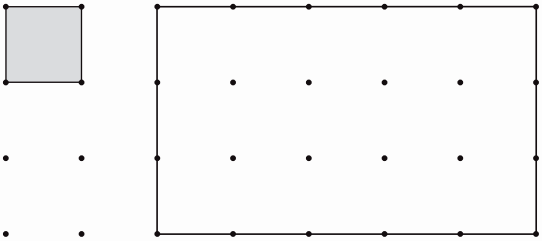


A. ***6 cm²*** Each square is 1 cm on each side.
Count the squares that cover the inside of the rectangle.
There are 6 squares, each with an area of 1 cm^2
Area = $6 \times 1\ cm^2$
= $6\ cm^2$

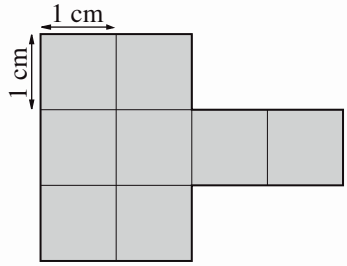
a) How many small squares are needed to cover the larger shape?



b) How many small squares are needed to cover the larger rectangle?

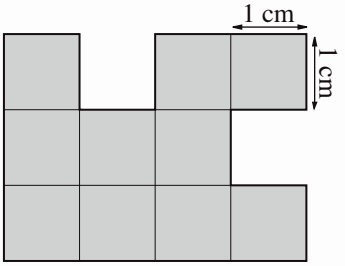


c) Find the area of this shape.



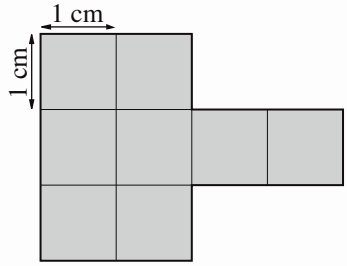
cm^2

d) Find the area of this shape.



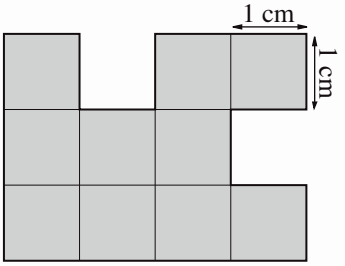
cm^2

e) Find the area of this shape.



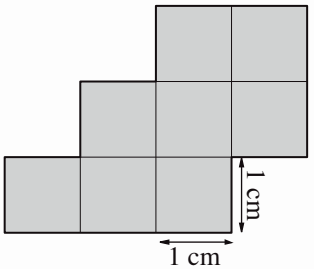
cm^2

f) Find the area of this shape.



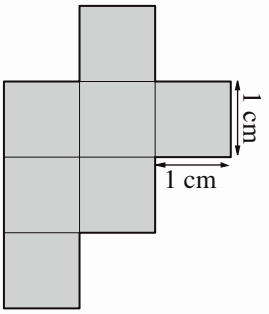
cm^2

g) Find the area of this shape.



cm^2

h) Find the area of this shape.



cm^2

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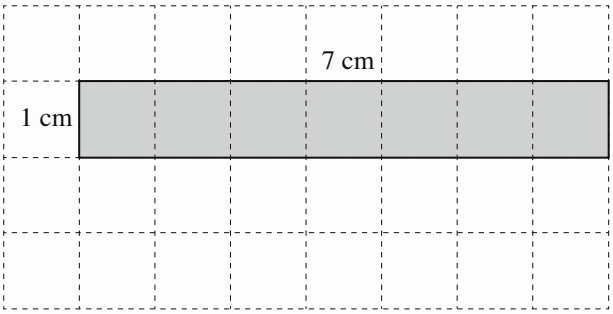
Skill 18.4 Calculating the area of a shape by counting squares (2).

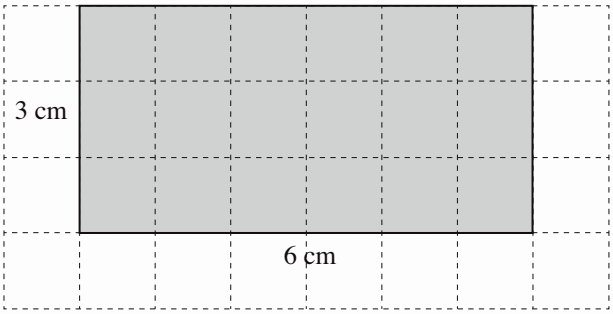
Yellow 1 1 2 2 3 4 4
Red 1 1 2 2 3 3 4 4

i) Find the area of the shaded rectangle.



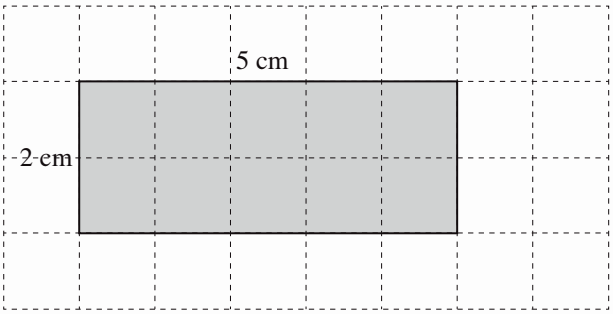
cm^2

j) Find the area of the shaded rectangle.



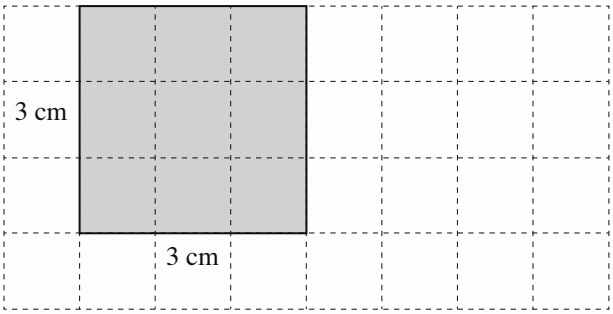
cm^2

k) Find the area of the shaded rectangle.



cm^2

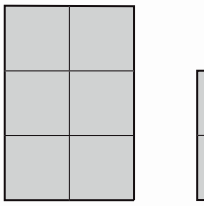
l) Find the area of the shaded square.



cm^2

m) The shapes below have the same:

A) perimeter and area
B) perimeter
C) area

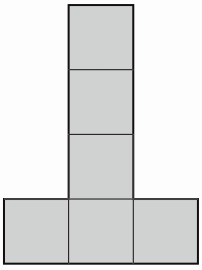


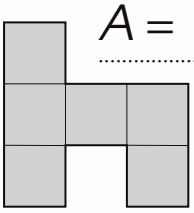
$P =$ .....

$A =$ .....

n) The shapes below have the same:

A) perimeter and area
B) perimeter
C) area



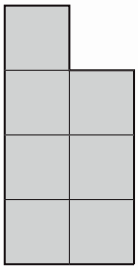


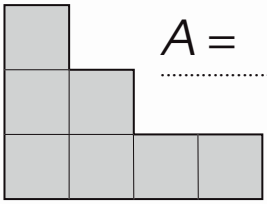
$P =$ .....

$A =$ .....

o) The shapes below have the same:

A) perimeter and area
B) perimeter
C) area



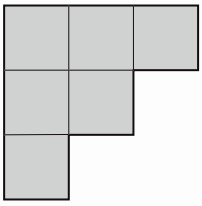


$P =$ .....

$A =$ .....

p) The shapes below have the same:

A) perimeter and area
B) perimeter
C) area



$P =$ .....

$A =$ .....

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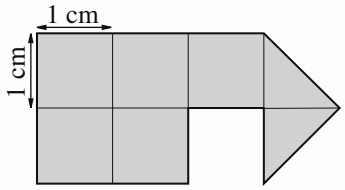
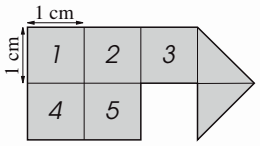
Skill 18.5 Calculating the area of a shape by counting triangles.

Q. Find the area of this shape.



A. ***6 cm²***



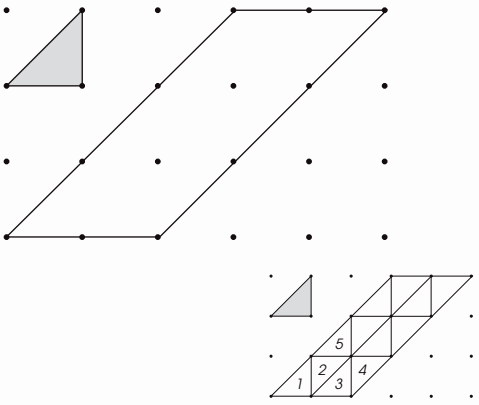
First count the number of complete squares.
There are 5 complete squares.

Then count the triangles.
Each triangle doubled forms 1 square.

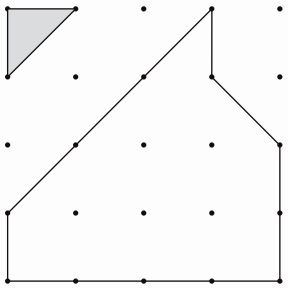
There are 2 triangles in the shape. Together they make 1 more square.

5 + 1 = 6 squares

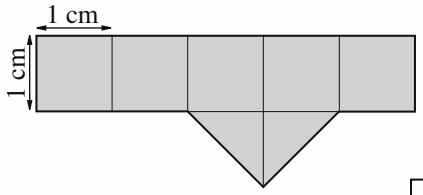
a) How many small triangles are needed to cover the parallelogram?



b) How many small triangles are needed to cover the shape?

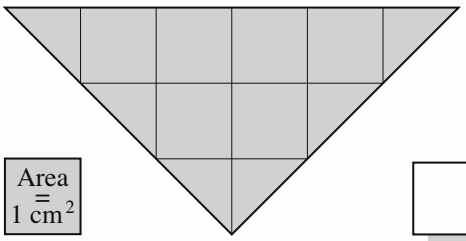


c) Find the area of this shape.



cm²

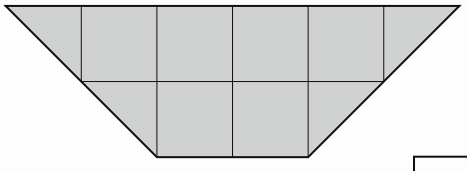
d) Find the area of this triangle.



Area = 1 cm²

cm²

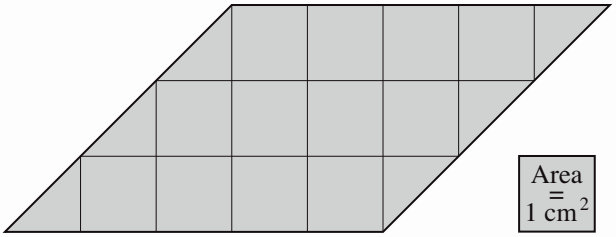
e) Find the area of this trapezium.



Area = 1 cm²

cm²

f) Find the area of this parallelogram.



Area = 1 cm²

cm²

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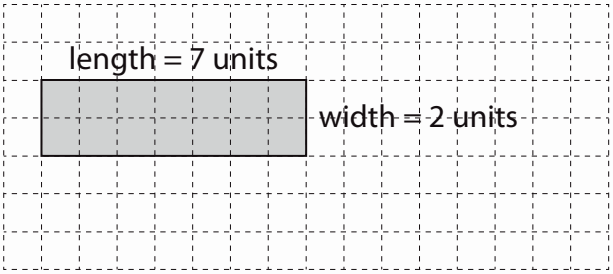
Skill 18.6 Calculating the area of a shape as a result of the enlargement of another shape.

- Count the number of squares that make the area of both the original and the enlarged rectangles.
- Divide the enlarged area by the original area.

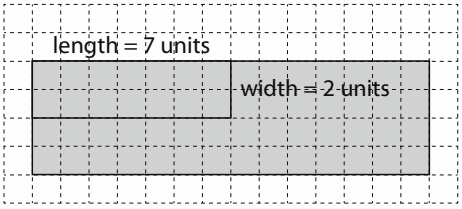
Q. Double the length and the width of this rectangle. How many times bigger is the area of the new rectangle compared to the original rectangle?



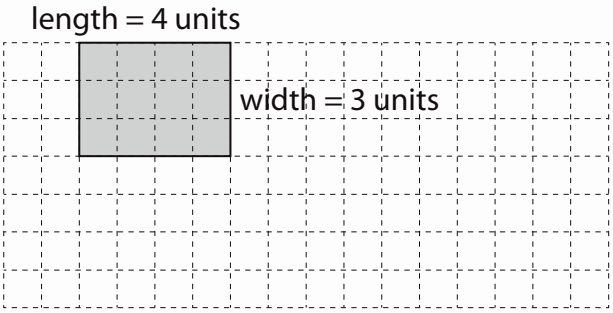
A. ***4***

Original area = 14 square units
Enlarged area = 56 square units

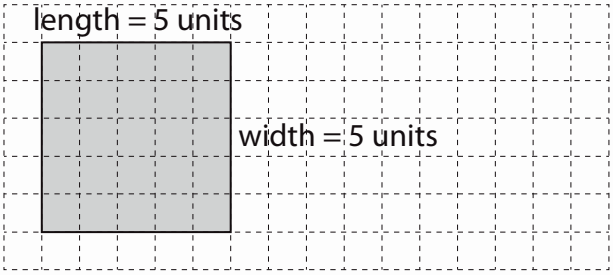
Enlarged area ÷ original area =
= 56 ÷ 14
= 4



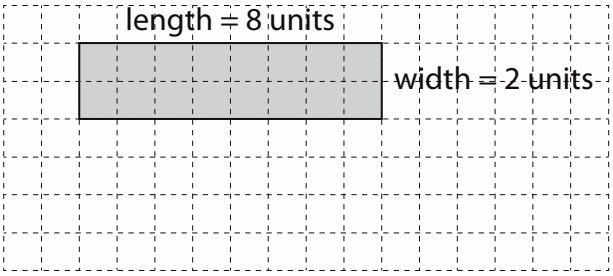
a) Double the length and the width of this rectangle. How many times bigger is the area of the new rectangle compared to the original rectangle?



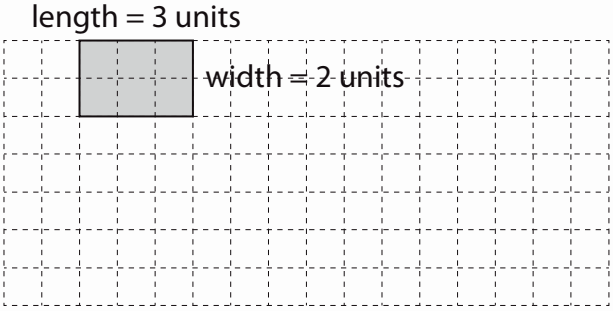
b) Double the length of this square. How many times bigger is the area of the new rectangle compared to the original square?



c) Triple the width of this rectangle. How many times bigger is the area of the new rectangle compared to the original rectangle?



d) Triple the length and the width of this rectangle. How many times bigger is the area of the new rectangle compared to the original rectangle?



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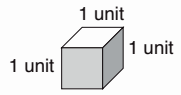
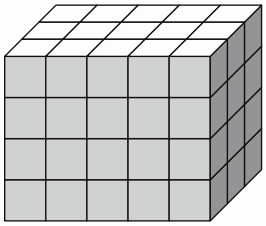
Skill 18.7 Describing volume of prisms by counting cubes.

- Count the number of cubes needed to fill the top layer.
- Multiply this amount by the number of layers.

1 CUBIC UNIT



Q. How many cubes were used to make the prism?



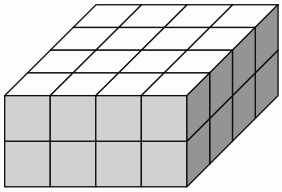
A. $3 \times 5 = 15$

$15 \times 4 = \mathbf{60}$

First count the cubes in the top layer. There are 3 rows of 5 cubes.

Then count the number of layers. There are 4 layers of cubes.

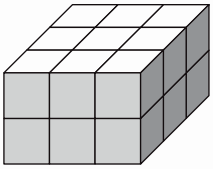
a) How many cubes were used to make the prism?



$4 \times 4 = 16$

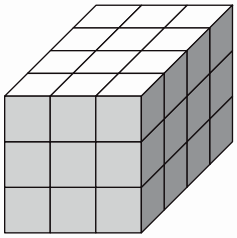
$16 \times 2 =$ ☐

b) How many cubes were used to make the prism?



= ☐

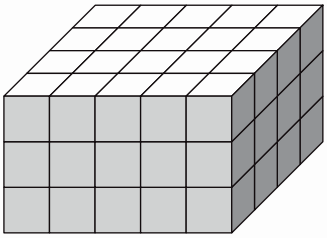
c) Find the volume of the prism.



Volume = 1 cm^3

..... ☐ cm^3

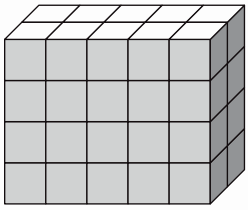
d) Find the volume of the prism.



Volume = 1 cm^3

..... ☐ cm^3

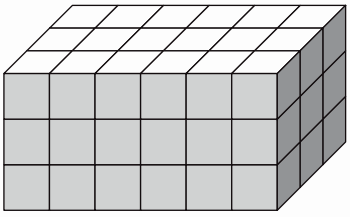
e) Find the volume of the prism.



Volume = 1 cm^3

..... ☐ cm^3

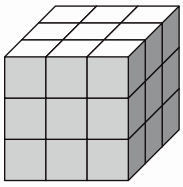
f) Find the volume of the prism.



Volume = 1 cm^3

..... ☐ cm^3

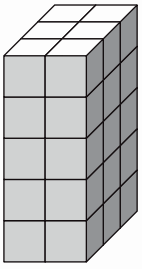
g) Find the volume of the prism.



Volume = 1 cm^3

..... ☐ cm^3

h) Find the volume of the prism.



Volume = 1 cm^3

..... ☐ cm^3

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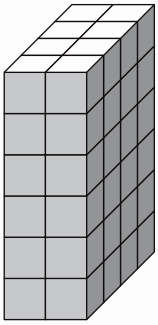
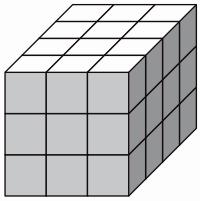
Skill 18.8 Comparing volume of prisms by counting cubes.

- Count the number of cubes in each prism.
  Hint: Find a shortcut. Count the cubes in the top layer and multiply by the number of rows.
- Compare the number of cubes in each shape.

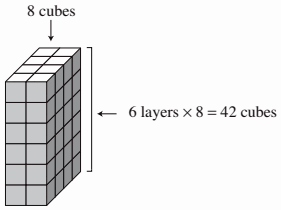
Q. Which prism has the greater volume?

A) 

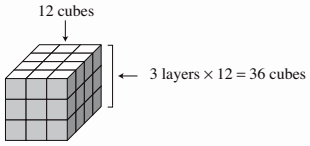
B) 

A. ***A***

A) Top layer = 8 cubes
Number of layers = 6
$6 \times 8 = 48$ cubes

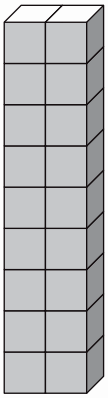


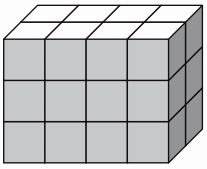
B) Top layer = 12 cubes
Number of layers = 3 layers
$3 \times 12 = 36$ cubes



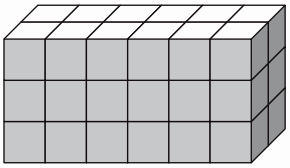
48 > 36 so the answer is A

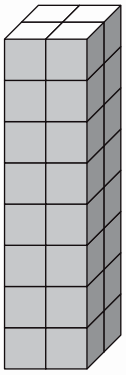
a) Which prism has the greater volume?

A) 

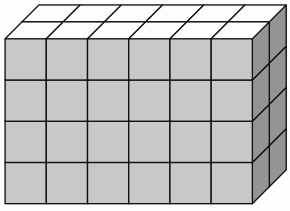
B) 

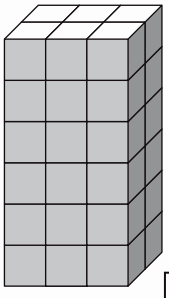
b) Which prism has the lesser volume?

A) 

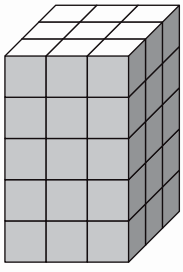
B) 

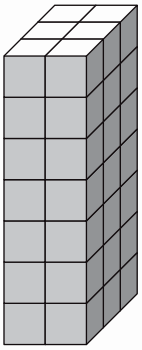
c) Which prism has the greater volume?

A) 

B) 

d) Which prism has the lesser volume?

A) 

B) 

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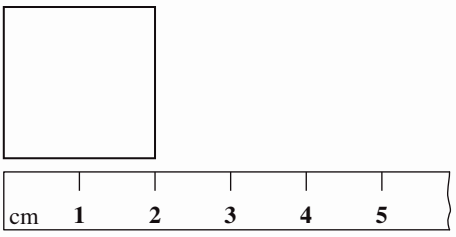
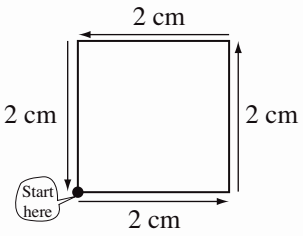
Skill 18.9 Calculating perimeter by using a ruler.

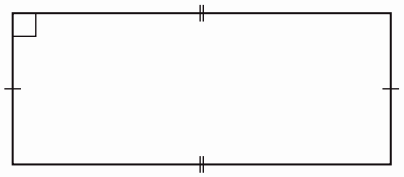
- Measure the side lengths of the shape.
- Add the lengths of all sides.

Example: Side length = 2 cm, then the perimeter of the square = 2 + 2 + 2 + 2 = 8 cm





Q. Using a ruler measure the side lengths of the rectangle in centimetres. What is the perimeter of the rectangle?

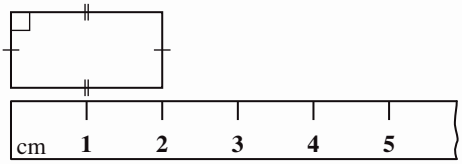


A.
5 cm
5 cm
2 cm
+ 2 cm
14 cm

A rectangle has opposite sides the same length.
Measure the length of 1 side. (5 cm long)
Measure the length of the adjacent side. (2 cm long)
Add all four sides.

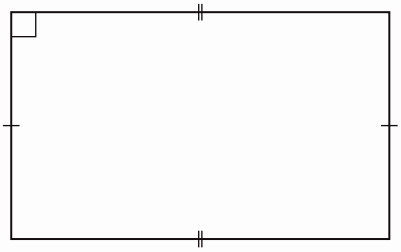
Using a ruler measure the side lengths of these shapes in centimetres. What is the perimeter of each shape?

a)



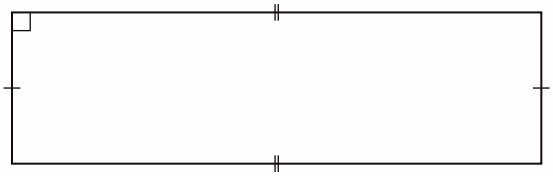
..... cm

b)



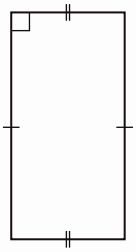
..... cm

c)



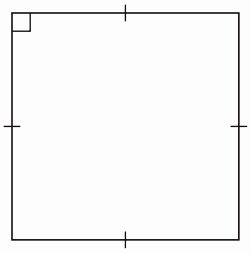
..... cm

d)



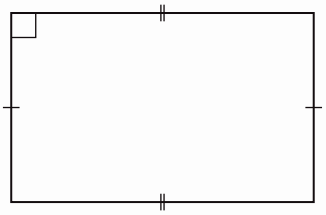
..... cm

e)



..... cm

f)



..... cm

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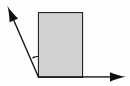
19. [Shapes]

Skill 19.1 Comparing angles to a right angle.

- Place the corner of a page (which is a right angle) at the corner (vertex) of the angle.
- Align the base of the page with one line of the angle.
- Compare the angle to the right angle that is the page.



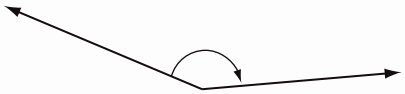
If the other line of the angle extends beyond the page, then the angle is "greater than" a right angle.

RIGHT ANGLE

If the corner of the page matches perfectly, then the angle is "equal to" a right angle.

If the other line of the angle is inside the page, then the angle is "less than" a right angle.

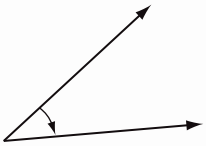
Q. Is the angle shown "less than", "equal to" or "greater than" a right angle?



A. ***greater than***

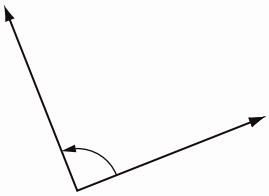
The angle appears greater than 90°. Check by placing the corner of a Maths Mate page inside the angle.

a) Is the angle "less than", "equal to" or "greater than" a right angle?

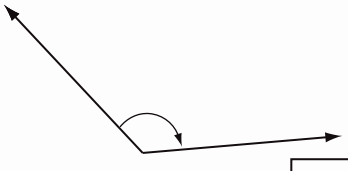


b) Is the angle "less than", "equal to" or "greater than" a right angle?

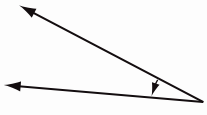
c) Is the angle "less than", "equal to" or "greater than" a right angle?



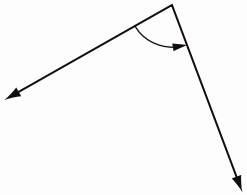
d) Is the angle "less than", "equal to" or "greater than" a right angle?



e) Is the angle "less than", "equal to" or "greater than" a right angle?



f) Is the angle "less than", "equal to" or "greater than" a right angle?



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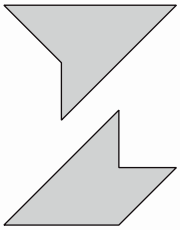
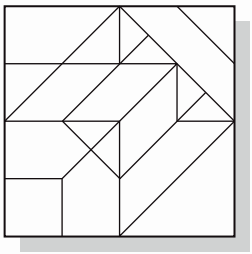
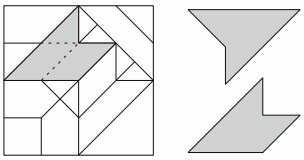
Skill 19.2 Recognising 2D shapes.

Q. One of these shapes is hidden in the maze. Find it and colour it in.
[Same size and orientation.]



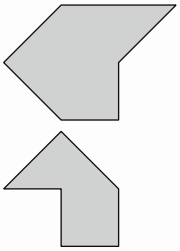


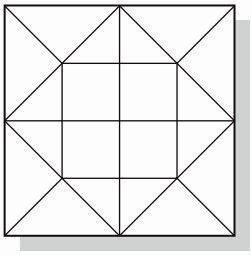
A.



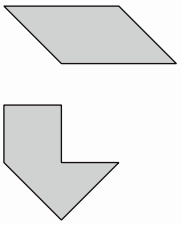
Trace and cut out the shapes to lay over the maze. Slide them to check possible positions. [Remember: Do not change their orientation by turning them. The shapes must have every edge outlined.]

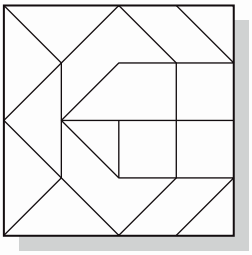
a) One of these shapes is hidden in the maze. Find it and colour it in.



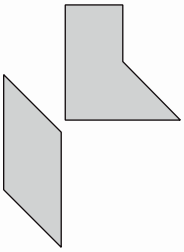


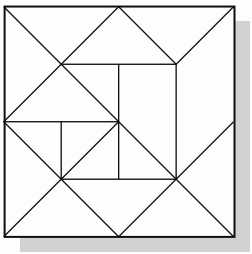
b) One of these shapes is hidden in the maze. Find it and colour it in.



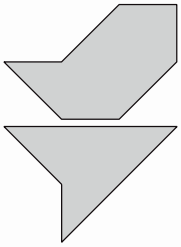


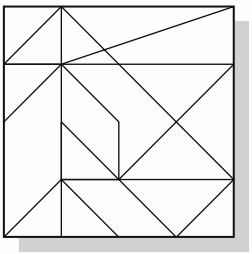
c) One of these shapes is hidden in the maze. Find it and colour it in.



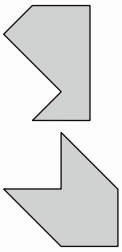


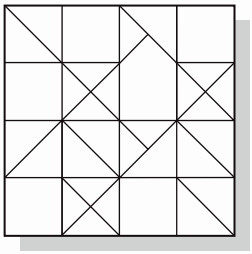
d) One of these shapes is hidden in the maze. Find it and colour it in.



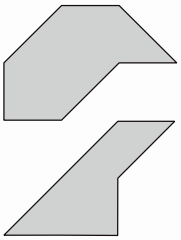


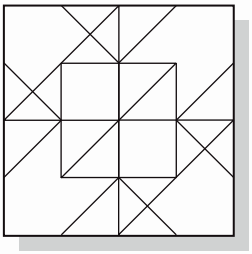
e) One of these shapes is hidden in the maze. Find it and colour it in.



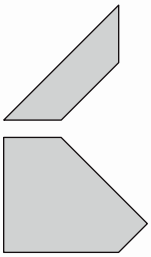


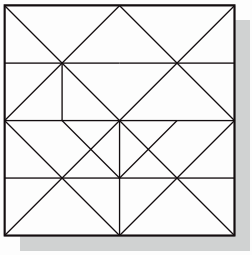
f) One of these shapes is hidden in the maze. Find it and colour it in.



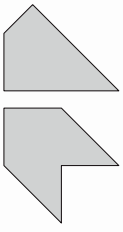


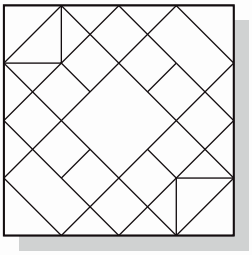
g) One of these shapes is hidden in the maze. Find it and colour it in.





h) One of these shapes is hidden in the maze. Find it and colour it in.





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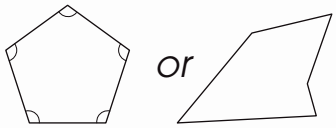
Skill 19.3 Drawing 2D shapes.

LATIN and GREEK TERMS					
poly	- many	mono	- one	hexa	- six
equi	- equal	bi or di	- two	hepta	- seven
gon	- angle	tri	- three	octa	- eight
lateral	- side	quad or tetra	- four	nona	- nine
		penta	- five	deca	- ten

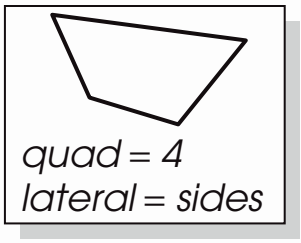
- Draw two dimensional shapes (2D) in two directions, length and width.
  Hint: 2D shapes have no height.
- Use the name of the shape (based on Latin and Greek words) to work out the number of sides.

Q. Draw a pentagon.

A. 

Consider the name:
gon = angle
penta = 5
You need to draw a shape that has 5 interior angles and therefore 5 sides.

a) Draw a quadrilateral.



b) Draw a triangle.

c) Draw a rectangle.

d) Draw a square.

e) Draw a decagon.

f) Draw a heptagon.

g) Draw a pentagon.

h) Draw an octagon.

i) Draw a nonagon.

j) Draw a trapezium.

k) Draw a hexagon.

l) Draw a rhombus.

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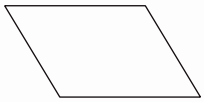
Skill 19.4 Describing polygons.

- Use the name of the polygon (poly means *'many'* and gon means *'angle'* to determine the number of interior angles or the number of sides.
  Hint: The number of interior angles = The number of sides.

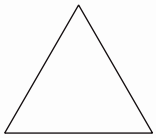
Q. How many sides does a rhombus have?



A. ***4***

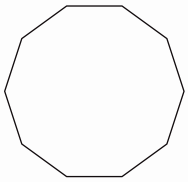
A rectangle, square, trapezium and rhombus all belong to the quadrilateral family: quad = 4
lateral = sides

a) How many interior angles does a triangle have?

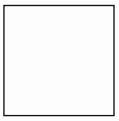


b) How many sides does a rectangle have?

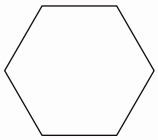
c) How many sides does a decagon have?



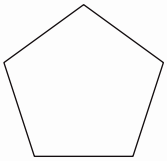
d) How many interior angles does a square have?



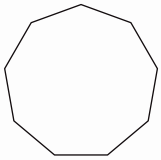
e) How many interior angles does a hexagon have?



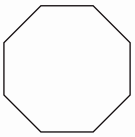
f) How many sides does a pentagon have?



g) How many sides does a nonagon have?

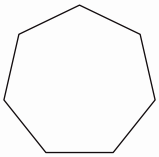


h) How many sides does an octagon have?



i) How many interior angles does a quadrilateral have?

j) How many sides does a heptagon have?



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Skill 19.5 Recognising properties of triangles and quadrilaterals.

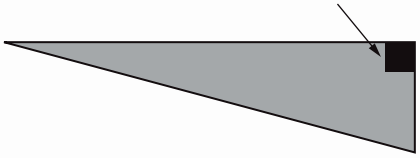
- Look for equal sides or equal angles.
- Look at the types of angles inside the triangle.
- Look at the types of lines inside the triangle or quadrilateral (parallel, perpendicular, symmetry).

Q. This triangle has:

A) one line of symmetry
B) two parallel sides
C) all sides of equal length
D) one right angle

A. ***D***

A, B and C are not true.
D is the correct answer, because the triangle has a right angle.

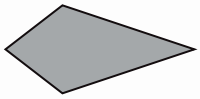


a) This square has:

A) one obtuse angle
B) no line of symmetry
C) all sides of equal length
D) two acute angles

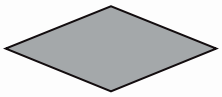
C

b) This kite has:



A) two parallel sides
B) one line of symmetry
C) two perpendicular sides
D) all sides of equal length

c) This rhombus has:



A) one right angle
B) two perpendicular sides
C) all angles equal
D) two lines of symmetry

d) This trapezium has:

A) one line of symmetry
B) two perpendicular sides
C) two parallel sides
D) all sides of equal length

e) I am a quadrilateral. I have both pairs of sides parallel. I have four right angles. Any two adjacent sides are not equal in length. What shape am I?

A) rectangle
B) square
C) rhombus

f) I am a quadrilateral. I have opposite sides that are parallel. My diagonals are not equal in length. What shape am I?

A) square
B) parallelogram
C) trapezium

g) I am a quadrilateral. I have both pairs of sides parallel. My diagonals are not equal in length but they do cross at right angles. What shape am I?

A) parallelogram
B) square
C) rhombus

h) I am a quadrilateral. I have two pairs of equal sides. My diagonals cross at right angles. I have only one line of symmetry. What shape am I?

A) square
B) kite
C) rectangle

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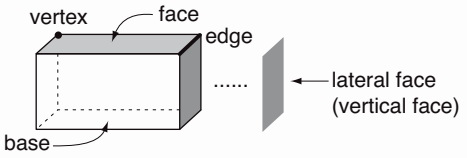
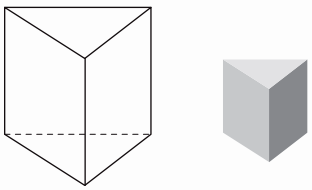
Skill 19.6 Describing 3D shapes.

- Count the number of: Faces,
  Edges and/or
  Vertices (points/corners).

3D SHAPE

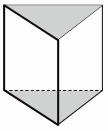


Q. What is the shape of the 3 lateral faces of the triangular prism?

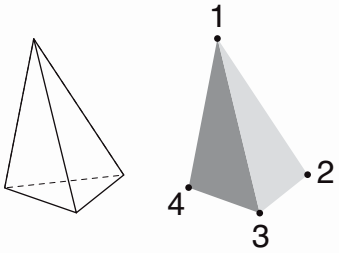


A. ***rectangle***

The 2 parallel bases of a triangular prism are triangular in shape. These triangles, as for all prisms, are joined by rectangular faces. The number of rectangular faces is the same as the number of sides on the base shape.

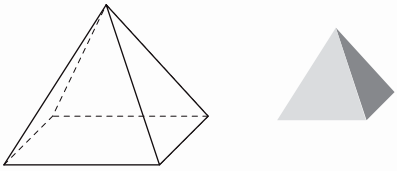


a) How many vertices does a triangular pyramid have?

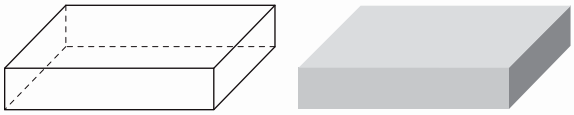


Count the number of points.

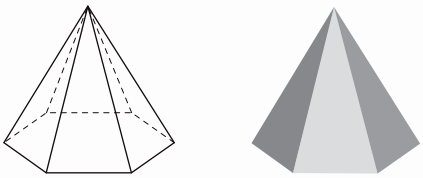
b) How many edges does a rectangular pyramid have?



c) How many edges does a rectangular prism have?



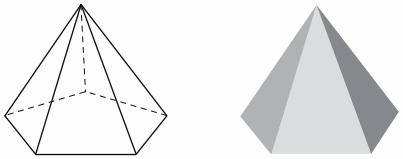
d) How many faces does a hexagonal pyramid have?



e) The base of a tetrahedron is triangular. What shape are the other faces?

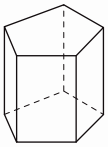
f) What is the shape of the 8 lateral (vertical) faces of the octagonal prism?

g) How many vertices does a pentagonal pyramid have?



h) What is the name of this solid?

A) pentagonal prism
B) hexagonal pyramid
C) pentagonal pyramid
D) hexagonal prism



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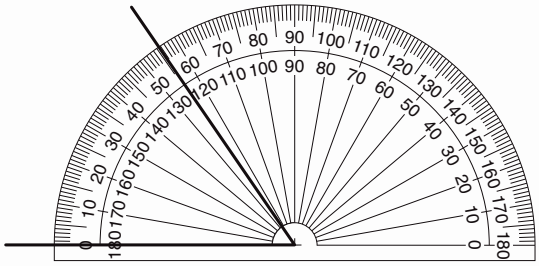
Skill 19.7 Measuring angles using a protractor.

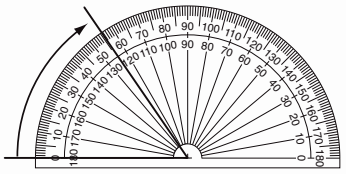
- Place the centre of the protractor at the corner (vertex) of the angle.
- Align one line of the angle with a zero line on the protractor.
- Take the reading from where the second line of the angle crosses the scale on the protractor.

  Hint: Protractors can be read using either the inside or outside scale depending on which zero is used.

Q. Using the protractor measure the size of the angle shown.

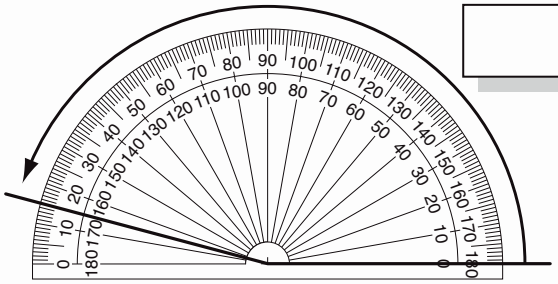


A. ***55°***

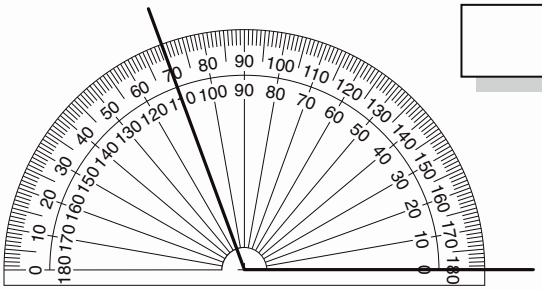


Read from the outside scale.
One line of the angle is at 0°and the other line of the angle extends around to 55°.

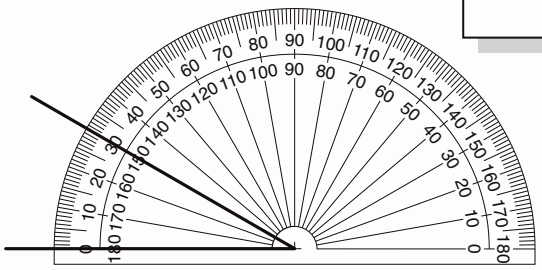
a) Using the protractor measure the size of the angle shown.



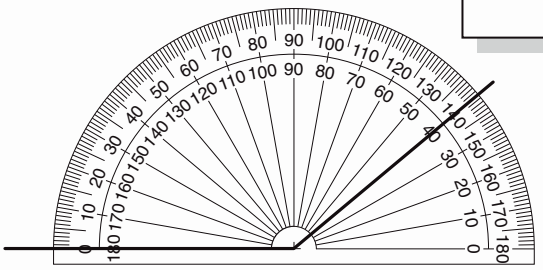
b) Using the protractor measure the size of the angle shown.



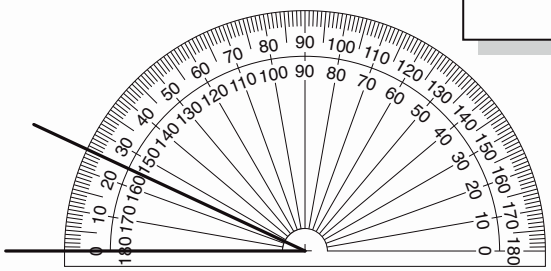
c) Using the protractor measure the size of the angle shown.



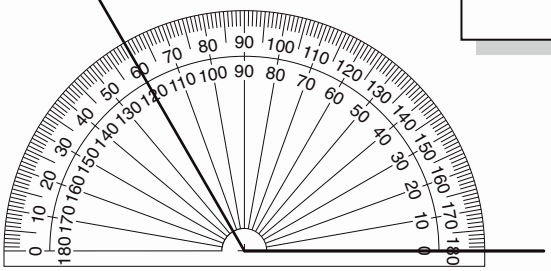
d) Using the protractor measure the size of the angle shown.



e) Using the protractor measure the size of the angle shown.



f) Using the protractor measure the size of the angle shown.



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Skill 19.8 Recognising and drawing different types of angles.

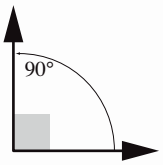
To recognise a type of angle

- Draw a right angle using one of the lines and the corner over each of the given angles.
- Compare each angle to the right angles you have drawn.

To draw a type of angle

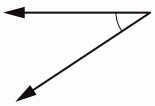
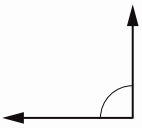
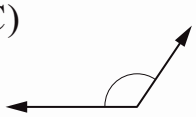
- Draw a line starting from one end of the given line.
- Draw the line according to the type of angle required (see Glossary).
- Mark the angle with a curved line.

RIGHT ANGLE

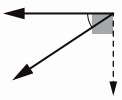


A right angle measures 90° (degrees).
It is marked with a corner.

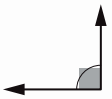
Q. Which angle is an obtuse angle?

A)  B)  C) 

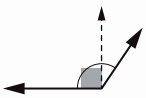
A. C



The angle is smaller than a right angle ⇒ not obtuse

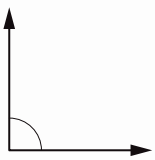
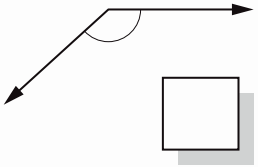


The angle is equal to a right angle ⇒ not obtuse

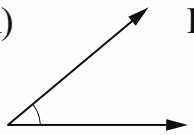
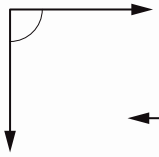
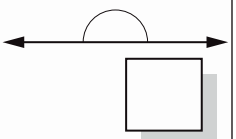


The angle is greater than a right angle ⇒ obtuse

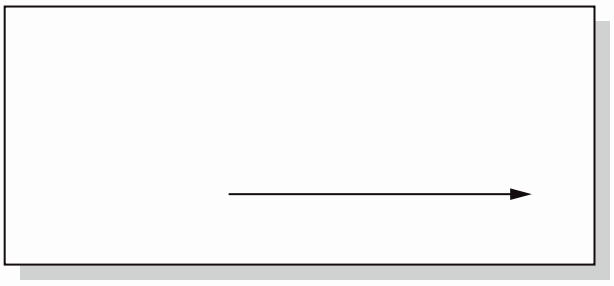
a) Which angle is a right angle?

A)  B) C) 

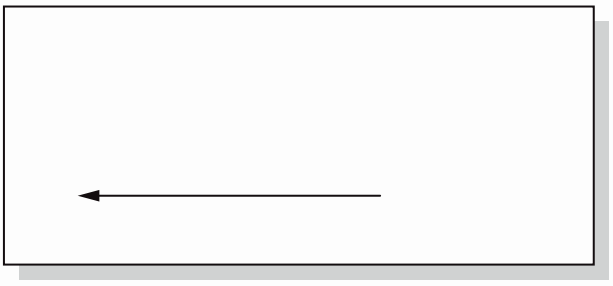
b) Which angle is a straight angle?

A)  B)  C) 

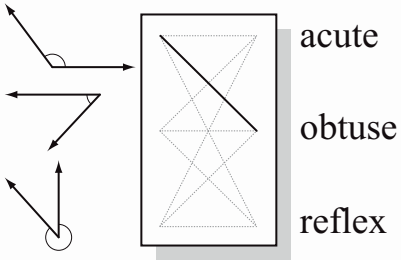
c) Draw an obtuse angle using this line.



d) Draw an acute angle using this line.



e) Match the angle to its description.

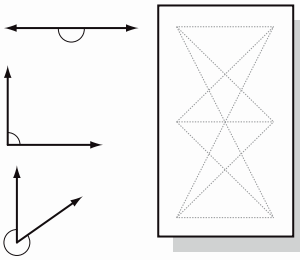


acute

obtuse

reflex

f) Match the angle to its description.



right

reflex

straight

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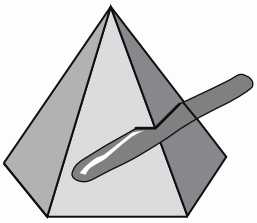
Skill 19.9 Identifying the shape of a cross section.

Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

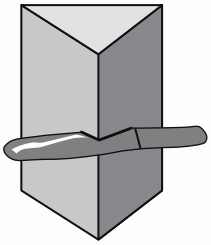
Q. Name the shape of the cross section through the pentagonal pyramid.



A. ***pentagon***

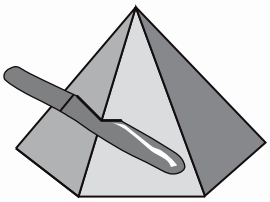
The base of the pyramid is a pentagon. The shape of the cross section will also be pentagonal.

a) Name the shape of the cross section through the triangular prism.

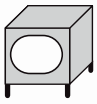


The view of the cross-section is the same as the view from the top.

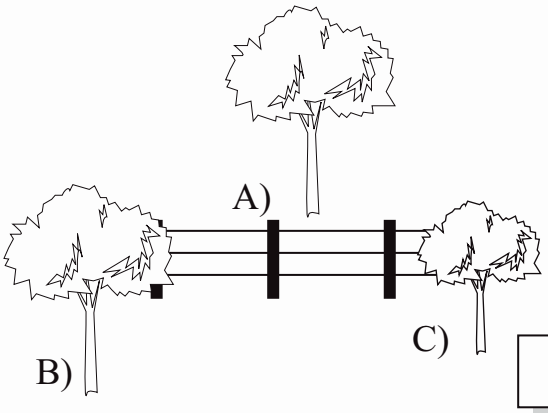
b) Name the shape of the cross section through the hexagonal pyramid.



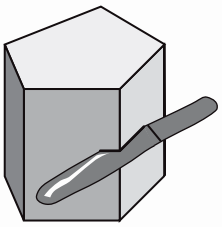
c) A fly on the ceiling, a father and a baby all looked at the television. Which view looks like the one seen by the fly?

A) B)  C)

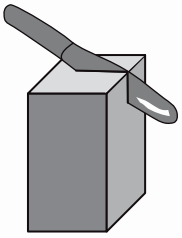
d) Which tree appears to be the biggest?



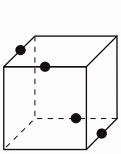
e) Name the shape of the cross section through the pentagonal prism.



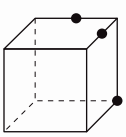
f) Name the shape of the cross section through the square prism.



g) Which shape shows the cross section produced by slicing through the points indicated on the cube?



h) Which shape shows the cross section produced by slicing through the points indicated on the cube?



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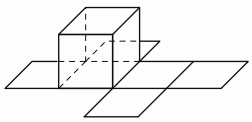
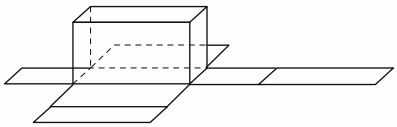
Skill 19.10 Identifying nets of 3D shapes (1).

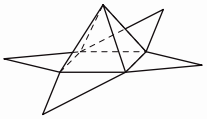
NETS of 3D SHAPES



Cube



Prism

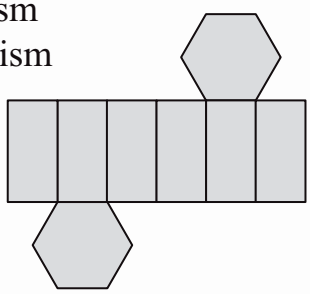


Pyramid

- Identify the shapes in the net.
- Imagine the shape folded.
  OR
  Make a model by tracing, cutting out and folding the net.

Q. Which shape can this net be used to make?

A) hexagonal pyramid
B) hexagonal prism
C) rectangular prism



A. ***B***

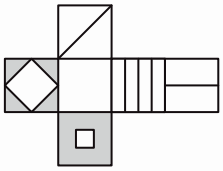
The net is formed from 2 hexagons and 6 rectangles. Pyramids have triangles as their lateral sides. Prisms have rectangles. It must be a prism not a pyramid. This prism has hexagons as its base and top.
OR
Trace, cut out and fold the shape.

a) Which of the boxes can be made from the net below?

A)

B)

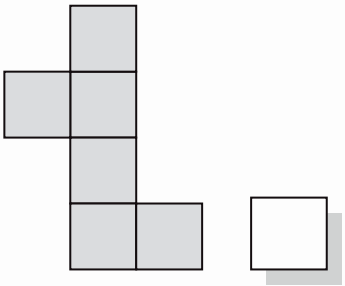
C)



Trace, cut out and fold the shape.

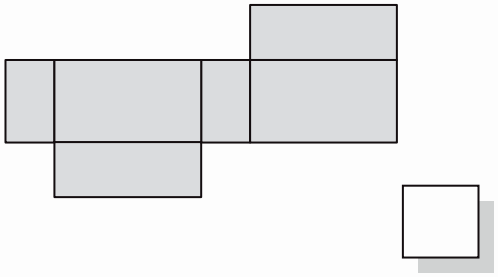
b) Which shape can this net be used to make?

A) cube
B) tetrahedron
C) square prism



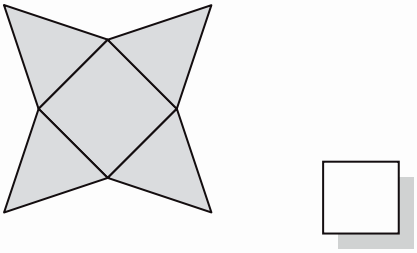
c) Which shape can this net be used to make?

A) square prism
B) rectangular prism
C) cube



d) Which shape can this net be used to make?

A) triangular pyramid
B) square prism
C) square pyramid



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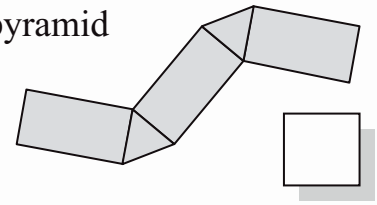
e) Which shape can this net be used to make?

A) cube
B) triangular prism
C) triangular pyramid

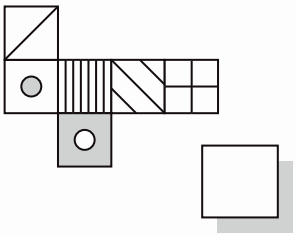


f) Which of the boxes can be made from the net below?

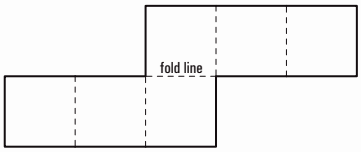
A)

B)

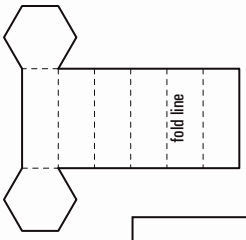
C)



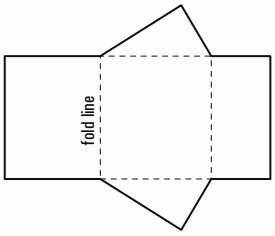
g) What 3-dimensional shape can this net be used to make?



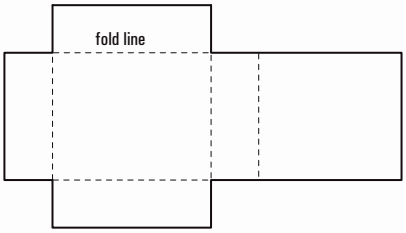
h) What 3-dimensional shape can this net be used to make?



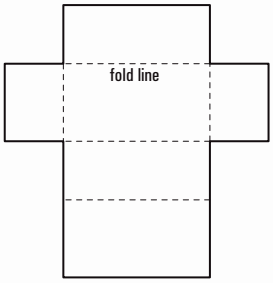
i) What 3-dimensional shape can this net be used to make?



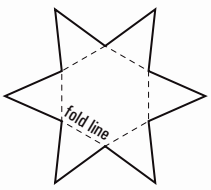
j) What 3-dimensional shape can this net be used to make?



k) What 3-dimensional shape can this net be used to make?



l) What 3-dimensional shape can this net be used to make?



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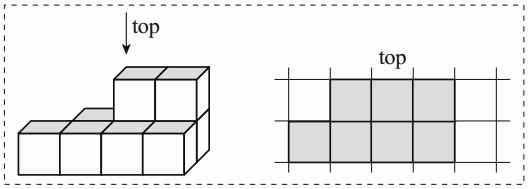
Skill 19.11 Drawing top, side and front views of 3D shapes.

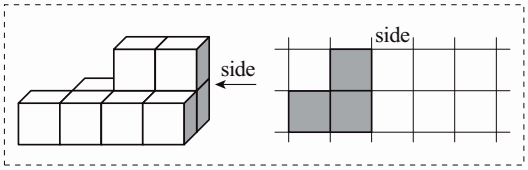
Drawing the top view of a 3D shape

- Imagine what you would see if you were looking at the solid from directly above.



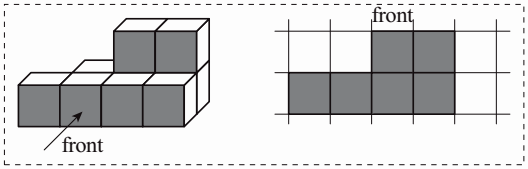
Drawing the side view of a 3D shape

- Imagine what you would see if you were looking at one of the sides of the solid.

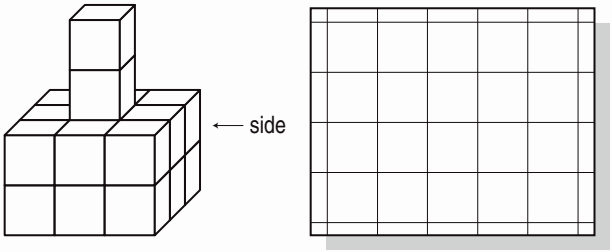


Drawing the front view of a 3D shape

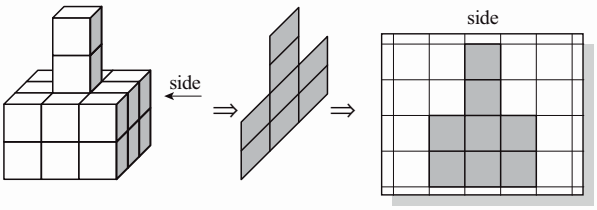
- Imagine what you would see if you were looking at the front of the solid.



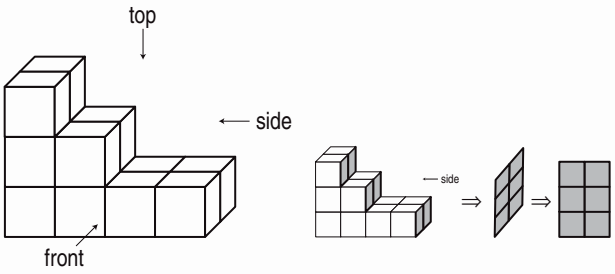
Q. Draw the side view of this solid.



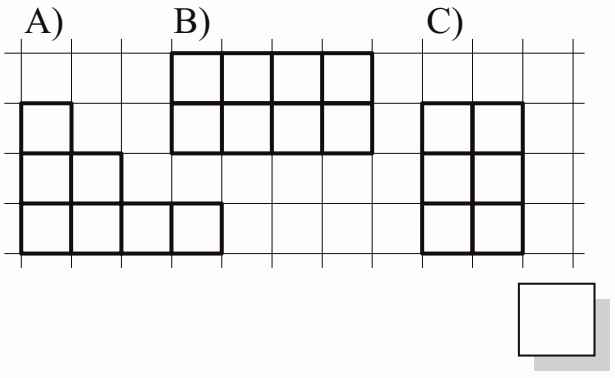
A.



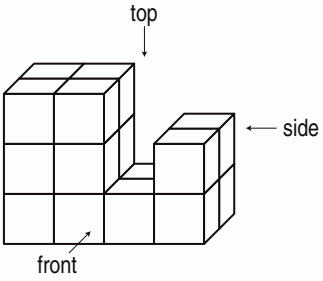
a)



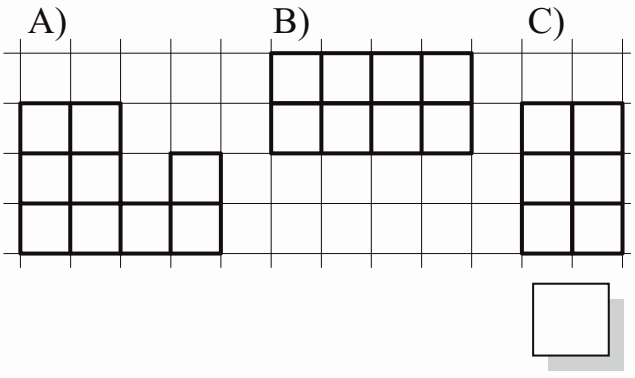
Which shape is the side view of the solid above?



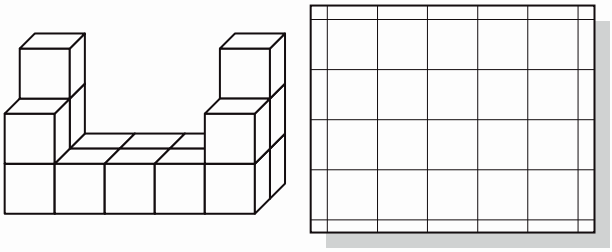
b)



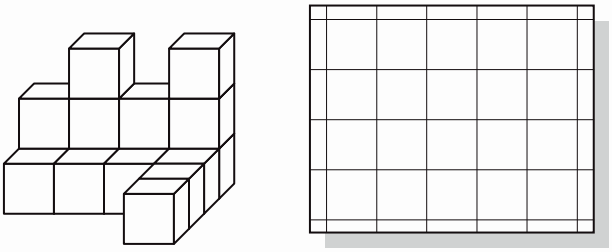
Which shape is the top view of the solid above?



c) Draw the front view of this solid.



d) Draw the side view of this solid.



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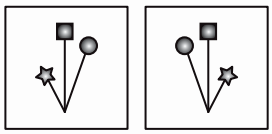
20. [Location / Transformation]

Skill 20.1 Describing the movement of an object.

Q. Which movement has transformed this shape?

A) flip (reflection)
B) slide (translation)
C) turn (rotation)



Position 1 Position 2

A. ***A***

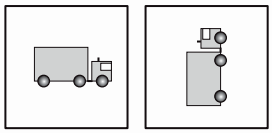
A) Hold a mirror vertically on the right edge of position 1. This shows the object has been reflected to achieve position 2. correct

Sketch the object as in position 1.
B) Try sliding it. Note the change in position as a result. incorrect

C) Try turning it. Note the change in position as a result. incorrect

a) Which movement has transformed this shape?

A) flip (reflection)
B) slide (translation)
C) turn (rotation)

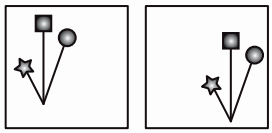


Position 1 Position 2

The truck has been turned a quarter of a turn, anticlockwise.

b) Which movement has transformed this shape?

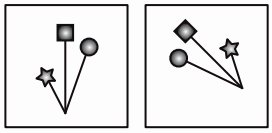
A) flip (reflection)
B) slide (translation)
C) turn (rotation)



Position 1 Position 2

c) Which movement has transformed this shape?

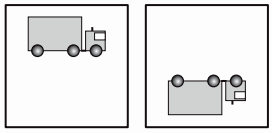
A) flip (reflection)
B) slide (translation)
C) turn (rotation)



Position 1 Position 2

d) Which movement has transformed this shape?

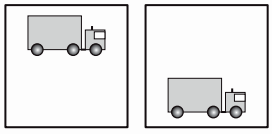
A) flip (reflection)
B) slide (translation)
C) turn (rotation)



Position 1 Position 2

e) Which movement has transformed this shape?

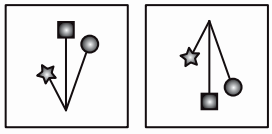
A) flip (reflection)
B) slide (translation)
C) turn (rotation)



Position 1 Position 2

f) Which movement has transformed this shape?

A) flip (reflection)
B) slide (translation)
C) turn (rotation)



Position 1 Position 2

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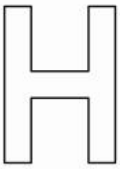
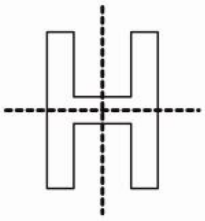
Skill 20.2 Drawing lines of symmetry through a shape.

- Imagine a line along which the shape can be folded to have one part fit exactly over the other part.

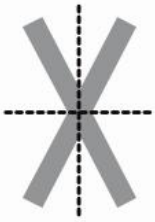
Q. Draw the lines of symmetry through the shape. How many lines of symmetry does the shape have?



A. *2*



a) Draw the lines of symmetry through the shape. How many lines of symmetry does the shape have?

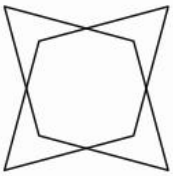


b) Draw the lines of symmetry through the shape. How many lines of symmetry does the shape have?

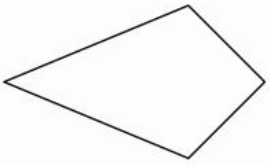
c) Draw the lines of symmetry through the shape. How many lines of symmetry does the shape have?

d) Draw the lines of symmetry through the shape. How many lines of symmetry does the shape have?

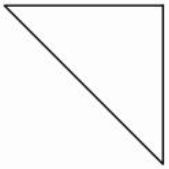
e) Draw the lines of symmetry through the shape. How many lines of symmetry does the shape have?



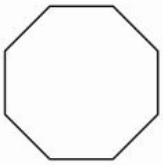
f) Draw the lines of symmetry through the kite. How many lines of symmetry does it have?



g) Draw the lines of symmetry through the triangle. How many lines of symmetry does it have?



h) Draw the lines of symmetry through the octagon. How many lines of symmetry does it have?



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Skill 20.3 Locating places using compass bearings N, E, S and W.

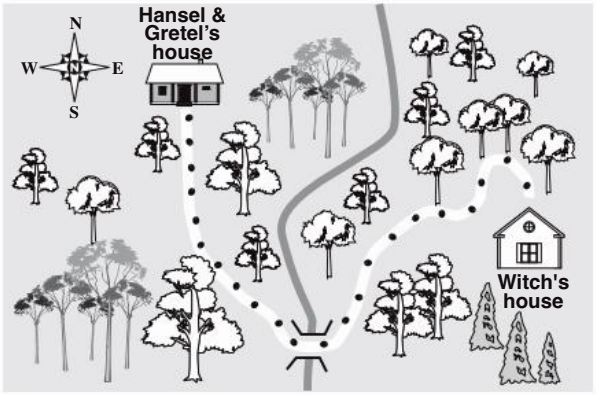
- Refer to the 4 point compass to find your bearings.
  Hint: (Clockwise) - '**N**ever **E**at **S**ea **W**eed' - North, East, South, West.

Q. Which capital city is east of Skopje, the capital of Macedonia?

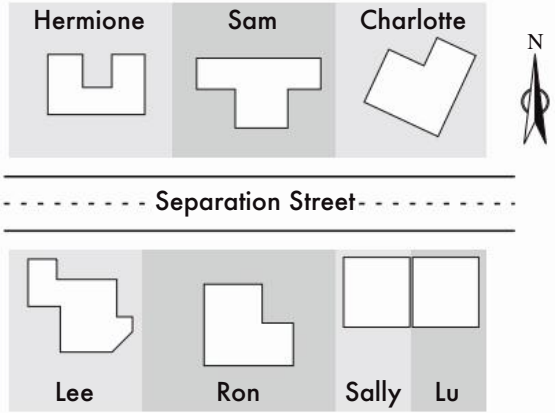
A. ***Istanbul***

Find Skopje on the map.
Consider that you are there.
Imagine the central point of a compass on Skopje.
Turn and face the direction of the arrow pointing east.
Which capital city would you be looking at?

a) Hansel and Gretel left a trail along the forest path. In which direction did they walk when they first left their house?

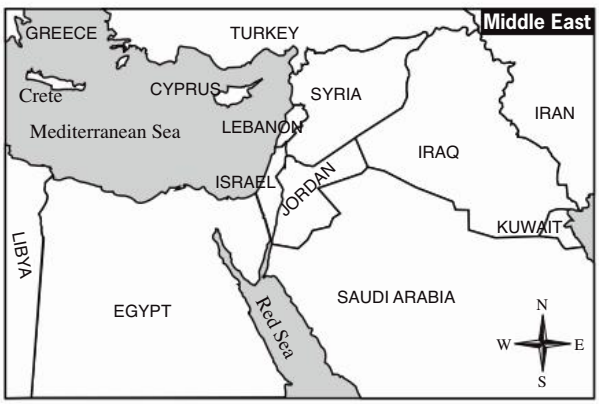


b) Hermione's house is on the north side of Separation Street. On which side of the street is Ron's house?



c) Of the Queensland cities shown below, which city is the most northerly?

d) In which direction is the Red Sea from Saudi Arabia?



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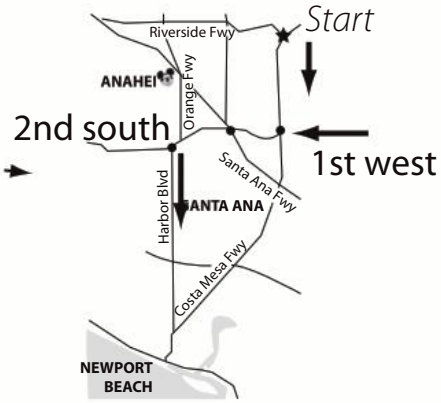
Q. Head south from the starting point. Take the first road west and the second south. Which beach is at the end of the road?

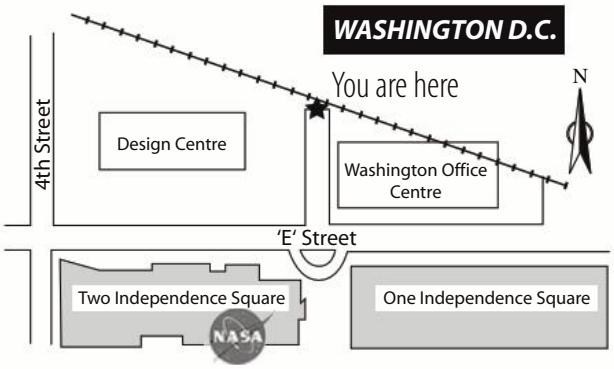
Enlargement

A. ***Newport Beach***

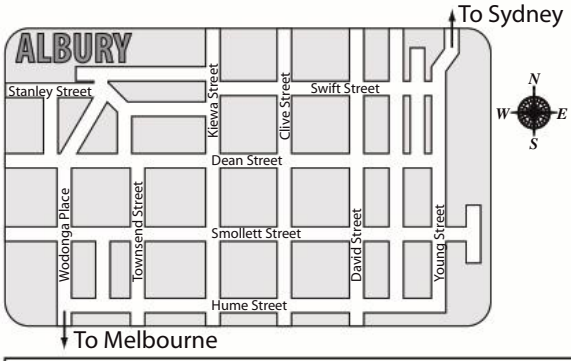


Consider one movement at a time. Mark your position as you go.

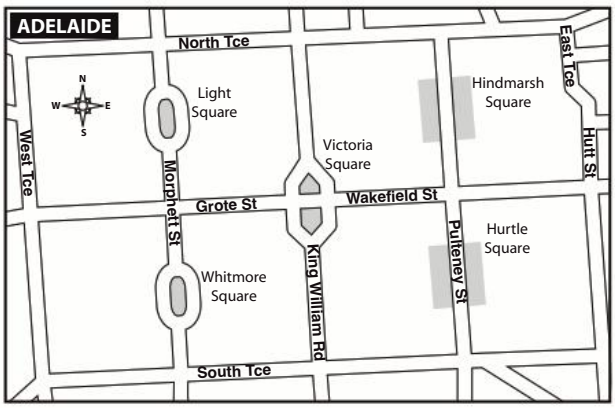
a) You head south towards 'E' street and turn west. To which number Independence Square are you headed?



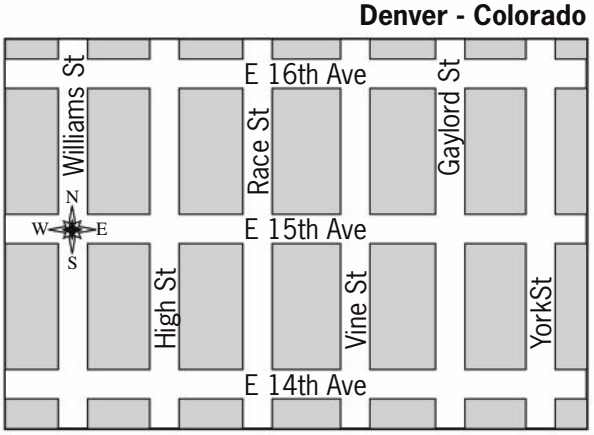
b) From the corner of Kiewa and Dean Street you walk east for two blocks and then walk south for two blocks. If you then go west, which street are you in?



c) Head north on Morphett St. Turn east into North Terrace. Then take the second turn south. Which square are you approaching?



d) Start at the compass. Go east on E 15th Ave and take the second road north. Turn east again at the next corner. Which street are you in?



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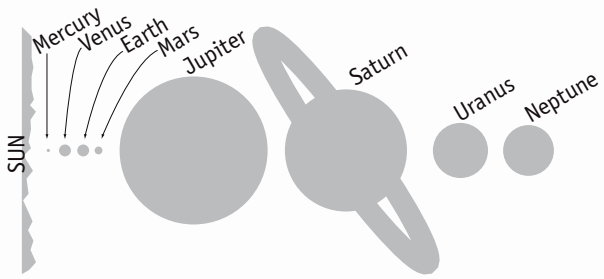
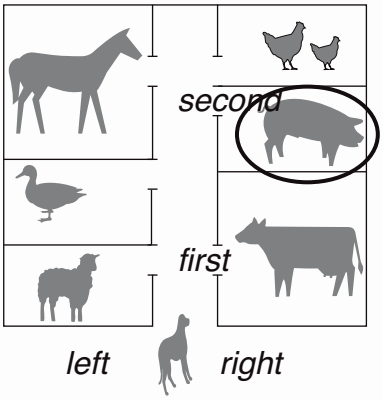
Q. In our Solar System which planet is between Mars and Neptune but closest to Mars?



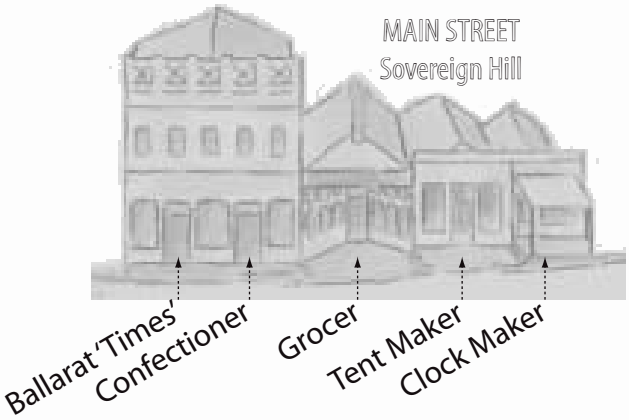
A. ***Jupiter***

Check the meaning of any unknown terms used to describe location.
Between means somewhere in the middle of the boundaries.
Closest means the shortest distance from.

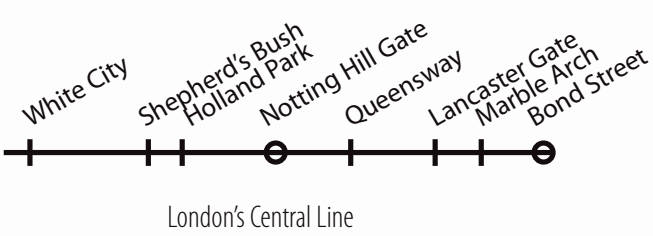
a) A dog enters a shed and goes into the pen that is second on the right. What animal is it now with?



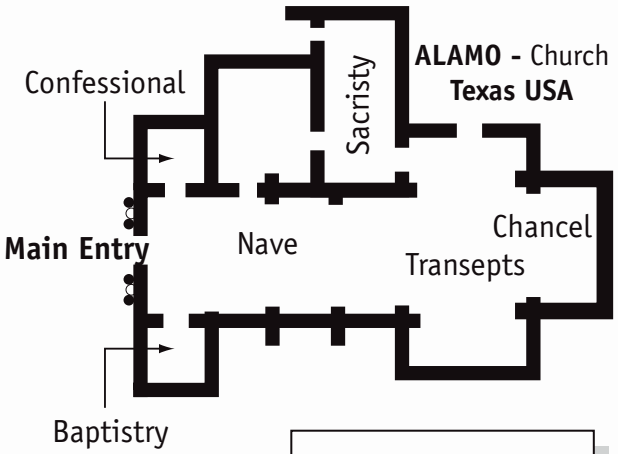
b) At Sovereign Hill, which building is between the Ballarat 'Times' and the Tent Maker but closest to the Tent Maker?



c) On the Central Line in London which station is between White City and Bond Street but closest to Bond Street?



d) From the main entry of the church in the Alamo compound you take the second opening on the left and then the first on the right. Where are you?



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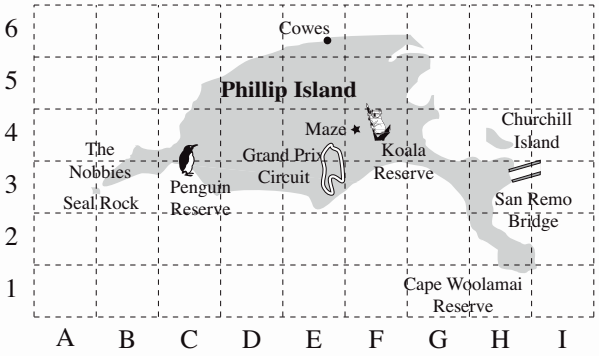
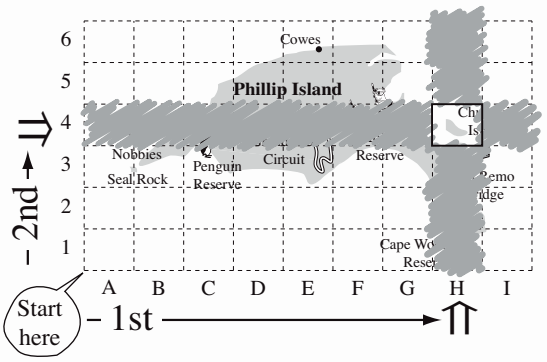
Skill 20.6 Using regions on a grid to describe location, e.g. A3 (1).

- Start at the bottom left corner of the grid.
- First read **across** the horizontal axis to find the letter that matches the column you need.
- Then read **up** the vertical axis to find the number that matches the row you need.
  The grid space that is common to both lines marks the position you are locating.

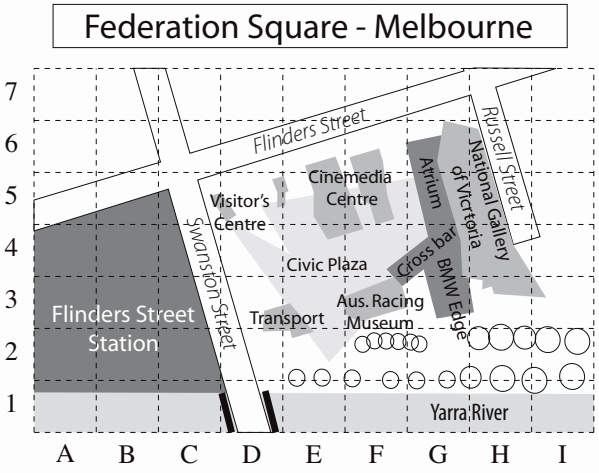
Q. Which Island is found at H4?



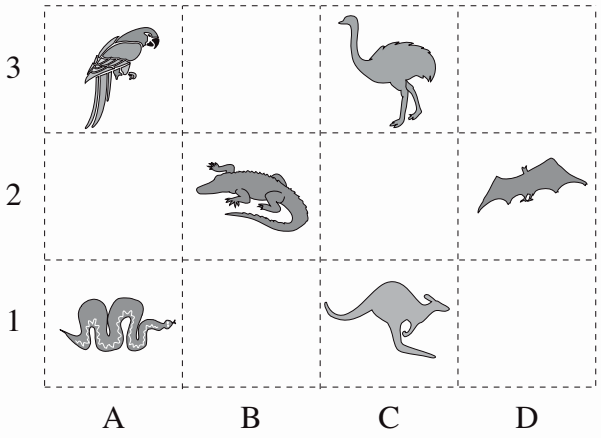
A. ***Churchill Island***



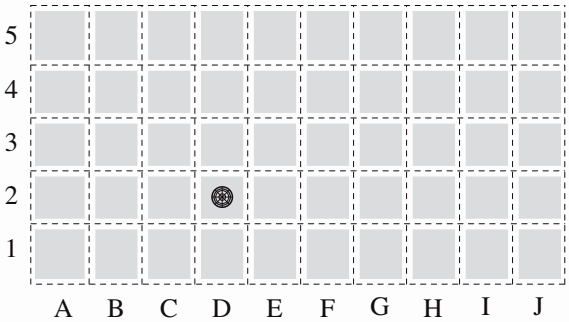
a) Where is the Australian Racing Museum located on the grid?



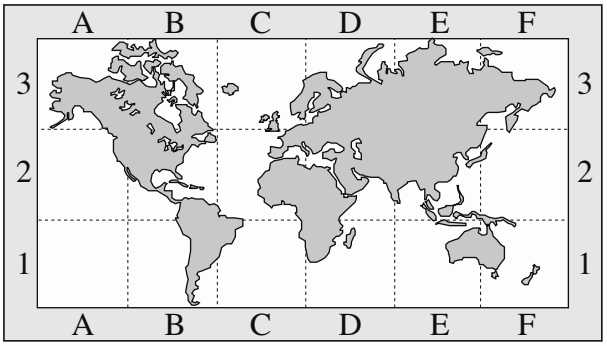
b) Which Australian animal is located at C1?



c) What is the location of the drain on the tiled bathroom floor?



d) Alaska is located at A3 on this map. Where is New Zealand located?



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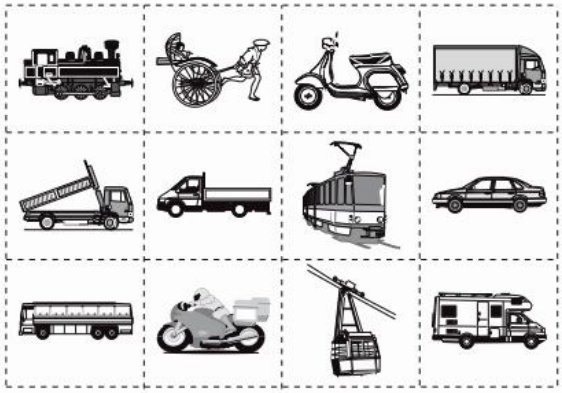
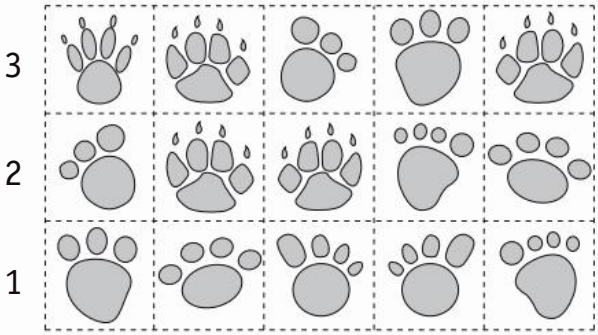
e) Where is the rickshaw located on the grid?



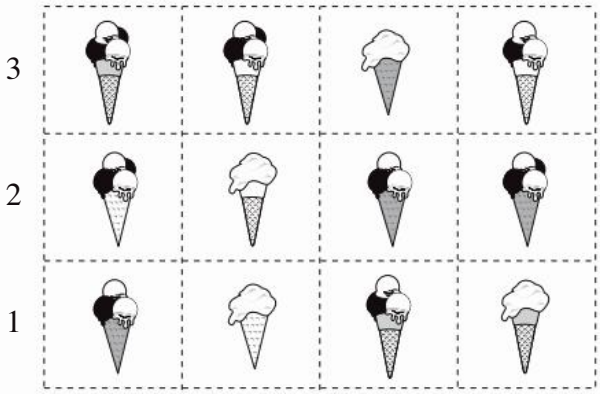
f) Where is the person who is poking out his tongue located on the grid?

g) Of these fantasy creatures, what would you be if you were at E2?

h) There are 7 pairs of paw prints in this diagram. Find the grid reference of the paw print that has no pair.

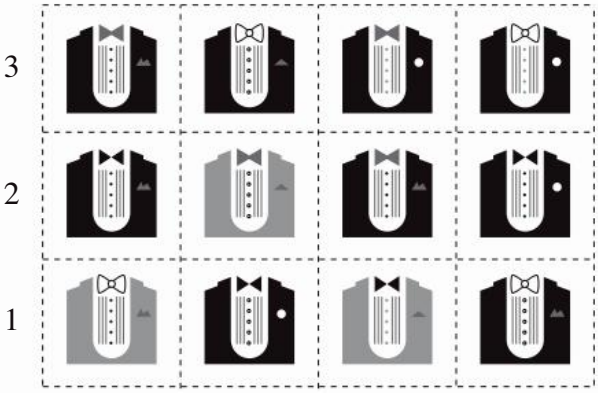


i) Find the coordinates of the only two identical icecreams. [Hint: cone type, cone colour, scoop type and scoop number all vary.]



and

j) Find the coordinates of the only two identical tuxedos. [Hint: suit colour, bow tie, buttons and pocket handkerchief all vary.]



and

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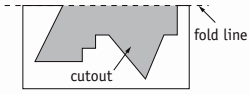
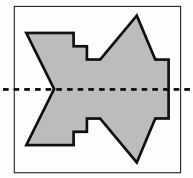
Skill 20.7 Sketching symmetrical shapes.

- Hold a mirror on the fold line to see what you should sketch.
- Sketch this image on the other side of the fold line.

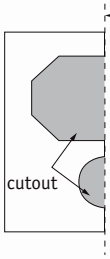
Q. Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.

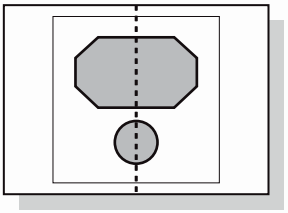


A.

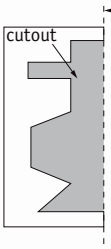


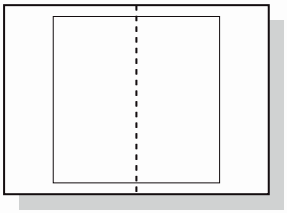
a) Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.



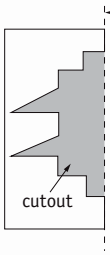


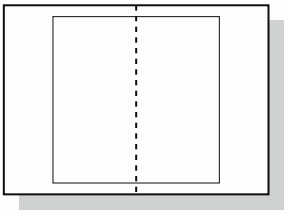
b) Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.



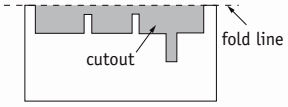


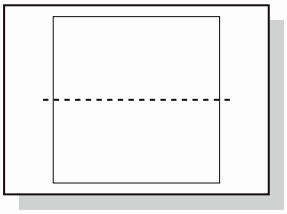
c) Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.



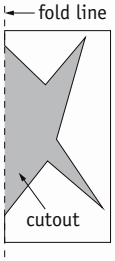


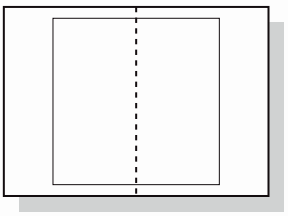
d) Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.



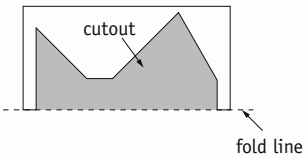


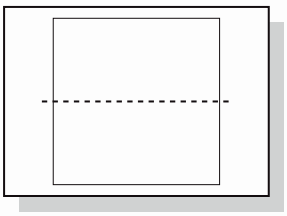
e) Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.



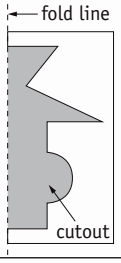


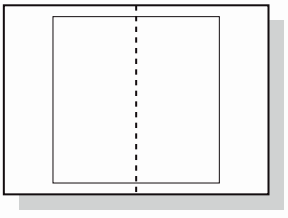
f) Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.



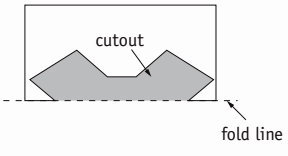


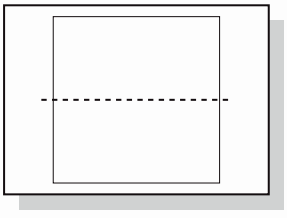
g) Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.





h) Paper is folded in half. This design is cut out. Draw the paper unfolded with the full cutout.





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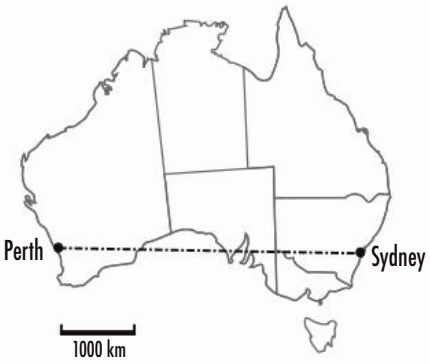
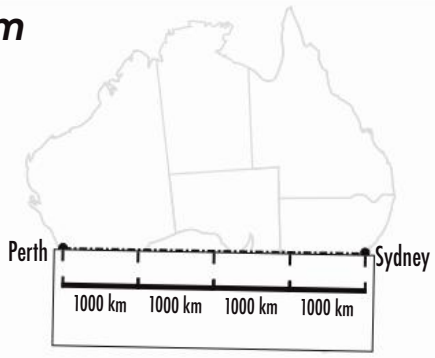
Skill 20.8 Using a linear scale to calculate distance (1).

- Put a piece of paper along the distance to be measured.
- Mark the start and end points on the paper.
- Place the paper against the scale matching the starting points.
- Slide the paper across the length of the scale marking the start and end points as you go.
- Add together the distance covered.

Q. Using the scale, what is the marked distance from Perth to Sydney?
[Round off to the nearest 500 km.]

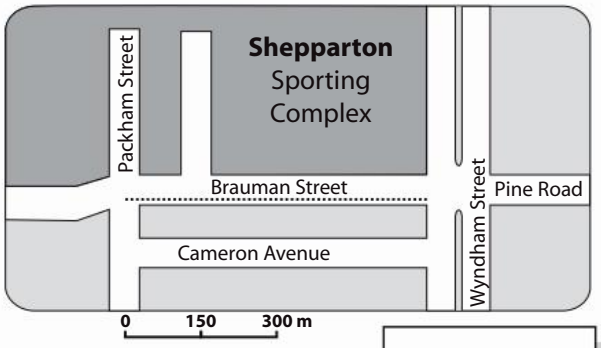


A. ***4000 km***



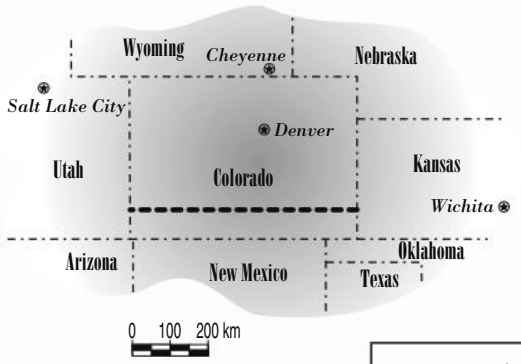
Check the scale against the length of the line. Slide the scale as necessary.
$4 \times 1000 = 4000$

a) Use the scale to find the length of Brauman Street.
[Round off to the nearest 50 m.]



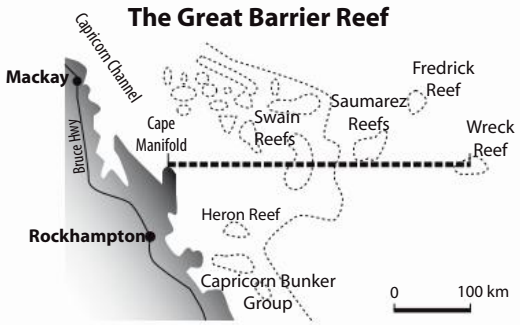
m

b) Use the scale to find the width of Colorado. [Round off to the nearest 100 km.]



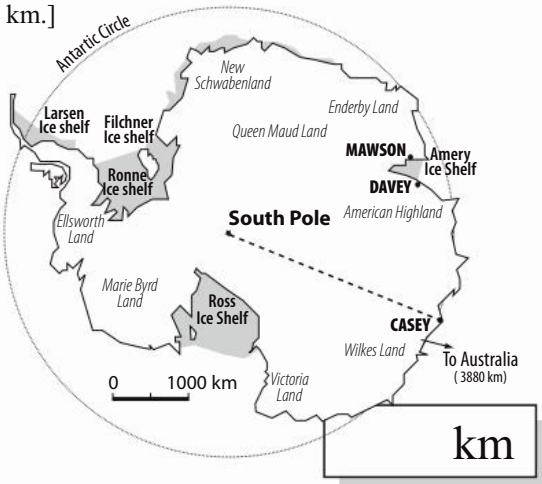
km

c) Using the scale, what is the marked distance from Cape Manifold to Wreck Reef? [Round off to the nearest 100 km.]



km

d) Using a ruler and the scale, find the distance between the South Pole and Casey Station. [Round off to the nearest 1000 km.]



km

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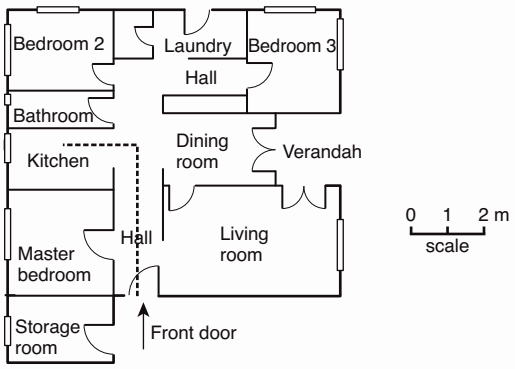
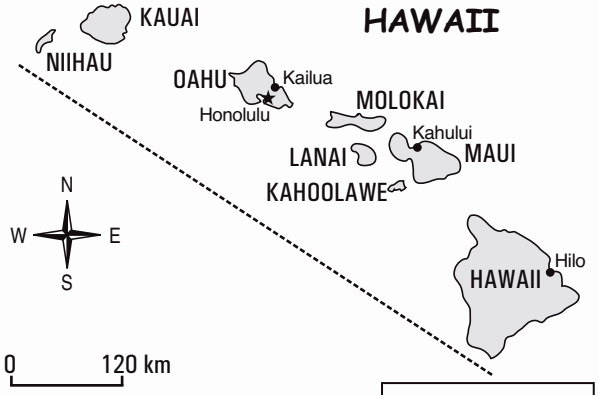
e) Calculate the marked distance from the front door to the kitchen. [Round off to the nearest 1 m.]



m

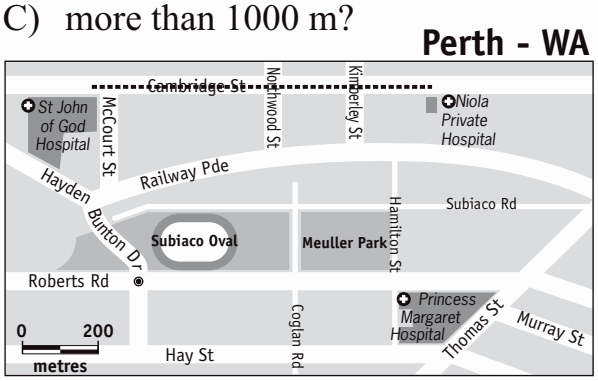
f) What is the marked distance from end to end of the Hawaiian islands? [Round off to the nearest 20 km.]



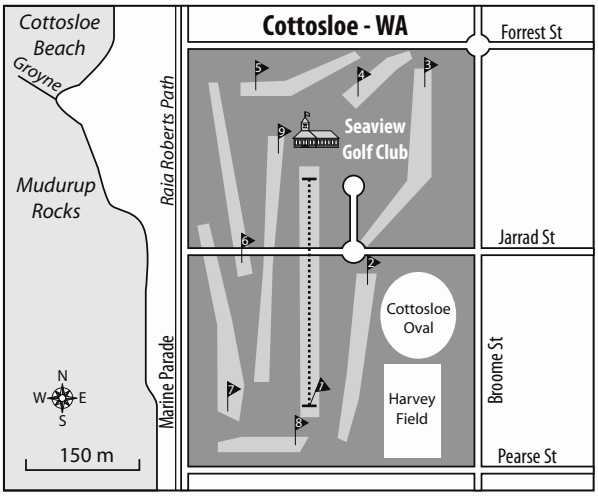
km

g) Is the distance between St John of God Hospital and Niola Private Hospital

A) less than 800 m,
B) between 800 m and 1000 m or
C) more than 1000 m?

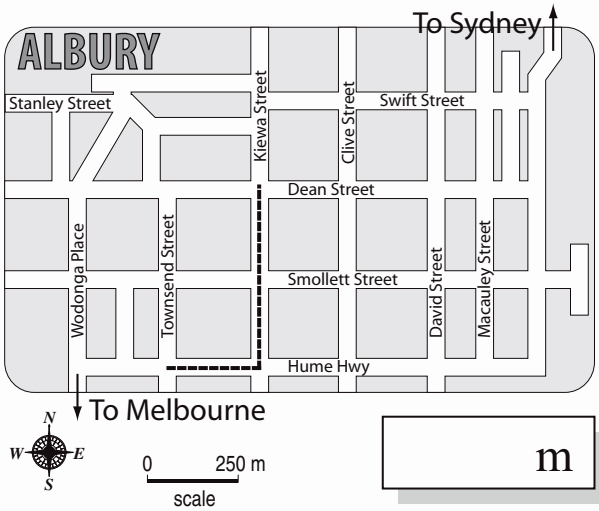


h) Using the scale, what is the distance from the tee to the hole on the first fairway? [Round off to the nearest 1 m.]



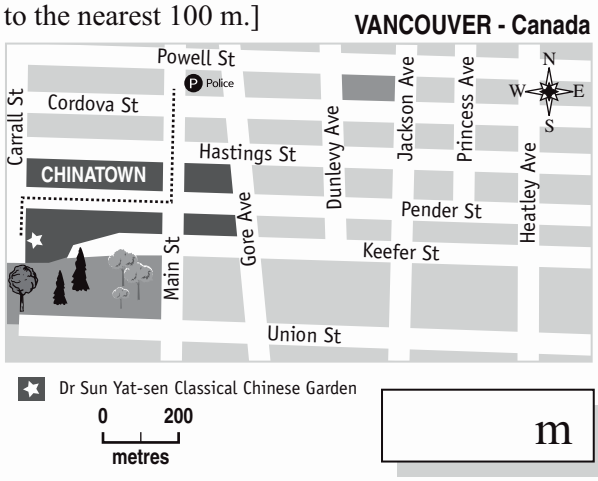
m

i) What is the marked distance from the intersection of the Hume Highway and Townsend Street to Dean Street in Albury? [Round off to the nearest 50 m.]



m

j) What is the marked distance from Dr Sun Yat-sen Classical Chinese Garden to the Police station? [Round off to the nearest 100 m.]



m

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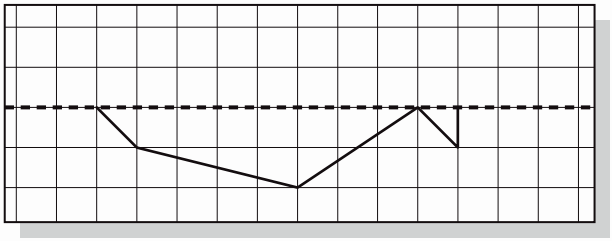
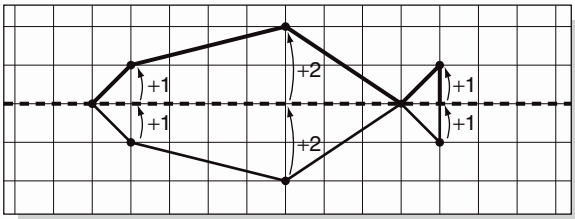
Skill 20.9 Drawing reflections on a grid (1).

- Mark every vertex on the shape.
- Measure the distance to the dashed line.
- Measure the same distance on the other side of the dashed line.
- Draw a point.
- Join the points.

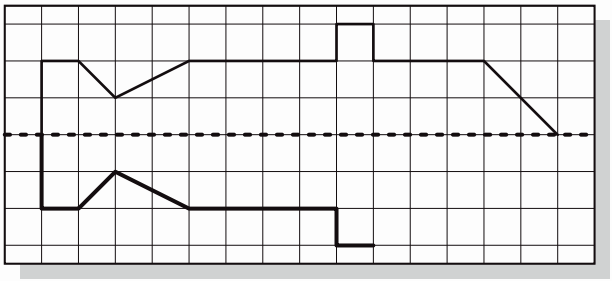
Q. Complete the drawing so that it has a line of symmetry as shown by the dotted line.



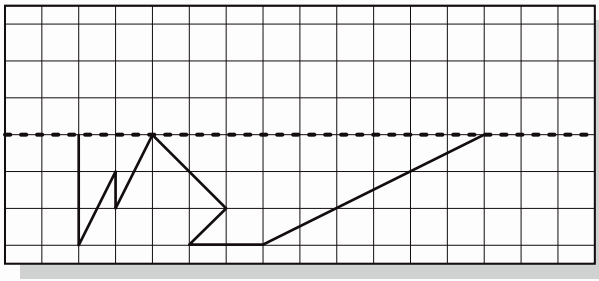
A.



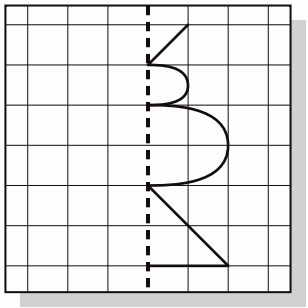
a) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



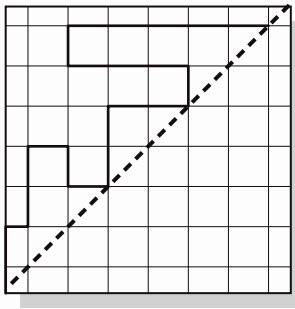
b) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



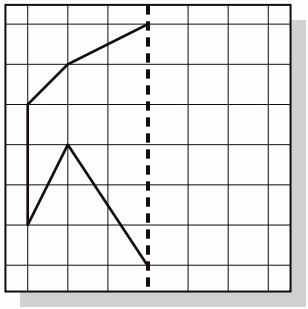
c) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



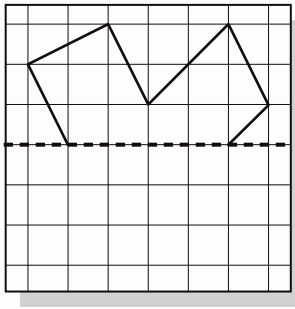
d) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



e) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



f) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



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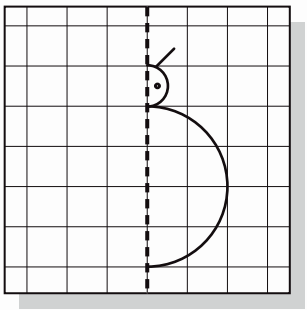
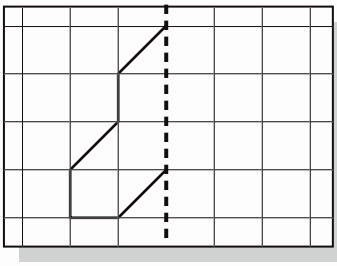
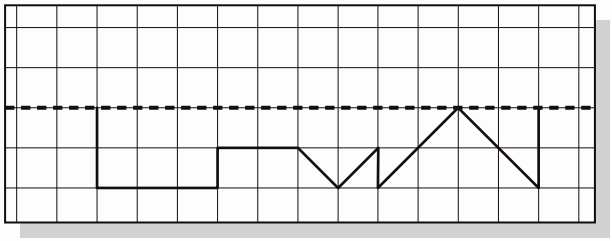
g) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



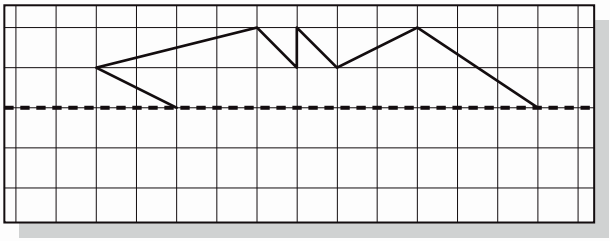
h) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



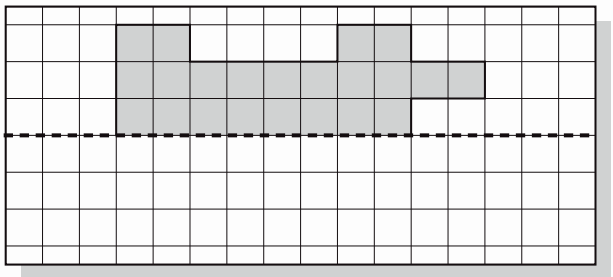
i) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



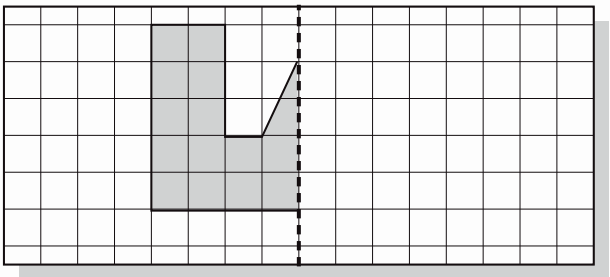
j) Complete the drawing so that it has a line of symmetry as shown by the dotted line.



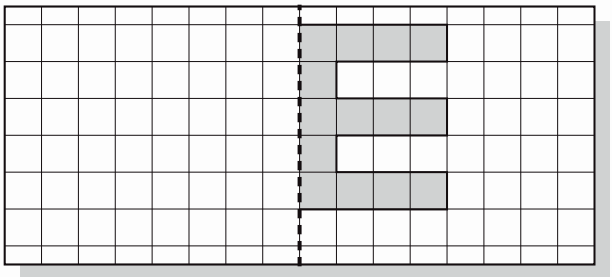
k) Draw the reflection of this shape in the dotted line.



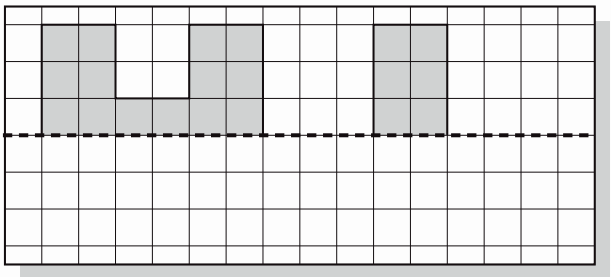
l) Draw the reflection of this shape in the dotted line.



m) Draw the reflection of this shape in the dotted line.



n) Draw the reflection of this shape in the dotted line.



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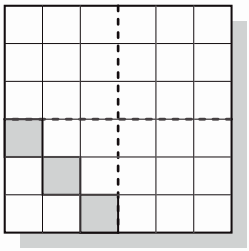
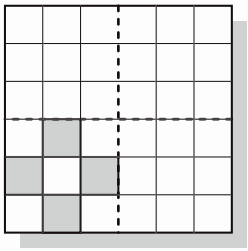
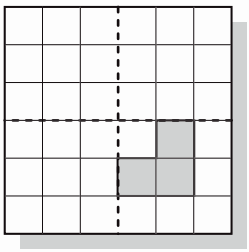
o) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



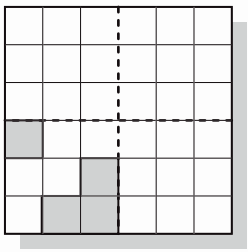
p) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



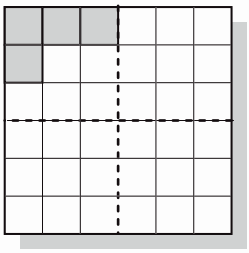
q) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



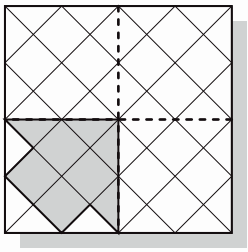
r) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



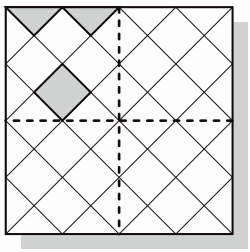
s) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



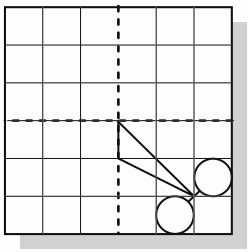
t) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



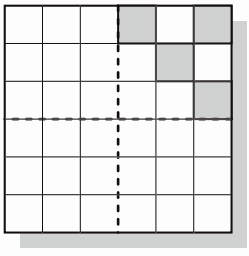
u) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



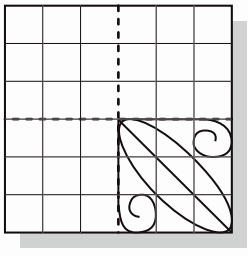
v) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



w) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



x) Complete this design so that it has two lines of symmetry as shown by the dotted lines.



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Skill 20.10 Drawing reflections, translations, rotations, enlargements and reductions on a grid (1).

To draw a shape moved by a reflection

- Mark every vertex on the shape.
- Measure the distance to the dashed line.
- Measure the same distance on the other side of the dashed line.
- Draw a point.
- Join the points.

To draw a shape moved by a rotation

- Rotate each vertex by the given angle, in the given direction.
- Plot and join the rotated points.

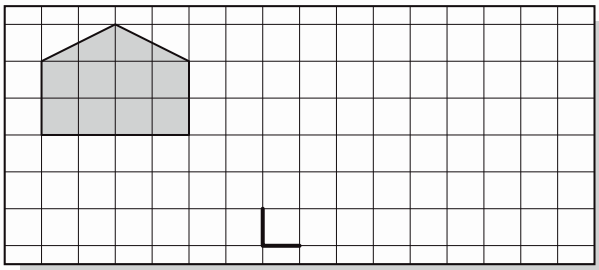
To draw a shape moved by a translation

- Mark every vertex on the shape.
- From each vertex move across the required number of units.
- Draw a point.
- Join the points.

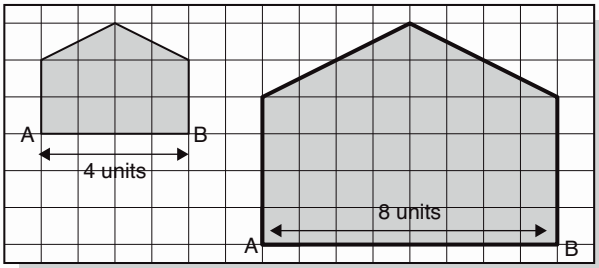
To draw a reduced or enlarged shape

- Measure the length of one side.
- Calculate the reduction or enlargement for this side.
- Repeat for all sides of the shape.
- Redraw the shape.

Q. Redraw this shape after doubling its size.

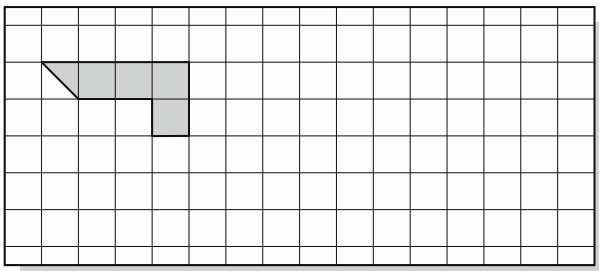


A.

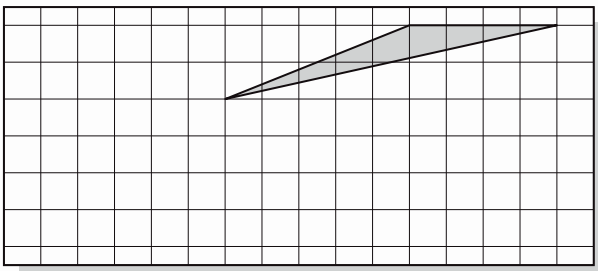


Doubling means ×2.
The distance from A to B is 4 units.
$4 \times 2 = 8$ units
Start drawing the enlargement, 8 units long, from the given corner.
Repeat for all sides of the shape.

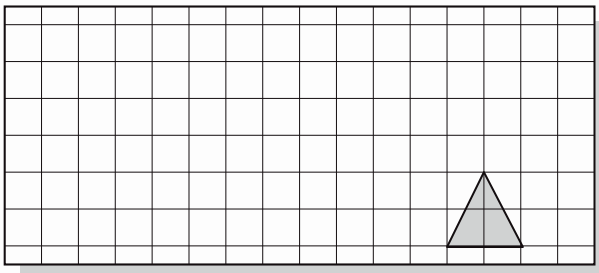
a) Redraw this shape after translating it 8 units to the right.



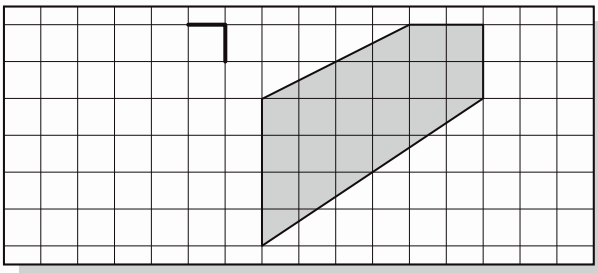
b) Redraw this shape after translating it 4 units down.



c) Redraw this shape after translating it 7 units to the left and then 3 units up.



d) Redraw this shape after halving its size.



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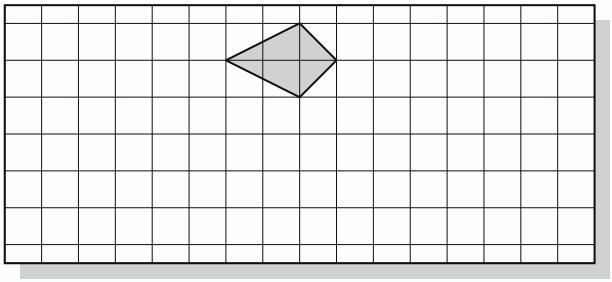
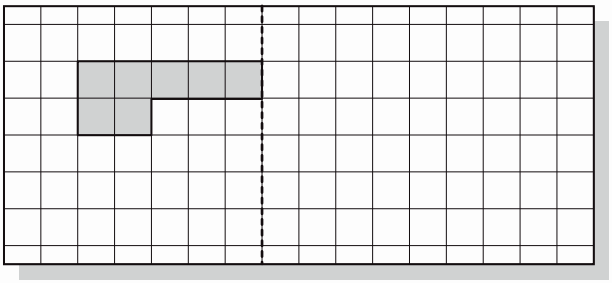
Skill 20.10 Drawing reflections, translations, rotations, enlargements and reductions on a grid (2).

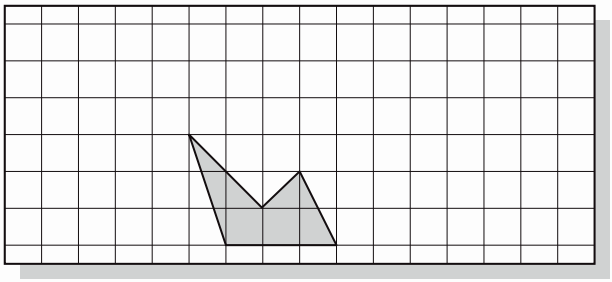
e) Redraw this shape after translating it 6 units to the right and then 3 units down.



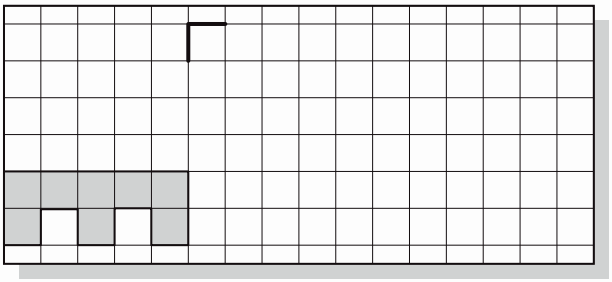
f) Redraw this shape after reflecting it in the dotted line, and then translating it 3 units down.



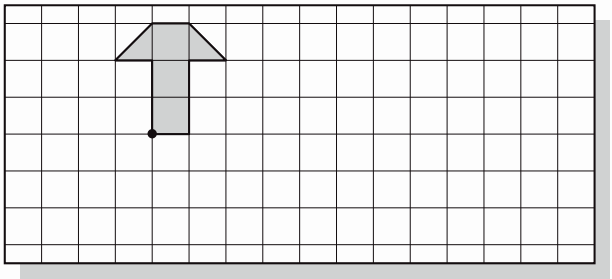
g) Redraw this shape after translating it 3 units up and then 5 units to the left.



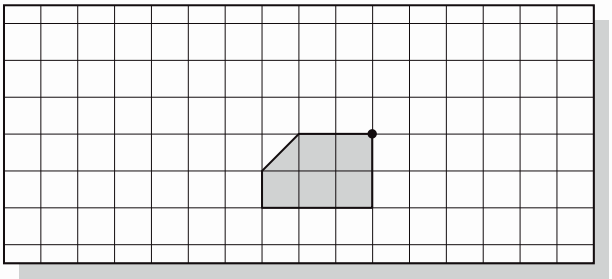
h) Redraw this shape after doubing its size.



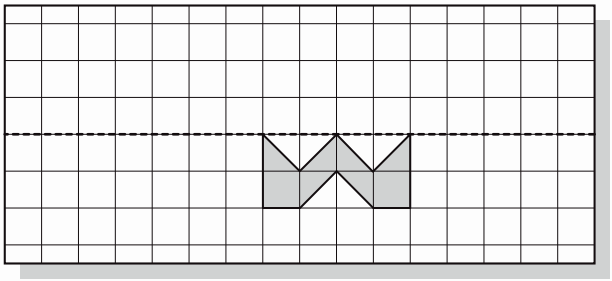
i) Redraw this shape after turning it 90° anticlockwise around the marked point.



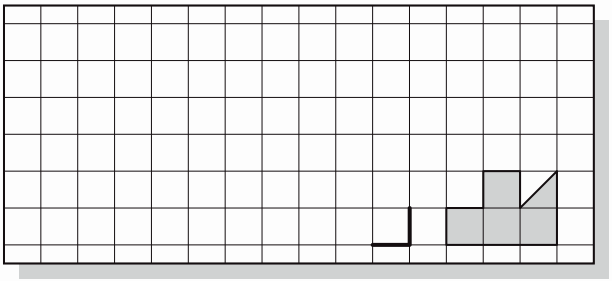
j) Redraw this shape after turning it 90° clockwise around the marked point and then translating it 4 units to the right.



k) Redraw this shape after reflecting it in the dotted line, and then translating it 6 units to the left.



l) Redraw this shape after tripling its size.



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Skill 20.11 Identifying line and rotational symmetry.

For line symmetry

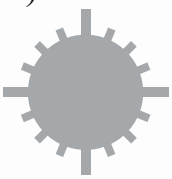
- Imagine a line along which the shape can be folded to have one part fit exactly over the other part.

For rotational symmetry

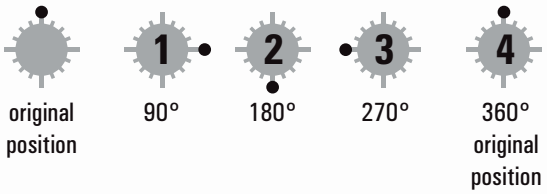
- Try to visualise the shape during a full turn of 360° and make sure that the shape could cover itself at least once before the full turn is completed.

Q. The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry



A. *C*



This shape covers itself 4 times before a full 360° turn.
The shape has also line symmetry.

a) The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry

b) The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry

c) The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry

d) The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry

e) The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry

f) The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry

g) The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry

h) The shape has:

A) line symmetry
B) rotational symmetry
C) both line and rotational symmetry

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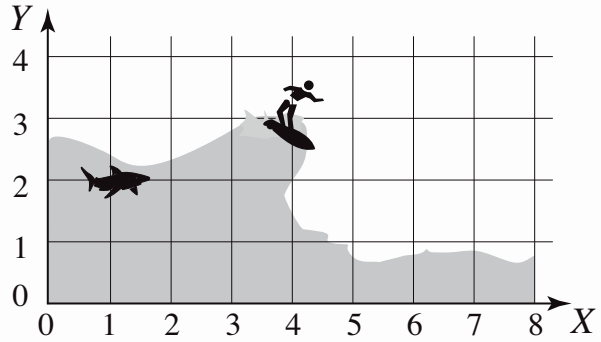
Skill 20.12 Finding the coordinates of a point on a Cartesian plane, first quadrant.

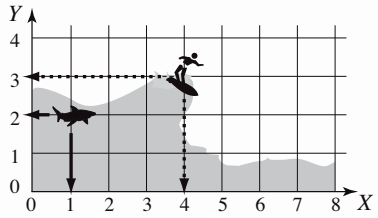
- Read the coordinate along the horizontal or *x*-axis first.
- Then read the coordinate on the vertical or *y*-axis.

Hint: *x* comes before *y* in the alphabet.

Q. What are the coordinates of the shark and the surfer on the grid?



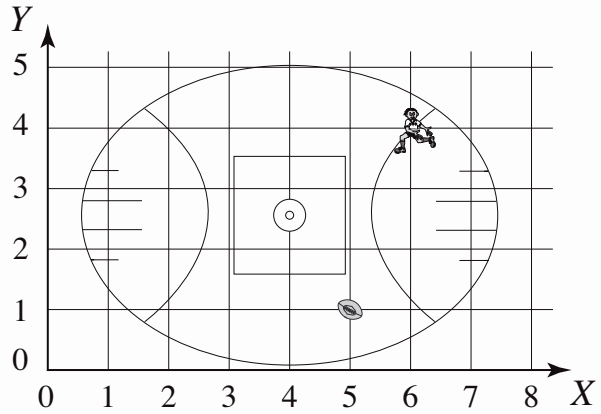
A. *shark* = ***(1,2)*** *surfer* = ***(4,3)***



Trace down from the shark to the *x*-axis. Write the number (1,).
1 is the *x*-coordinate for the shark.

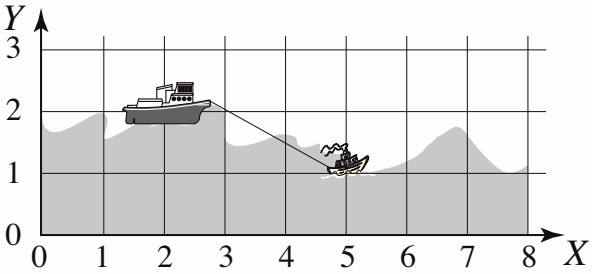
Trace across from the shark to the *y*-axis. Add the number 2 to the coordinate pair (1,2). 2 is the *y*-coordinate for the shark.
Repeat for the surfer: (4,3)

a) What are the coordinates of the umpire and the football on the oval?



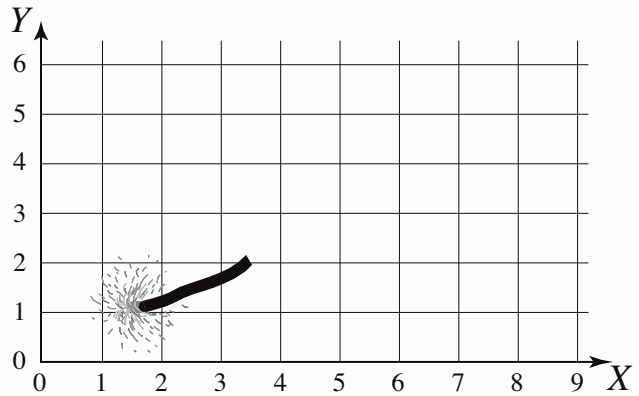
umpire = football =

b) What are the coordinates of the ship and the tugboat on the grid?

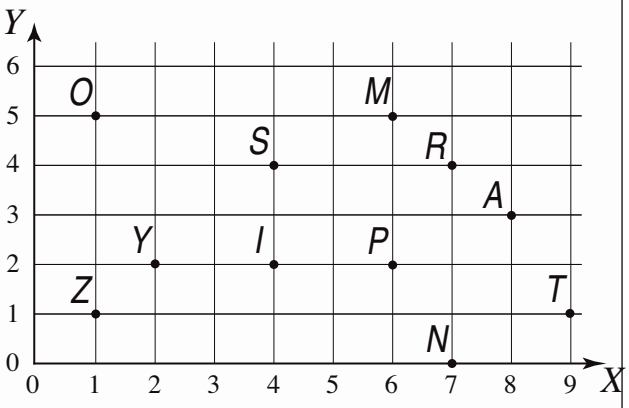


ship = tugboat =

c) Start at (4,1). Draw a line to (3,3) and continue to (6,5), (8,5), (7,3) and (4,1).



d) Find the letter at each pair of coordinates to decode the word.
(4,2) (7,4) (1,5) (7,0) (6,5) (8,3) (7,0)



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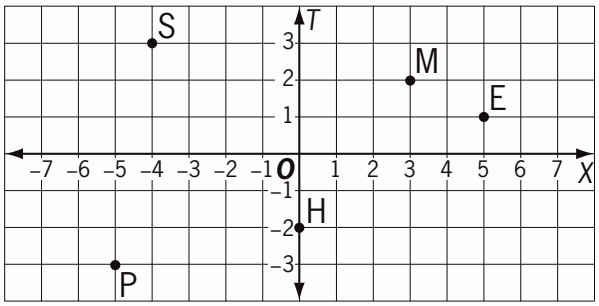
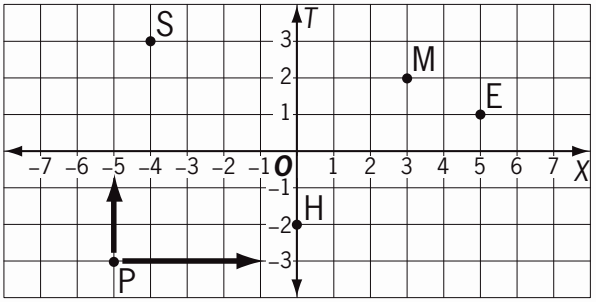
Skill 20.13 Finding the coordinates of a point on a Cartesian plane, all quadrants.

- Read the coordinate along the horizontal or *x*-axis first.
- Then read the coordinate on the vertical or *y*-axis.
  Hint: *x* comes before *y* in the alphabet.

Q. What are the coordinates of the point labelled P on the Cartesian plane?



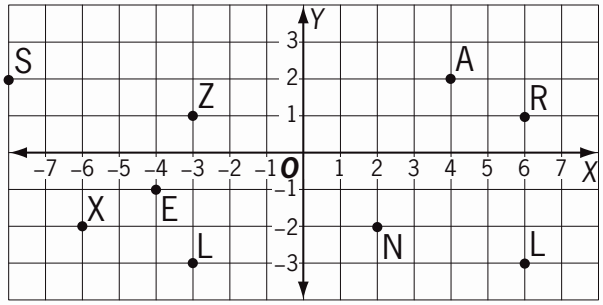
A. *P* = ***(–5,–3)***



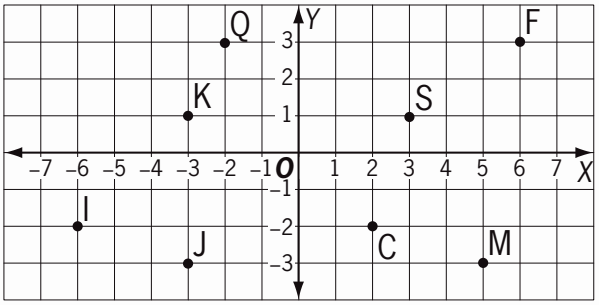
Trace toward the *x*-axis.
Write the number (–5,).
–5 is the *x*-coordinate for P.

Trace across from P to the *y*-axis.
Add the number –3 to the coordinate pair.
–3 is the *y*-coordinate for P.

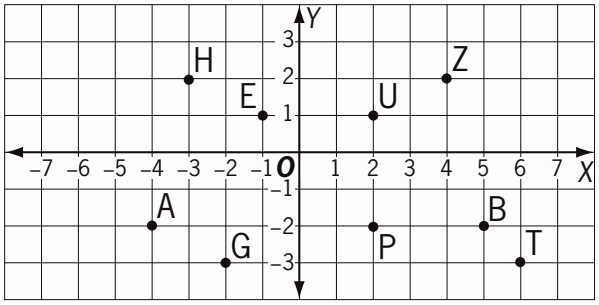
a) List the points in the second quadrant.



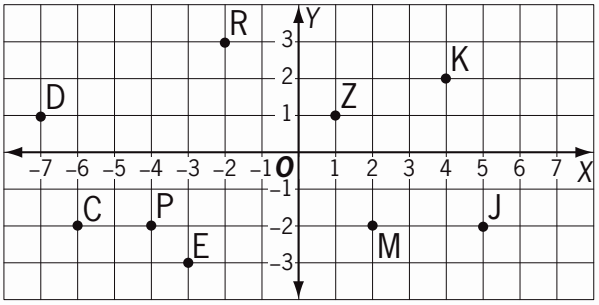
b) What are the coordinates of the point labelled M on the Cartesian plane?



c) List the points in the fourth quadrant.



d) What are the coordinates of the point labelled C on the Cartesian plane?



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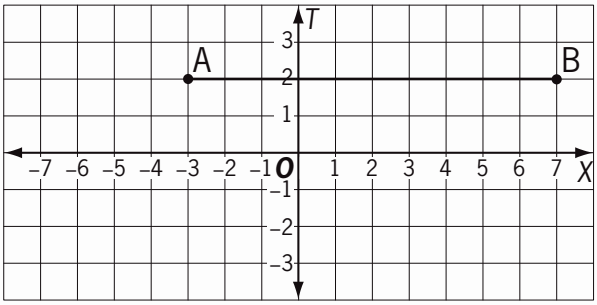
Skill 20.14 Measuring distance on a Cartesian plane.

- Count the number of grid spaces along the line.

OR

- If the line crosses an axis, add the number of grid spaces from either side of the axis.

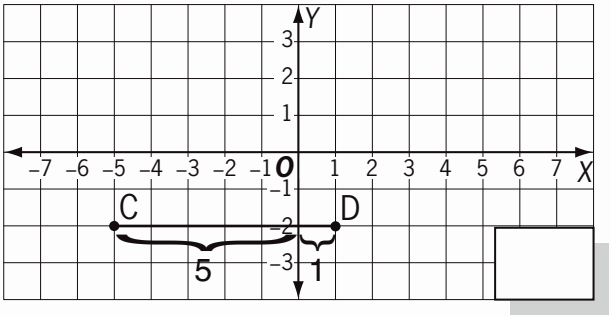
Q. What is the length in units of the segment AB?



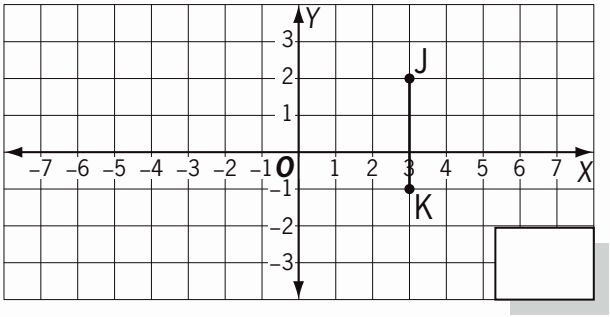
A. *Length of AB =* ***10 units***

There are 3 grid spaces from A to the x-axis.
There are 7 grid spaces from the x-axis to B.
$3 + 7 = 10$

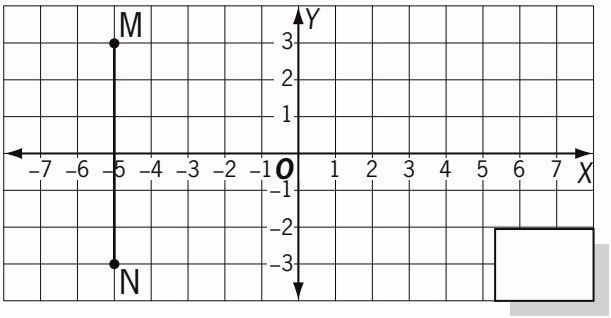
a) What is the length in units of the segment CD?



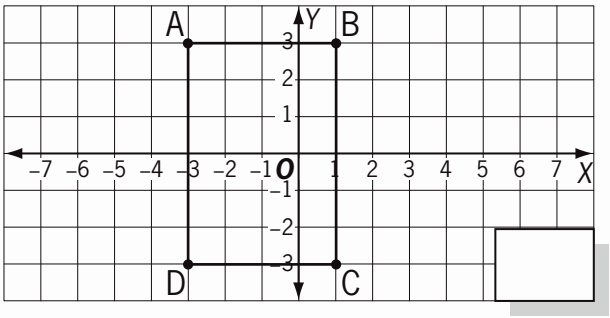
b) What is the length in units of the segment JK?



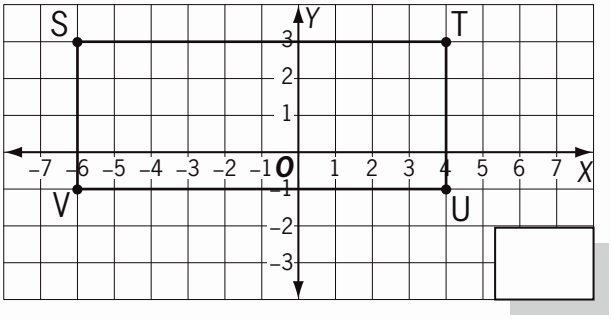
c) What is the length in units of the segment MN?



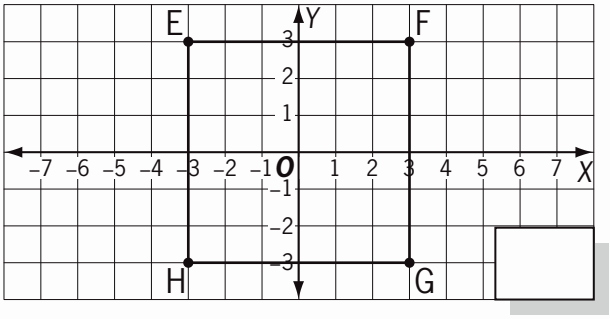
d) What is the perimeter in units of the rectangle ABCD?



e) What is the perimeter in units of the rectangle STUV?



f) What is the perimeter in units of the square EFGH?



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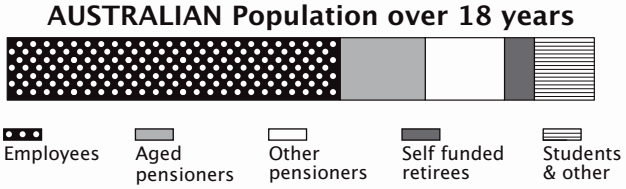
21. [Statistics / Probability]

Skill 21.1 Interpreting stacked bar graphs without a scale.

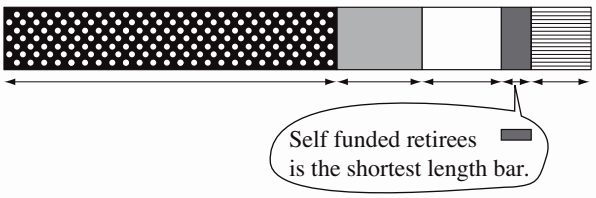
Yellow 1 1 2 2 3 3 4 4
Red 1 1 2 2 3 3 4 4

Q. Which group of Australians represent the smallest proportion of our over 18 population?



A. ***Self funded retirees***

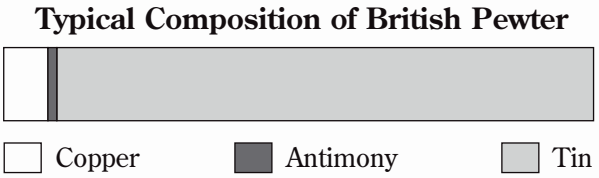
Compare the length of each shaded bar.



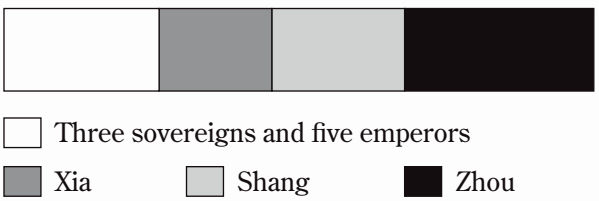
a) Australian and English cricketers have played for the Ashes since 1876. Which country has had the most wins?

b) Which coloured medal did Germany win second most at the 2018 Pyeongchang Winter Olympics?

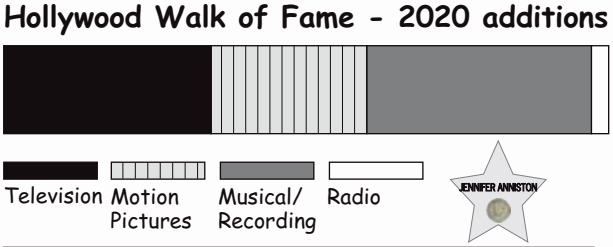
c) What is the main metal in British Pewter?



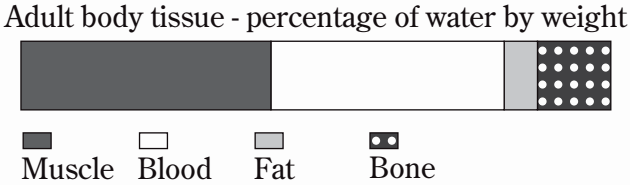
d) Which of the ancient Chinese dynasties reigned for the least amount of time?



e) Which category had the most additions to the Hollywood Walk of Fame in 2020?



f) Which of the types of adult body tissue shown has the lowest percentage of water?



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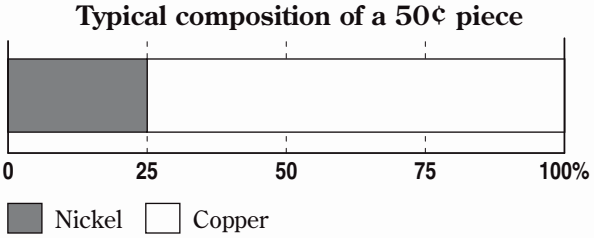
Skill 21.2 Interpreting stacked bar graphs with a scale.

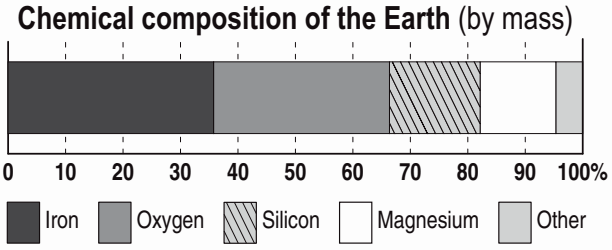
Q. What percentage of a typical 50 cent piece is copper?



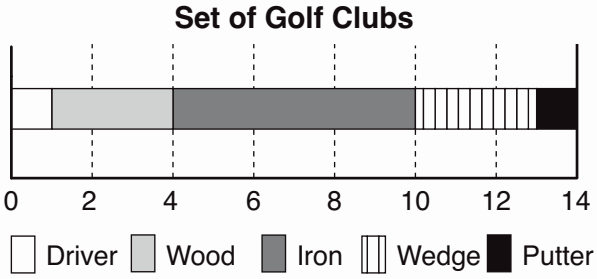
A. ***75%***

The copper section of the bar is shaded white.
It runs from 25% to 100%.
100 – 25 = 75

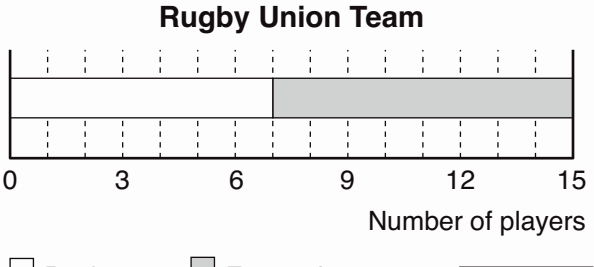
a) Which chemical element makes up the largest proportion of the Earth's mass?



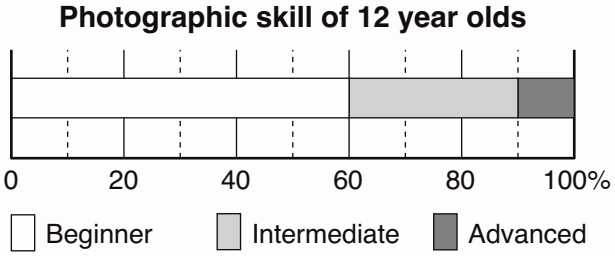
b) How many irons are there in this set of golf clubs?



c) How many forwards in a rugby union team?

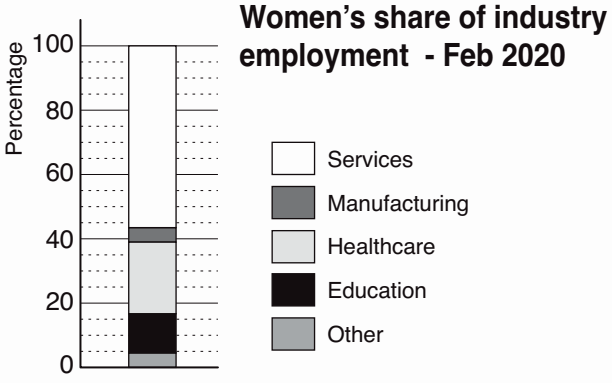


d) What percentage of 12 year olds have intermediate photographic skills?

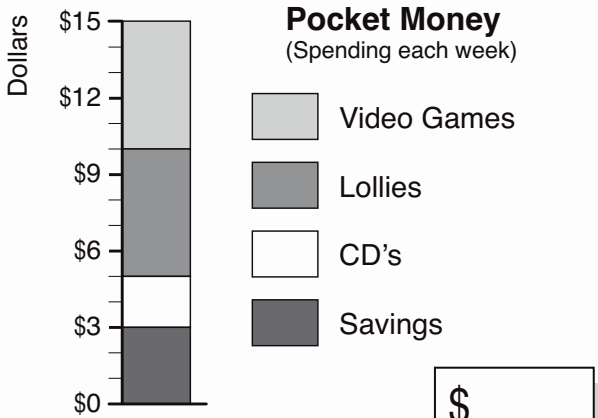


%

e) Which sector employs closest to 20% of the Australian women?



f) How much is spent on lollies and video games each week?



$

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Skill 21.3 Interpreting pictographs without a scale.

- Add the value of each symbol in the category.

Q. How many silver medals did Australia win at the Rio 2016 Olympics?

Rio 2016 Olympics - Australian medals	
Gold	
Silver	
Bronze	

Each = 2 medals | Each = 1 medal

A. $2 + 2 + 2 + 2 + 2 + 1 = \mathbf{11}$

The silver category has 5 complete medals and half a medal.

Rio 2016 Olympics - Australian medals	
Gold	
Silver	
Bronze	

Each = 2 medals | Each = 1 medal

a) How many premolars does a human have?

Human Teeth

Incisors	Canines	Premolars	Molars

each = 4 teeth

b) How many par 4 holes on the Augusta National golf course?

Augusta National

par 3	
par 4	
par 5	

Each = 2 holes

c) Which city is a 5 hour drive from Berlin?

Drive Time

Berlin - Paris	
Berlin - Warsaw	
Berlin - Amsterdam	

Each = 2 hours | Each = 1 hour

d) What is the population of Birmingham?

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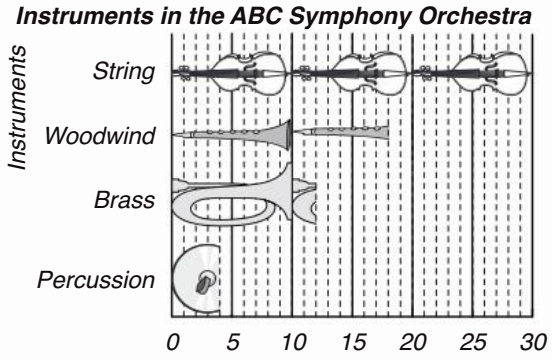
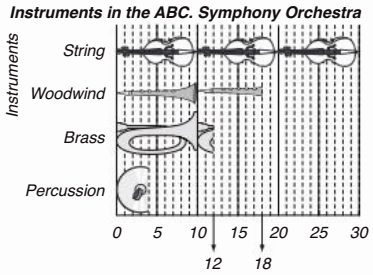
Q. How many more woodwind than brass instruments are in the ABC Symphony Orchestra?

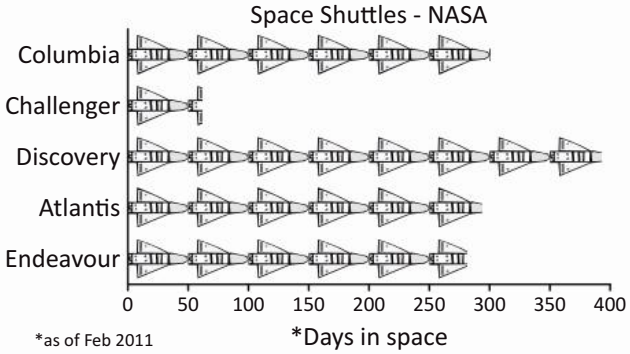


A. *6*

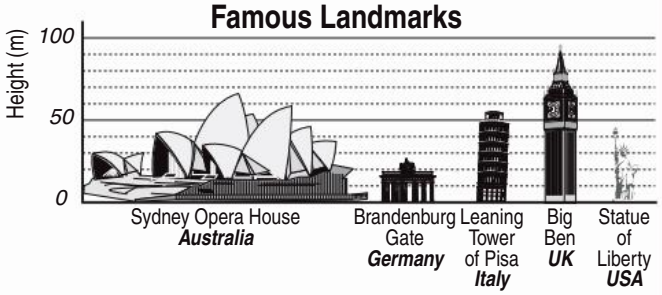


Each interval on the scale equals one instrument.
There are 18 woodwind instruments.
There are 12 brass instruments.
18 – 12 = 6

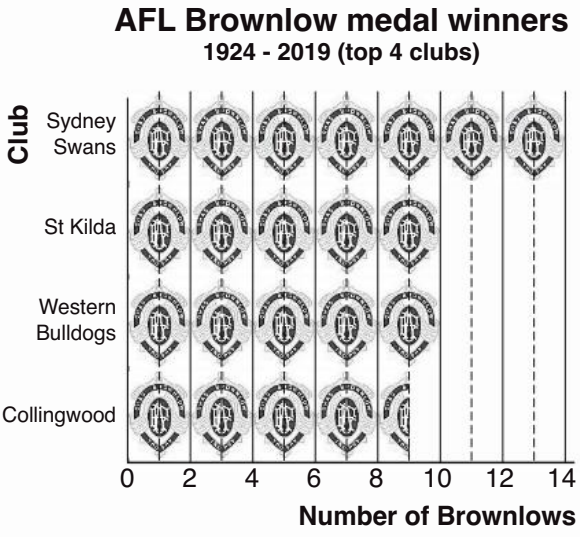
a) Which space shuttle has spent closest to 1 year in space?



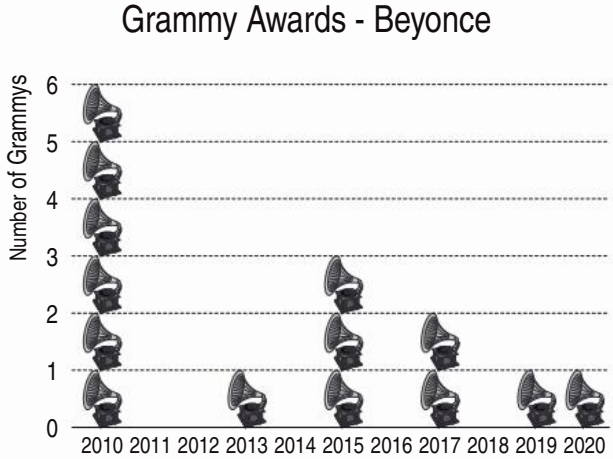
b) Which landmark is closest to 70 m in height?



c) How many Brownlow medals in total have been won by Collingwood and the Sydney Swans?



d) In which year did Beyonce win three grammy award's?



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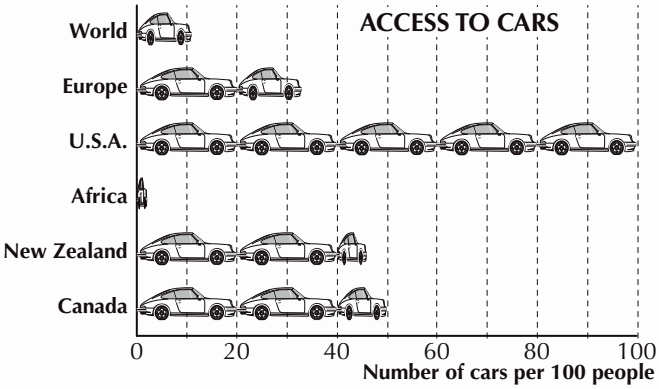
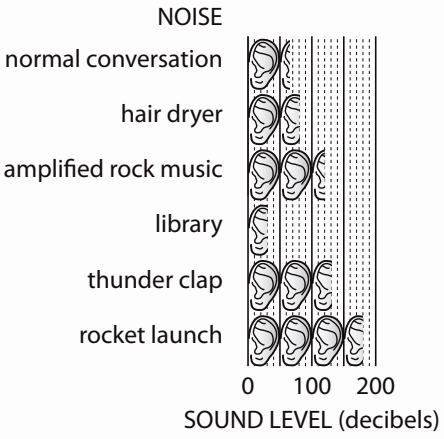
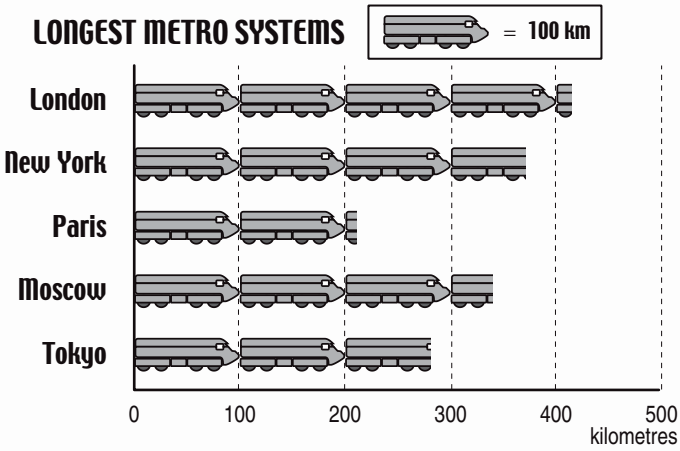
e) How many cars per 100 people are there in Canada?



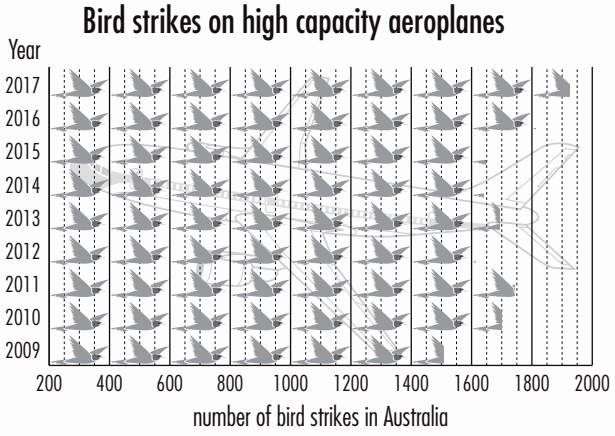
f) Pain is felt once a sound goes beyond 125 decibels. How many of these sounds would hurt your ears?



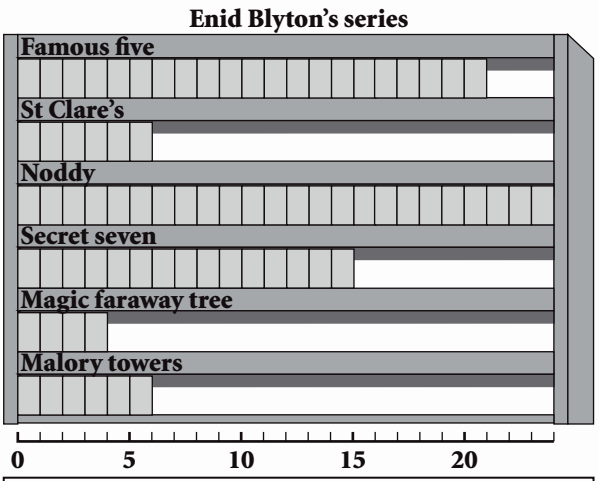
g) Name the cities with metro systems between 300 and 400 kilometres in length.



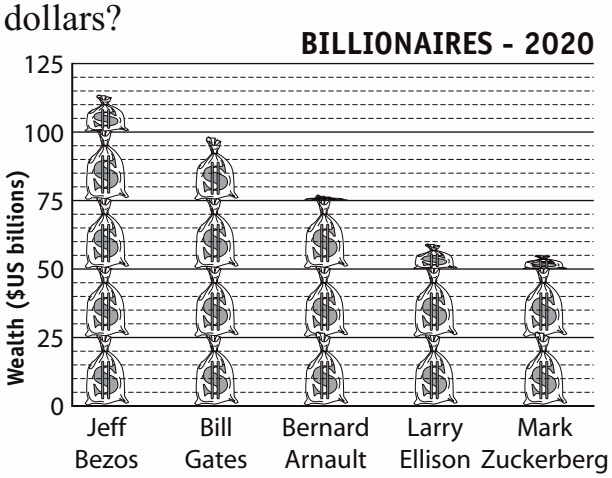
h) How many of the years shown had between 1650 and 1750 birds hitting high capacity aeroplanes in Australia?



i) Which Enid Blyton Series has 15 books?



j) Which of these billionaires has a wealth of approximately 75 billion dollars?



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Skill 21.5 Interpreting tables.

- Check what each row and column represents.

Q. Which lessons are Australian girls most likely to choose?

Cultural lessons - Australian Children (5 - 14)

Class	Participation Rate (%)	
	Boys	Girls
Musical Instrument	13	22
Singing	3	7
Dancing	2	24
Drama	3	6

A. ***Dancing***

Cultural lessons - Australian Children (5 - 14)

Class	Participation Rate (%)	
	Boys	Girls
Musical Instrument	13	22
Singing	3	7
Dancing	2	24
Drama	3	6

First find the 'girls' column.

Then check participation rates down the column. The highest is 24%.

Trace the 24% back along the row to its title, dancing.

a) Which Australian state recorded the earthquake with the highest magnitude?

Earthquakes in Australia

Date	Location	State	Magnitude
27.05.2013	NE of Koorda	WA	2.4
25.05.2013	NW of Koorda	WA	1.7
25.05.2013	W of Macquarie Island	WA	4.9
22.05.2013	S of Mundubbera	QLD	2.5
22.05.2013	Franklin River	WA	2.6

b) Which Imperial ship is closest in length to the Rebellion ship the Y-wing?

STAR WARS

Rebellion Ships	Length (m)	Imperial Ships	Length (m)
X-wing	12.5	Twin-Ion Engine Starfighters (TIE)	6.3
Y-wing	16	Imperial Shuttle	20
B-wing	16.9	AT - AT	14
Blockade Runner	150	Imperial Star Destroyer	1600
Mon Calamari Cruiser	1200	Death Star	120 000

c) Which two generations are showing an equal share of games involvement worldwide?

Share of Active Console and PC Gamers worldwide (2020)

Generation	Age	Percentage
Alpha	10-15	19%
Z	16-22	20%
Millenials (Y)	23-38	42%
X	39-55	19%

&

d) How far is it from Invercargill to Queenstown?

South Island New Zealand

Road distances between some major cities, given in kilometres.

	Christchurch	Dunedin	Franz Josef	Invercragill	Milford Sound	Mt Cook	Queenstown
Dunedin	360						
Franz Josef	408	567					
Invercragill	578	217	581				
Milford Sound	764	402	686	280			
Mt Cook	418	331	500	445	558		
Queenstown	487	283	408	187	307	266	
Westport	333	695	280	861	996	664	688

km

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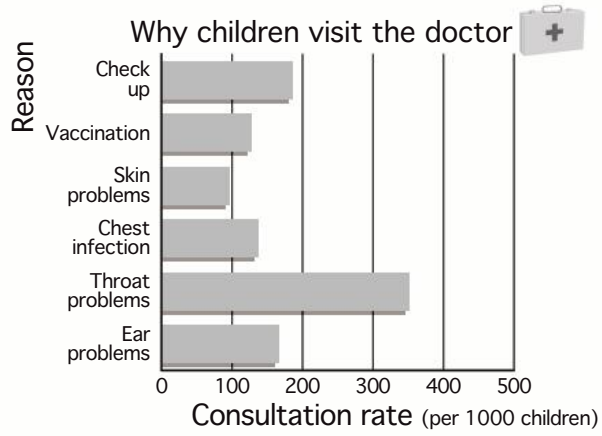
Q. What was the most common reason for children to visit the doctor?

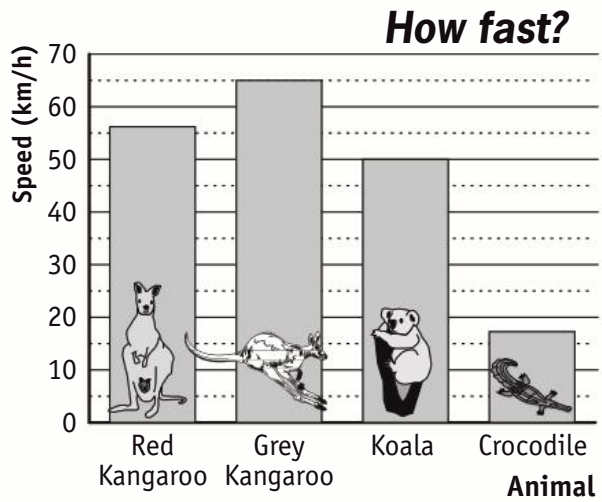


A. ***Throat problems***

Check the scale along the base of the graph. The more visits to the doctor, the longer the bar.

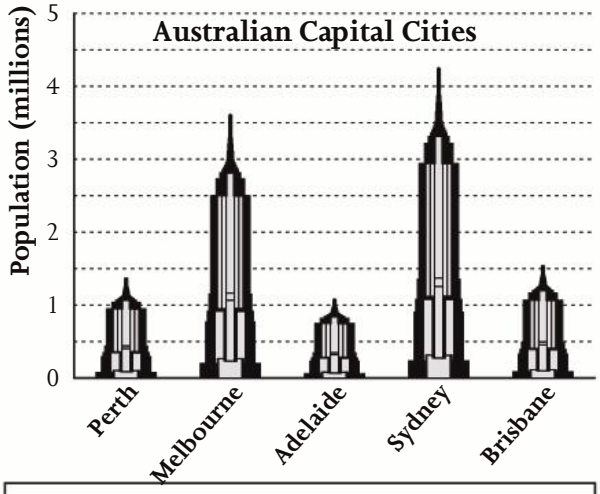
The longest bar is beside 'Throat problems'.

a) What speed can a koala reach?

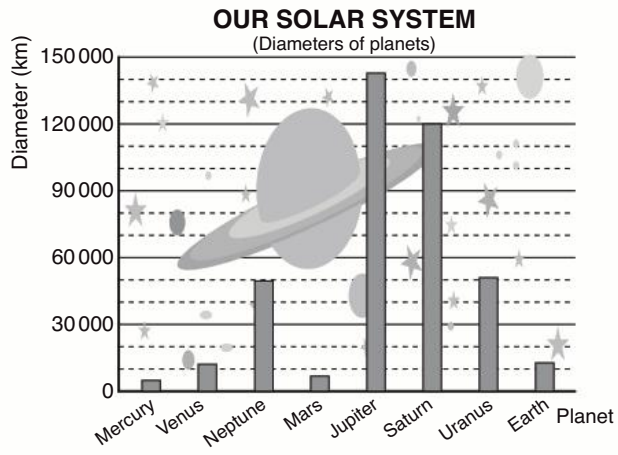


km/h

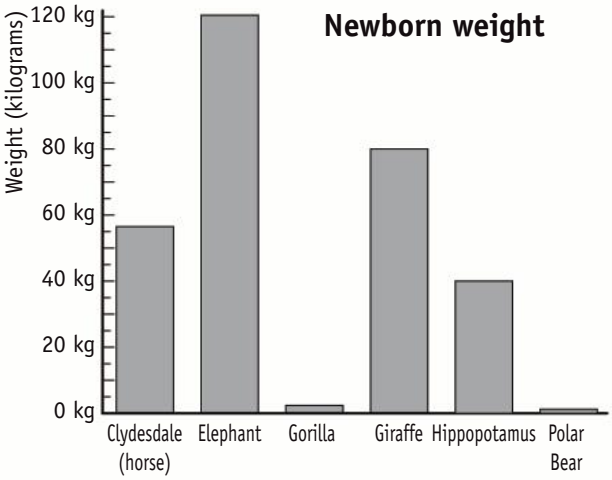
b) Which of the capital cities shown has the smallest population?



c) Name the planet with the greatest diameter.



d) What is the weight of a newborn giraffe? [Give your answer to the nearest ten.]



kg

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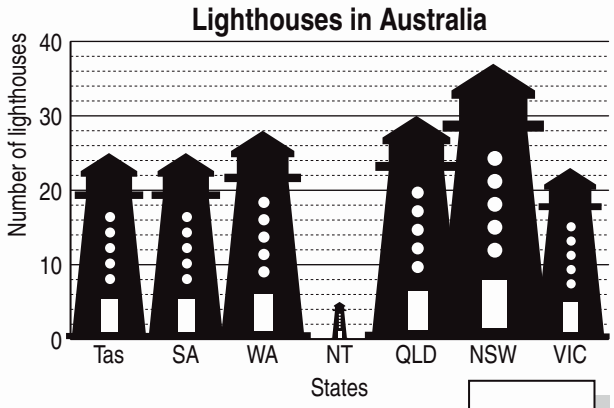
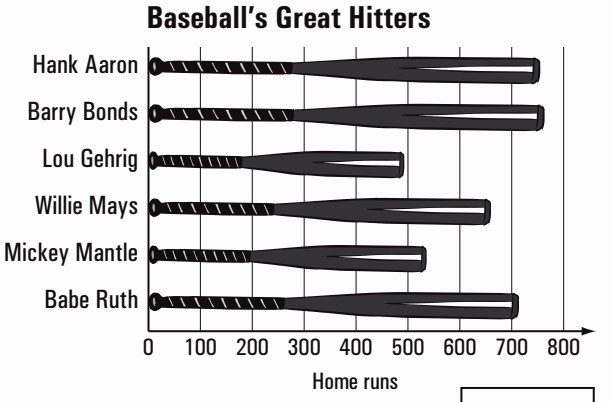
e) How many more lighthouses are there in Queensland than Victoria?

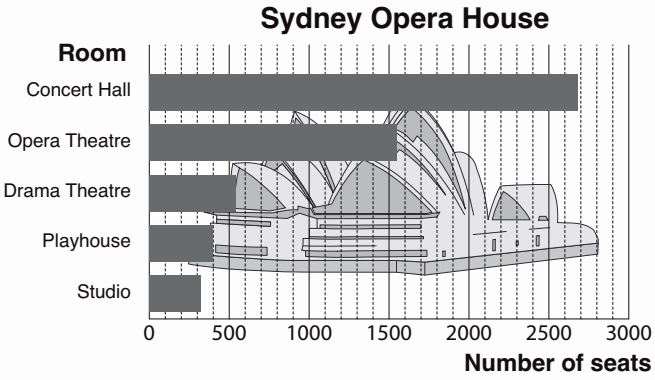


f) How many of baseball's great hitters have made over 700 home runs?

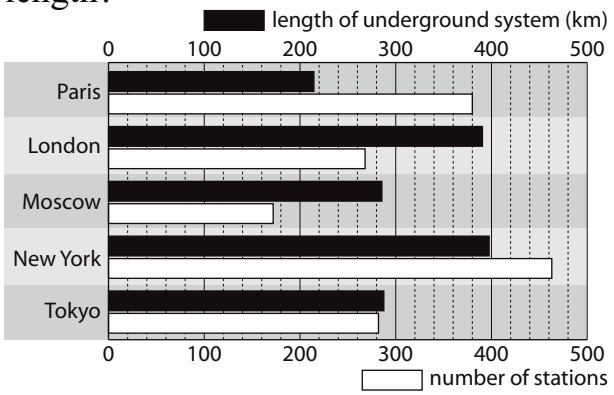


g) Who is closest to filling Shaquille O'Neals' one shoe with two shoes?

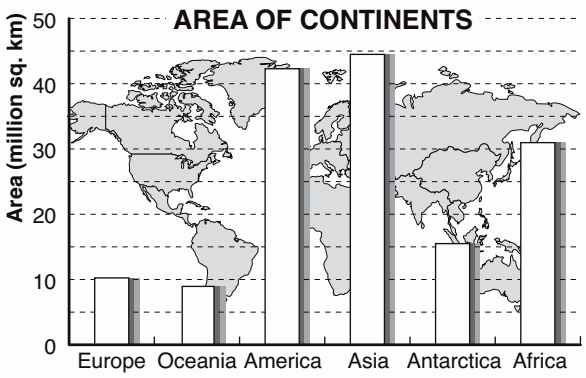
h) Harry booked the 398th and last seat in the room. Which part of the Sydney Opera House was Harry in?



i) The underground railway system in which city has nearly the same number of stations as kilometres in its length?



j) Which continent is closest to 15 million square kilometres in area?



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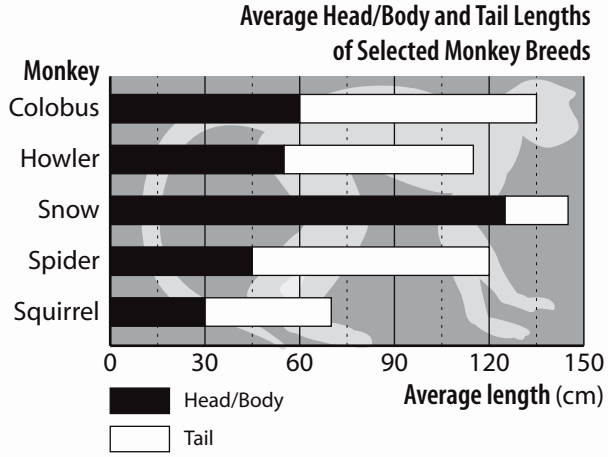
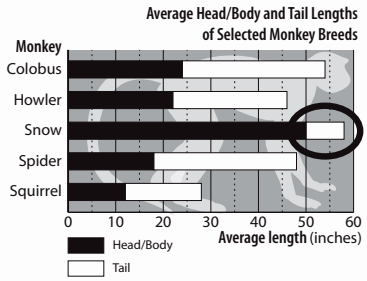
Skill 21.7 Interpreting multiple stacked bar graphs.

Q. Which of these monkeys has the shortest average tail length?



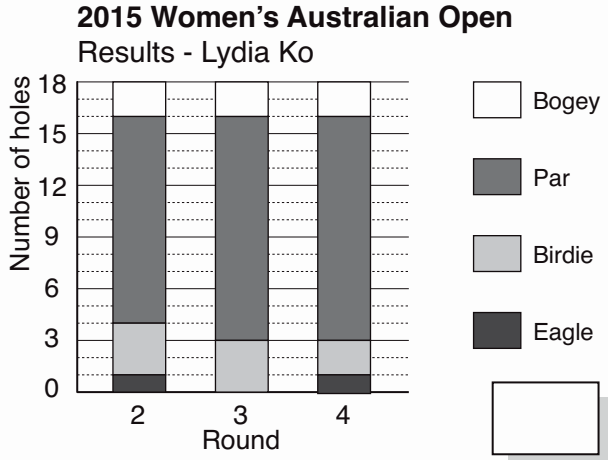
A. ***Snow monkey***



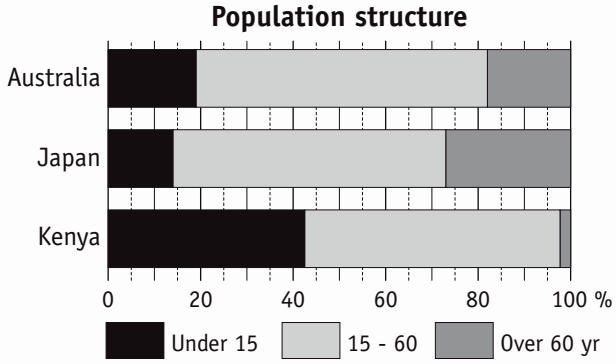
Check the scale along the base of the graph. The shorter the tail length, the shorter the bar.

Check the key. The white bars represent the tail. The shortest white bar is beside the snow monkey.

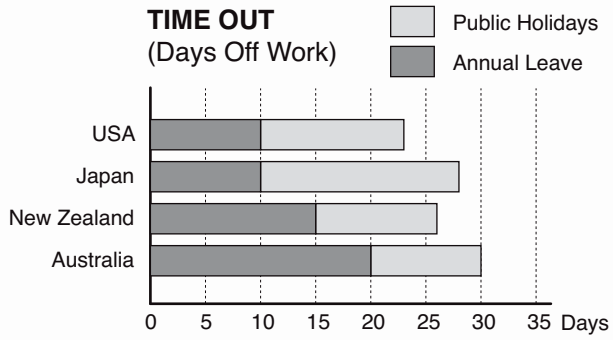
a) In which round of the 2015 Women's Australian open did Lydia Ko score the least pars?



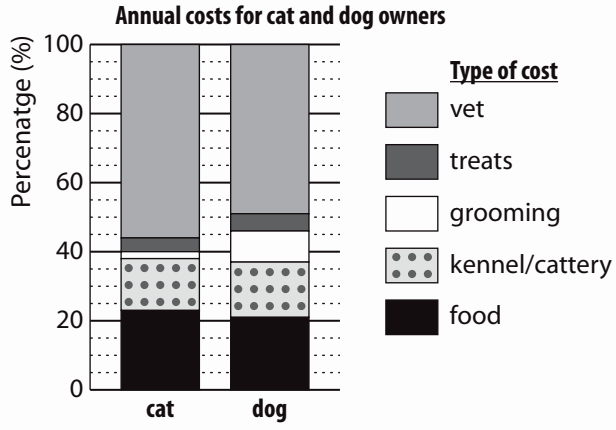
b) Which of the 3 countries shown has the largest percentage of under 15 year olds in their population structure?



c) Which country has the greatest number of public holidays?



d) Which expense is greater than the cost of food for both dog and cat owners?



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Skill 21.8 Recognising the relative likelihood of an event.

Yellow 1 1 2 2 **3** 3 4 4
Red 1 1 2 **2** 3 3 4 4

Q. Which alternative is closest in meaning to the expression "Par for the course"?

A) certain
B) likely
C) impossible

A. ***B***

Consider each alternative.
Par on a golf course is set so that 'some' people can achieve it.
Par is neither certain, nor impossible.

a) Choose the best phrase (***is likely to / is unlikely to / will not***) to complete this statement:

"The moon _____ collide with the Earth tonight."

b) Choose the best phrase (***is certain to / is likely to / is unlikely to / will not***) to complete this statement:

"Beethoven _____ have played the piano."

c) Which alternative is closest in meaning to the expression "Skating on thin ice"?

A) most likely to succeed
B) unlikely to succeed
C) certain to succeed

d) Which alternative is closest in meaning to the expression "It's a toss up"?

A) 50 - 50 chance
B) unlikely
C) impossible

e) Which alternative is closest in meaning to the expression "Fat chance"?

A) 50 - 50 chance
B) unlikely
C) certain

f) Which alternative is closest in meaning to the expression "Find a needle in a haystack"?

A) occurs about half the time
B) not common
C) extremely rare

g) Choose the best phrase (***is likely to / is unlikely to / will not***) to complete this statement:

"The movie _____ to start on time."

h) Choose the best phrase (***is certain to / is likely to / is unlikely to / will not***) to complete this statement:

"Friday _____ immediately follow Monday."

i) Choose the best phrase (***is likely to / is unlikely to / will not***) to complete this statement:

"A Russian _____ win a Commonwealth Games gold medal."

j) Choose the best phrase (***is certain to / is unlikely to / will not***) to complete this statement:

"The Southern Cross _____ be in the Southern sky."

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Skill 21.9 Finding the number of objects to achieve a given outcome.

Yellow 1 1 2 2 3 **3** 4 4
Red 1 1 2 **2** 3 3 4 4

Q. A bag contains the letters

A R C H I T E C T

Letters are drawn at random. How many letters do you need to pick from the box to be certain you can make the word CAR?

A. ***9***

It is possible to pick these letters first:
H, I, T, E, T
Then it is possible to pick these letters:
C, C
The next pick will either be an
A or an R
and still the word CAR cannot be formed.
Therefore all 9 letters must be picked to be certain that the word CAR is formed.

a) You have six 10-cent coins and ten 20-cent coins in your pocket. What is the smallest number of coins you need to take out of your pocket to be certain of having at least one of each coin?

b) In the game of Mahjong there are 16 wind tiles, 4 each of North, South, East and West. If the tiles are turned face down on the table, how many tiles do you need to select to be sure to choose at least one East wind?

c) You have 10 light bulbs and 3 do not work. What is the smallest number of light bulbs you must check to be certain of having a good one?

d) There are 6 orange, 8 blue and 10 red flippers in the swimming bag. How many flippers must you take out of the bag, without looking, to be sure you have a pair of orange flippers?

e) There are six pairs of runners in the back of Mike's closet. Because the closet is dark, how many individual runners must he take out of the closet to make sure he has a matching pair of runners?

f) A shop keeper has six green cricket pads, four red pads and two white pads in the store room. There is a power failure and he reaches into the room in the dark. How many pads must he take out to be certain of having at least two green cricket pads?

g) A bag contains the letters

M E A S U R E M E N T

Letters are drawn at random. How many letters do you need to pick from the box to be certain you can make the word ME?

h) A bag contains the letters

M I S S I S S I P P I

Letters are drawn at random. How many letters do you need to pick from the box to be certain you can make the word SIP?

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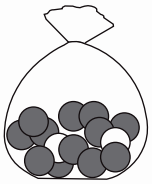
Skill 21.10 Describing the likelihood of an outcome.

Q. A bag contains 2 white marbles and 12 green marbles. What is the chance that the first marble drawn will be white?

A) impossible
B) unlikely
C) likely
D) certain



A. ***B***

Only 2 of the 14 marbles are white.
Only 2 out of 14 draws will give a white marble.

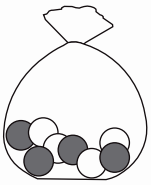
It is not impossible but it is unlikely that with your first draw you will pick a white marble. There are 12 chances to draw a green marble.

a) In a lotto draw, balls numbered 1 to 50 are mixed together. A machine then randomly selects balls numbered 8, 14, 2, 26 and 42.
Is the sixth number drawn:

A) more likely to be odd than even,
B) more likely to be even than odd or
C) just as likely to be odd as even?

b) A bag contains 4 white marbles and 4 green marbles. What is the chance that the first marble drawn will be orange?

A) impossible
B) unlikely
C) likely
D) certain

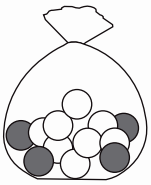


c) In a lotto draw, balls numbered 1 to 50 are mixed together. A machine then randomly selects balls numbered 8, 14, 2, 21 and 17.
Is the sixth number drawn:

A) more likely to be more than 25,
B) more likely to be less than 25 or
C) just as likely to be less than 25 as more than 25?

d) A bag contains 8 white marbles and 4 green marbles. What is the chance that the first marble drawn will be white?

A) impossible
B) unlikely
C) likely
D) certain



e) A pack contains 5 white, 9 purple, 6 green and 3 orange jelly beans. What is the chance that the first jelly bean taken will be purple?

A) impossible
B) unlikely
C) likely
D) certain

f) Amanda has six $1 coins and twelve $2 coins in her pocket. What is the chance that the first coin she takes out will be a $1 coin?

A) impossible
B) unlikely
C) likely
D) certain

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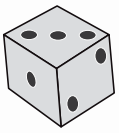
Skill 21.11 Calculating the probability of a simple event (1).

$$\textbf{Probability of an event} = \frac{\text{number of favourable outcomes}}{\text{number of possible outcomes}}$$

- Find the number of favourable outcomes for the event.
- Find the total number of possible outcomes.
- Divide the number of favourable outcomes by the number of possible outcomes.

Q. What is the probability of rolling a number greater than 2 with one roll of a die? [Give the answer as a fraction in its simplest form.]



A. $\frac{2}{3}$

Event: rolling a number greater than 2
Favourable outcomes (FO): 4
(rolling 3, 4, 5 or 6)
Possible outcomes (PO): 6
(rolling 1, 2, 3, 4, 5, or 6)
Probability: 4 out of 6
or $\frac{4}{6}\overset{\div 2}{_{\div 2}} = \frac{2}{3}$

a) What is the probability of drawing a Queen from a standard deck of playing cards? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} = \frac{4}{52}\overset{\div 4}{_{\div 4}} = \frac{1}{13}$

b) What is the probability of throwing a dart inside an 11-point area when you hit the dart board? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} = \frac{3}{12}\overset{\div 3}{_{\div 3}}$

c) Each of the letters in PROBABILITY is put into a bag. If a letter is randomly selected, what is the probability of choosing a consonant? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} =$

d) A money bag contains twenty 50-cent coins and sixty 10-cent coins. A coin is randomly picked. What is the probability of a 50-cent coin being selected? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} =$

e) What is the probability of rolling a multiple of 2 with one roll of a die? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} =$

f) What is the probability of rolling a number greater than 4 with one roll of a die? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} =$

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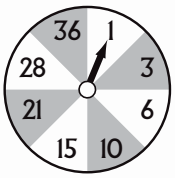
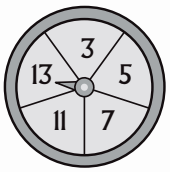
g) A spinner is spun. What is the probability that it will stop on an even number? [Give the answer as a fraction in its simplest form.]



$\frac{FO}{PO} =$ .....

h) A spinner is spun. What is the probability that it will stop on an odd number?



$\frac{FO}{PO} =$ .....

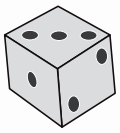
i) A box has 10 chocolate, 10 plain and 12 creamed biscuits. If a biscuit is randomly selected from the box, what is the probability of choosing a plain biscuit? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} =$ .....

j) A deck of cards has 5 navy, 5 yellow and 5 black cards. A card is randomly picked from the deck. What is the probability of a black card being picked? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} =$ .....

k) What is the probability of rolling a number less than 5 with one roll of a die? [Give the answer as a fraction in its simplest form.]



$\frac{FO}{PO} =$ .....

l) What is the probability of rolling an even number with one roll of a die? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} =$ .....

m) Ben and 11 other athletes are racing in the 800 m event. What is the probability that Ben will win one of 3 medals? [Give the answer as a fraction.]

$\frac{FO}{PO} =$ .....

n) Janet bought 20 raffle tickets. If there are 200 tickets altogether, what is the probability that one of her tickets will win? [Give the answer as a fraction in its simplest form.]

$\frac{FO}{PO} =$ .....

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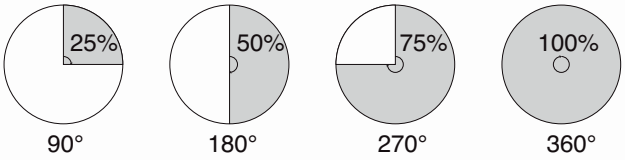
Skill 21.12 Interpreting pie charts.

- Consider each section of the pie chart as a sector of a circle (pie).

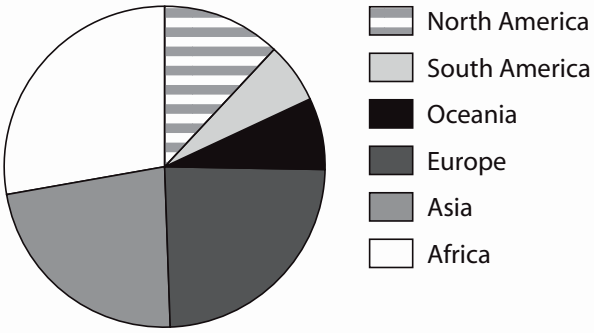
PIE CHARTS

Each piece of pie represents a percentage of the total.



Q. Which continent has the least number of countries?

Number of Countries by Continent

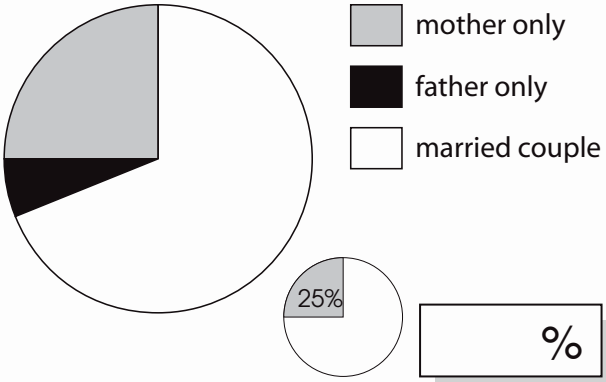


A. ***South America***

Look for the smallest sector of the circle. South America is slightly smaller than Oceania.

a) What percentage of children in the USA live with their mother only?

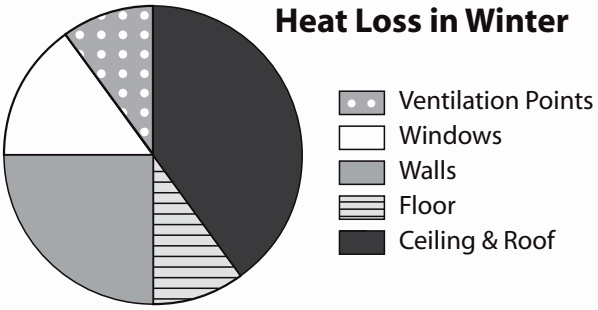
Child Population by Household USA



_____ %

b) Which part of an insulated brick veneer home is responsible for one quarter of the heat loss in winter?

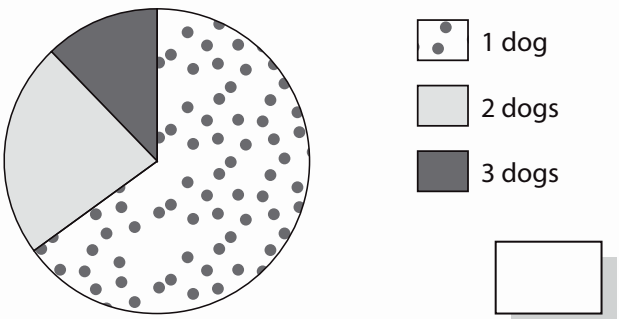
Insulated Brick Veneer Heat Loss in Winter



_____

c) If you were one of the 65 000 000 households in the USA to have dogs as a pet, how many are you most likely to have?

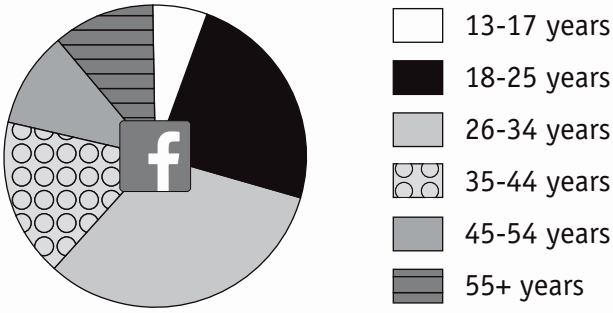
Households With Dogs



_____

d) Which age group accounts for closest to 25% of all facebook users?

Facebook Users by age - 2020



_____

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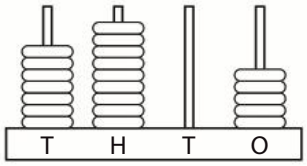
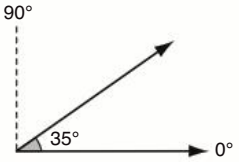
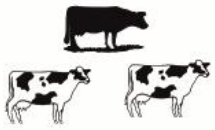
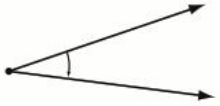
GLOSSARY

TERMS	DEFINITIONS	EXAMPLES
abacus	• Beads on a frame used for counting and calculating.	
acute angle	• An *angle* measuring less than 90°.	
add (+)	• To join together.	If you add together the number of cows, there are 3. 
addition	• The *operation* of finding the total or sum of two or more numbers to make one number.	Adding 15 and 6 we reach a total (sum) of 21. 15 + 6 = 21
am (**a**nte **m**eridiem)	• The *time* from midnight to midday (morning).	
analogue clock	• A clock or watch that has rotating hands and shows 12 *hour time*.	
angle	• The amount of turning between two straight lines that are fixed at a point. • An angle is measured in *degrees*.	
annual	• Happening *once* a *year*.	
anticlockwise	• Moving in the *opposite direction* to the hands on a clock.	
approximate	• Very close to the actual size. • To estimate by rounding off.	If you have $24.85 in your wallet, you can say you have approximately $25.00.

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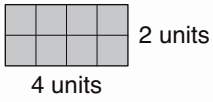
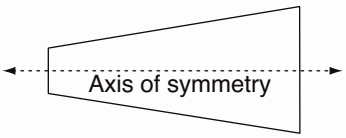
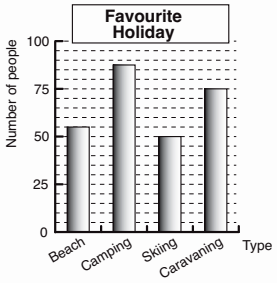
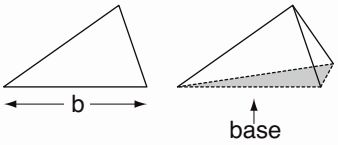
area	• The amount of surface covered by a *2D-shape*. • Area is measured in *square units* e.g. square centimetres (cm^2) or square metres (m^2).	The area of a rectangle is calculated by multiplying length by width: $\boldsymbol{A} = lw$ $\boldsymbol{A} = 4 \times 2$ $\boldsymbol{A} = 8$ Area = 8 square units 
axis of symmetry	• (pl. **axes**) See *line of symmetry*.	
backwards	• Away from your front. • In reverse of the usual way.	
bar graph	• Uses bars to show quantities or numbers so they can be easily compared.	 Camping is the favourite holiday.
base	• A line or surface on which a figure stands.	
between	• At a place bounded by two or more places.	Canberra is between Sydney and Melbourne.
bi	• (or **di**) Prefix meaning two.	A bicycle has 2 wheels.
brackets ( )	• A *pair* of symbols used to group mathematical expressions together.	$(20 \div 5) + 5 = 9$ Brackets group 20 divided by 5
calculate	• To work something out.	$3 + 5 + 6 = 14$

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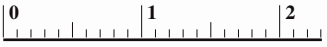
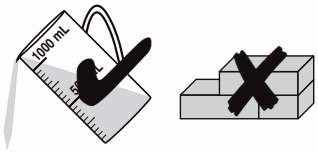
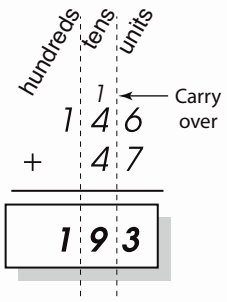
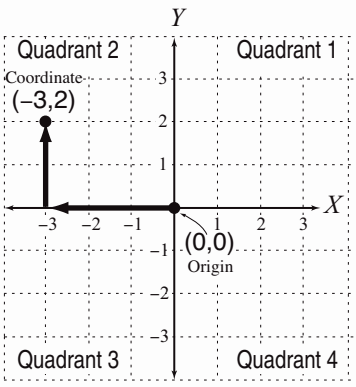
calendar	• A *time* chart that tells us what *day*, *week*, *month* and *year* it is.	
calibration	• A mark on a *scale*.	
capacity	• Or *volume*, is the measure of the amount of liquid a container can hold.	A jug has capacity because it can hold liquid, a brick does not. 
cardinal number	• A *whole number* that shows the amount.	1, 2, 3, 4, 5..... are cardinal numbers.
carry over	• The amount passed to the next *place value* in an algorithm.	
Cartesian plane	• A *plane* divided into four *quadrants* by a *horizontal line* called the *x-axis* and a *vertical line* called the *y-axis*.	
cent (¢)	• The *smallest unit* of money. 100 cents = 1 *dollar*	
century	• A *unit* of *time* equal to 100 *years*.	The 21st century will go from 2001 until 2100.

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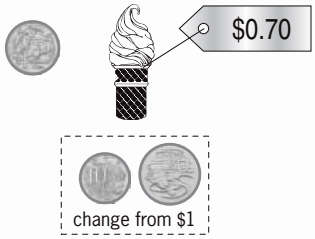
certain	• Being sure. • Will definitely happen.	death taxes
chance	• The possibility of getting a particular result.	Roll the die! There's a 1 in 6 chance of rolling a 2!
change (money)	• The leftover money you are given back after buying something.	
clockwise	• Moving in the direction of the hands on a clock.	
closest	• Nearest to.	The son is closest to the mother.
column	• A *vertical* line of *data* in a table.	Netball: Aust v NZ NZ Quarters / Shooting chances / Actual goals / Success % 1st: 9, 9, 100 2nd: 14, 13, 92.85 3rd: 23, 20, 86.95 4th: 18, 17, 94.44
compass	• An instrument that shows *direction*.	
composite number	• A *positive integer* that has *factors* other than just 1 and the number itself.	12 is a composite number. $12 = 1 \times 12 = 2 \times 6 = 3 \times 4$ The factors of 12 are: 1, 2, 3, 4, 6, 12
commutative property (of addition and multiplication)	• Rule: When *adding* or *multiplying*, no matter how the numbers are ordered, the answers will always be the same.	$a + b = b + a$ $1 + 3 = 3 + 1$ $4 = 4$ "✚" $a \times b = b \times a$ $3 \times 4 = 4 \times 3$ $12 = 12$ "✖"

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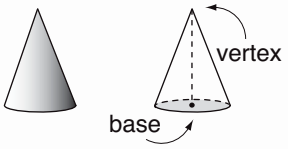
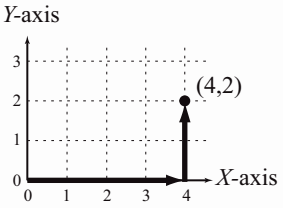
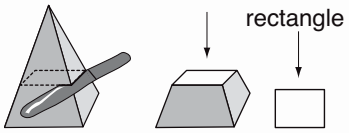
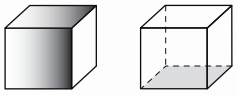
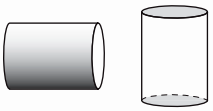
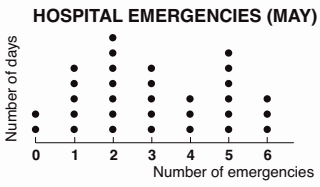
cone	• A *solid* with one circular base and one *vertex*.	
consecutive numbers	• Numbers that follow each other.	4 and 5 are consecutive numbers.
convert	• Change from a unit to another.	Five $20 notes can be converted to a $100 bill.
coordinates	• Two numbers that locate a *point*. • The *first* number tells you the position of a point along the *x*-axis. The *second* tells you the position of a point along the *y*-axis. • They are written in *brackets* with a comma between.	(4,2) are the coordinates of a point located 4 units to the right and 2 units upward. 
counting number	• Any of the *whole numbers* from zero onwards.	0, 1, 2, 3, 4, 5..... are counting numbers.
cross section	• The face that results when an object is cut through.	
cube	• A *solid* with six identical *square* faces.	
cylinder	• A *solid* with two *parallel* circular ends of the same size.	
data	• Collection of information that can include facts, numbers or measurements.	
day	• A *unit* of *time* equal to 24 *hours*.	A day starts and ends at midnight.
deca	• Prefix meaning ten.	Decathlon is an athletics contest with ten events.

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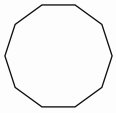
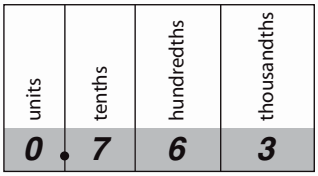
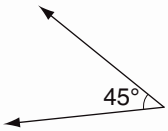
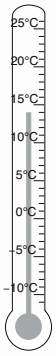
decade	• A *unit* of *time* equal to 10 *years*.	2000 to 2009 make a decade.
decagon	• A shape with 10 *sides*.	
decimal number	• A number based on the ten *place value* system.	The decimal number 4.3 represents: 4 - ones 3 - tenths. OR 4 and 3 tenths.
decimal place		7 is in the tenths place. 6 is in the hundredths place. 3 is in the thousandths place.
decimal point (.)	• A point that separates the *units* and *tenths* in a *decimal number*.	2.5 is a decimal number where the 2 and the 5 are separated by a decimal point.
decrease	• To make smaller.	8 must decrease by 5 to become 3.
deduct	• To take away.	If you deduct 1 from 3 there are 2 left. 3 – 1 = 2
degree (°)	• A *unit* used to measure the amount of turn in an *angle*.	The measure of this angle is 45° 
degrees Celsius (°C)	• A *unit* used to measure temperature.	The thermometer shows 14°C. 
denominator	• The number below the fraction bar in a *fraction*.	$\frac{3}{5}$ denominator - how many equal parts in one whole

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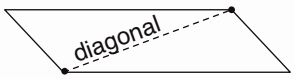
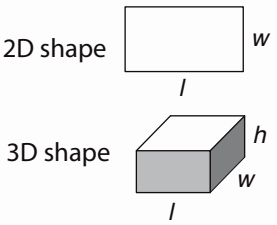
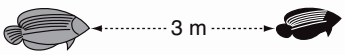
diagonal	• A straight line inside a *polygon* joining any two corners that are not next to each other.	
die	• (pl. **dice**) A numbered *cube* that is used in games.	
difference	• The result when a number is *subtracted* from another number. • The amount by which one number is bigger or smaller than another number.	The difference between 5 and 3 is 2. 5 – 3 = 2
digit	• Any of the first ten *whole numbers* from 0 to 9.	There are 10 digits: 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9.
digit sum	• The *sum* of the *digits* in a number.	124 has a digit sum of 7. 1 + 2 + 4 = 7
digital clock	• A clock that uses only numbers to show the *time*. (No hands!)	
dimension	• A measure of size. A *two dimensional* shape (2D shape) has *length* and *width*. A *three dimensional* shape (3D shape) has *length*, *width* and *height*.	
direction	• The way something is placed or pointing.	North, east, south, west, up, down, sideways, backwards and forwards.
distance	• The *length* between two points.	The distance between the fish is 3 metres. 
divide (÷)	• To share into groups.	These 6 cows are divided into 2 groups. 6 ÷ 2 = 3 in each group
divisible	• Can be divided without a *remainder*.	20 ÷ 2 = 10 with 0 remainder. So 20 is divisible by 2.

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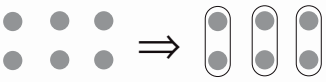
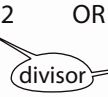
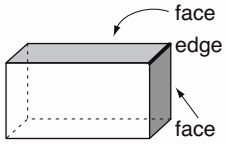
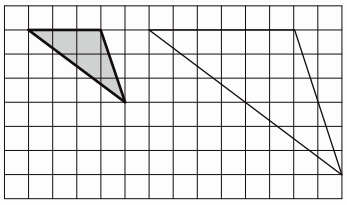
division	• The *operation* of sharing or grouping a number into *equal* parts.	The division 6 ÷ 2 = 3 means: How many groups of 2 can 6 be divided into? OR How many groups of 2 can be taken from 6 before none remain? ⇒3 groups of 2. 
divisor	• The *second* number written in a *division*. In a *fraction* the divisor is the *denominator*.	$8 \div 4 = 2$ OR $\frac{8}{4} = 2$ 
dollar ($)	• A *unit* of money. 1 dollar = 100 *cents*	5 dollars 10 dollars 20 dollars 50 dollars 100 dollars
double	• *Twice* as much. • *Multiplied* by two.	Double 4 is: 4 + 4 = 8 OR 4 × 2 = 8.
east	• A *compass direction*.	The sun rises in the east.
edge	• Where two *faces of a solid* meet.	
eighth	• The position after *seventh*.	1st, 2nd, 3rd, 4th, 5th, 6th, 7th, **8th**.....
enlargement	• To reproduce and make bigger.	The original triangle has been enlarged to make it 2× bigger. 
equal (=)	• Exactly the same in value or size.	100 centimetres is equal to 1 metre: 100 cm = 1 m

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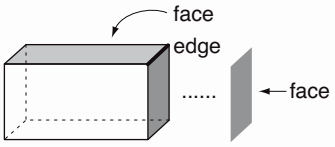
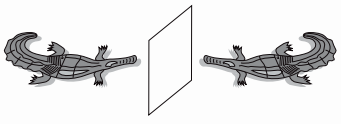
equation	• A mathematical sentence formed by placing an *equals* sign (=) between two *expressions*.	$6 \times 2 = 9 + 3$ is an equation.
equivalent fractions	• *Fractions* that represent the same number.	$\frac{2}{16}$ and $\frac{8}{64}$ are equivalent fractions. They both equal $\frac{1}{8}$.
estimate	• To make a close guess based on *rounding*.	$48 + 21 = ?$ By rounding to $50 + 20$, the estimation of the sum is 70.
evaluate	• To work out the value.	$21 \div x = 3$ Evaluate for x. $x = 7$
even numbers	• A *whole number* that can be *divided* by two. • Even numbers end with 0, 2, 4, 6 and 8.	134 is an even number. 134 ✔ 431 is not an even number. 431 ✘
event	• Possible *outcomes* resulting from a particular *experiment*.	Experiment: A die is rolled. Possible outcomes: Either a 5 or a 6 may result
faces of a solid	• *Polygons* that join on their *edges* to form a *solid*.	A rectangular prism has 6 rectangular faces. 
factor	• A whole number that divides exactly into another number. See *divisibility tests*.	Because $1 \times 12 = 12$ $2 \times 6 = 12$ and $3 \times 4 = 12$ 1, 2, 3, 4, 6 and 12 are all factors of 12.
fifth	• The position after *fourth*.	1st, 2nd, 3rd, 4th, **5th**.....
first	• Placed before anything else.	The first athlete to cross the finish line won the gold medal.
flip	• To turn across a line so the result is a mirror image. See *reflection*.	

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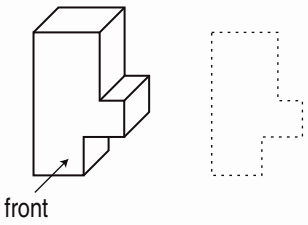
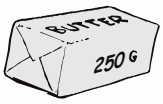
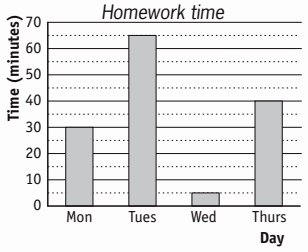
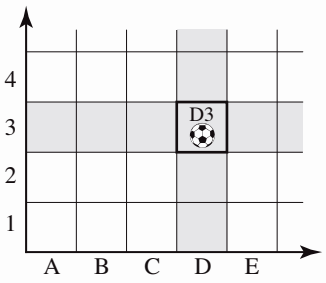
fortnight	• A *unit* of *time* equal to 2 whole *weeks* or 14 *days*.	
forwards	• In the *direction* of your front. • The usual way.	
fourth	• The position after *third*.	1st, 2nd, 3rd, **4th**.....
fraction	• Part of a group. • Part of a whole. • A number in the form $\frac{a}{b}$ $(b \neq 0)$ where a is the *numerator* and b is the *denominator*. • Fractions can be *proper fractions* or *improper fractions*.	5 out of a group of 8 dots are circled. $\frac{5}{8}$ 1 half of a whole orange. $\frac{1}{2}$
front view	• What you see of an object looking from a frontal perspective. • *Three-dimensional* objects have 3 views: front, top and side.	
gram (g)	• A *unit* of *measurement* for *mass equal* to 1000 *milligrams*.	250 g of butter. 
graph	• A diagram that shows a collection of *data*.	
greater than (>)	• A symbol showing which is bigger.	10 > 2 means that 10 is greater than 2.
grid reference	• A pair of letters and/or numbers that describe location within a grid. See also *coordinates*.	

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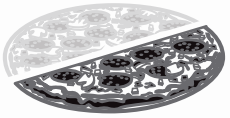
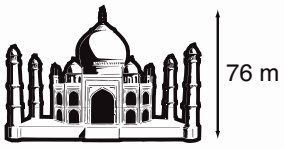
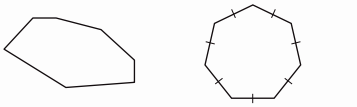
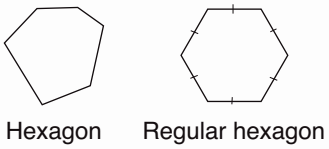
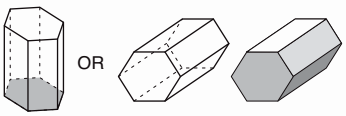
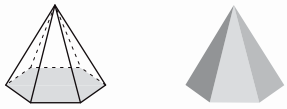
GST (money)	• An abbreviation for the Goods and Services Tax which is applied to certain purchases at a designated *rate*.	The standard GST in Australia is 10%. If the price of an item is $150 excluding GST then its GST inclusive price would be $165.
half	• (pl. **halves**) One of two *equal* parts expressed as a fraction.	One half is 1 of 2 parts of one whole pizza:  $\frac{1}{2}$
hectare (ha)	• A *unit* of *area equal* to 10 000 square metres (100 m × 100 m).	The field measures 2 hectares.
hedron	• (pl. **hedra**) Face.	Polyhedron - A solid object that has polygons as faces.
height	• The *vertical* distance from top to bottom.	
hepta	• Prefix meaning seven.	See *heptagon*
heptagon	• A *polygon* with 7 sides.	
hexa	• Prefix meaning six.	See *hexagon*
hexagon	• A *polygon* with 6 sides.	
hexagonal prism	• A *three dimensional* shape. Two identical *bases* are *hexagons*. Six *faces* are *rectangles*.	
hexagonal pyramid	• A *three dimensional* shape. The *base* is a *hexagon*. Six faces are *triangles*.	
horizontal line	• *Parallel* to the horizon.	

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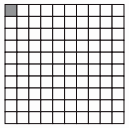
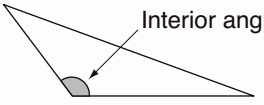
hour (h)	• A *unit* of *time equal* to 60 *minutes*.	One hour is the amount of time between 1 o'clock and 2 o'clock.
hundreds	• The *place value* between *tens* and *thousands*.	1825.763 has 8 hundreds. thousands: 1 · hundreds: 8 · tens: 2 · units: 5 · tenths: 7 · hundredths: 6 · thousandths: 3
hundredth	• One part out of 100 parts of one whole.	
hundredths	• The *place value* between *tenths* and *thousandths*.	1825.763 has 6 hundredths. thousands: 1 · hundreds: 8 · tens: 2 · units: 5 · tenths: 7 · hundredths: 6 · thousandths: 3
identity element (for addition)	Rule: The *sum* of any number and zero equals that number. • Zero is the identity element for *addition*.	$a + 0 = a$ *OR* $0 + a = a$ $3 + 0 = 3$ $0 + 3 = 3$
identity element (for multiplication)	Rule: The *product* of any number and one equals that number. • One is the identity element for addition.	$a \times 1 = a$ *OR* $1 \times a = a$ $3 \times 1 = 3$ $1 \times 3 = 3$
impossible	• Cannot happen.	 Christmas Day - 4th of April?
improper fraction	• Any *fraction* in which the *numerator* is greater than or equal to the *denominator*.	$\frac{9}{8}$ the numerator is 9 the denominator is 8 $9 \geq 8$ so $\frac{9}{8}$ is an improper fraction.
increase	• To make larger or grow in size.	8 must increase by 5 to get to 13.
interior angle	• An *angle* inside a *polygon*.	

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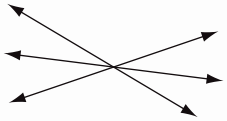
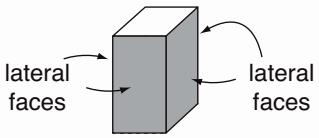
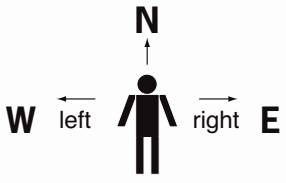
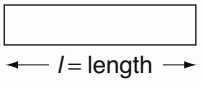
intersecting lines	• Lines that meet at a point.	
integer ($\mathbb{Z}$)	• Any *negative number*, zero or *positive number*.	–3, –2, –1, 0, 1, 2, 3 are integers. 3.5 and $5\frac{2}{3}$ are not integers.
inverse of an operation	• The *opposite* operation. Operations that undo each other.	+ is opposite – × is opposite ÷
kilogram (kg)	• A *unit* of *weight equal* to 1000 *grams*.	My father weighs 85 kg.
kilometre (km)	• A *unit* of *distance equal* to 1000 *metres*.	The distance from Melbourne to Sydney is 900 km.
largest to smallest	• Ranking in order from the biggest to the littlest.	 1st 2nd 3rd 4th
lateral faces	• The *vertical* surfaces on a solid.	A rectangular prism has 4 lateral faces. 
leap year	• A *year* with 366 *days* that falls every *fourth* year and includes the 29th of February as the extra day.	A leap year is divisible by 4. 2012 will be a leap year.
left	• The *direction* to the *west* of your body if you are facing *north*.	
length	• The *distance* from one end to the other. • How long a shape is.	

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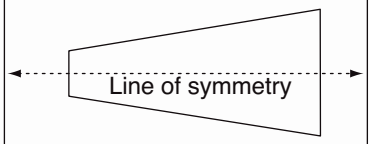
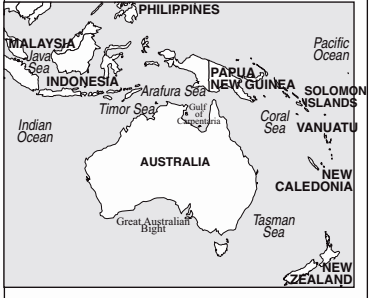
less than (<)	• A symbol showing which is smaller.	2 < 10 means that 2 is less than 10.
likely	• Will probably happen.	This spinner is likely to land on a Z.
line of symmetry	• A line that divides a shape so that one *side* is a mirror image of the other. Both sides match exactly when folded.	
litre (L)	• A *unit* of *capacity* equal to 1000 *millilitres*.	1 litre of milk.
location	• The exact place, where something is situated.	
longest	• Having the biggest *length*.	The reticulated python of SE Asia regularly exceeds 6.25 m. The record length is 10 m for a specimen shot in Celebes, Indonesia in 1912.
magic square	• A square grid filled with numbers • The *sum* of the numbers in every *row*, *column* and *diagonal* is the same.	4 9 2 3 5 7 8 1 6 Rows: 4 + 9 + 2 = 3 + 5 + 7 = 8 + 1 + 6 = 15 Columns: 4 + 3 + 8 = 9 + 5 + 1 = 2 + 7 + 6 = 15 Diagonals: 4 + 5 + 6 = 2 + 5 + 8 = 15
map	• A diagram of a region showing its position in the world.	South Pacific 

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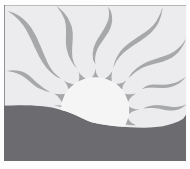
mass	• The amount of matter in an object.	The mass of 3 oranges is about 1 kg.
maximum	• The highest value.	The maximum speed in a residential area is 50 kilometres per hour.
metre (m)	• A *unit* of *length equal* to 100 *centimetres*.	Track distances are measured in metres.
millilitre (mL)	• A *unit* of *capacity*. • 1000 millilitres is *equal* to 1 *litre*.	Medicines are measured in mL.
millimetre (mm)	• A *unit* of *length*. • 1000 millimetres is *equal* to 1 *metre*.	Timber length is measured in millimetres.
million	• A thousand thousands.	1 000 000
minimum	• The lowest value.	The minimum temperature reached yesterday was 25°C.
minus (–)	• Another word for *subtract*. To take away.	\$20 minus \$5 is \$15. 20 – 5 = 15
minute (min)	• A *unit* of *time equal* to 60 *seconds*.	One minute has 60 seconds.
mixed number	• The *sum* of a *whole number* and a *fraction* less than one.	$3\frac{5}{7}$ is a mixed number.
month	• A *unit* of *time equal* to 28, 29, 30 or 31 *days*.	There are 12 months in a year starting with January.
morning	• The early part of the *day* ending at 12 noon.	
multiple	• A multiple of a *whole number* is the *product* of that number with any non-zero whole number.	The multiples of 2 are 2, 4, 6, 8, 10, ... $2 \times 1 = 2$ $2 \times 2 = 4$ $2 \times 3 = 6$ etc.

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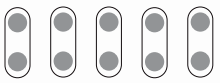
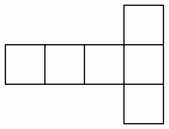
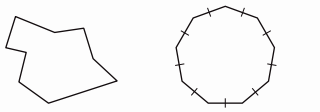
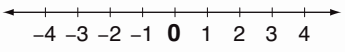
multiplication	• An *operation* where a number is added to itself a number of times.	$2+2+2+2+2=10$ or $5\times2=10$ 
multiply ($\times$)	• To find the *total* of a number of identical groups.	Three lots of 2 cows is 6. $3\times2=6$ or $2+2+2=6$
negative number	• A number that is less than zero.	–1, –2, –3, –4, –5, ... are negative numbers.
net	• The pattern you cut out to form a *3D* shape.	Net of a cube. 
ninth	• The *position* after *eighth*.	1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, **9th**.....
nona	• Prefix meaning nine.	See *nonagon*
nonagon	• A *polygon* with 9 sides.	 Nonagon Regular nonagon
north	• A *compass direction*.	
northeast	• A *compass direction*.	
northwest	• A *compass direction*.	
number line	• An evenly marked *line* that shows position of *numbers*.	
number sentence	• A sentence using numbers and *operations*.	"Mary had four cats and two dogs. How many pets did she have?" Number sentence: $4+2=6$
numeral	• A symbol used to represent a number.	Arabic numerals: 1, 2, 3, 4, 5 Roman numerals: I, II, III, IV, V

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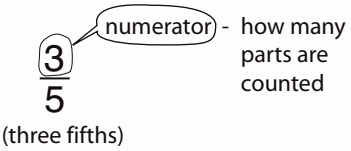
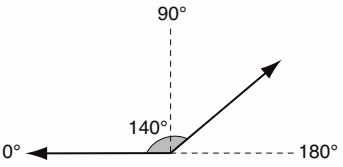
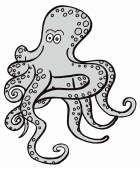
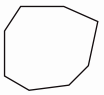
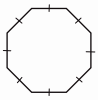
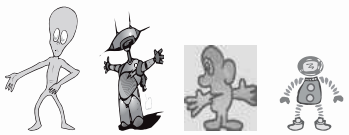
numerator	• The number above the fraction bar in a *fraction*.	
oblique line	• A line at an *angle* to the horizon.	
obtuse angle	• An *angle* measuring greater than 90° and less than 180°.	
octa	• Prefix meaning eight.	An octopus has 8 legs. 
octagon	• A *polygon* with 8 sides.	 Octagon  Regular octagon
odd numbers	• A *whole number* that is not *divisible* by 2.	Odd numbers end with 1, 3, 5, 7 and 9.
of	• Means to *multiply*.	Whenever you say or read 'of' then multiply!
once	• On one occasion.	Just this time!
operation	• A mathematical process performed according to certain rules.	There are four basic operations in arithmetic: addition 3 + 12 subtraction 3 – 1 multiplication 1 × 5 division 6 ÷ 3
opposite	• The equivalent position but on the other side.	The opposite: left/right +4/–4
order	• Placing a group in a special arrangement.	The aliens are arranged in order of height. 

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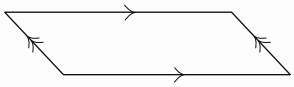
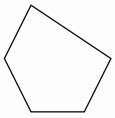
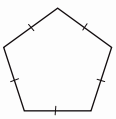
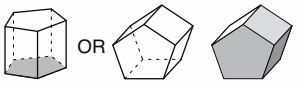
order of operations	• The order of doing *operations*. 1) *Simplify* inside all *brackets*. 2) Calculate × and ÷ from left to right. 3) Calculate + and – from left to right.	Calculate $4 + 3 \times (6 - 2)$ by 1) $= 4 + 3 \times 4$ 2) $= 4 + 12$ 3) $= 16$
ordinal numbers	• A *whole number* that shows position.	1st, 2nd, 3rd, 4th, 5th..... are ordinal numbers.
orientation	• Position relative to *direction*.	The tornado is coming from the west.
outcome	• Result.	The outcome (result) of 2×4 is 8
pair	• Two together.	
parallelogram	• A special *quadrilateral*. *Opposite* sides are *parallel lines*. *Opposite* sides are equal in length.	
pattern	• Numbers or objects that are arranged following a rule.	
penta	• Prefix meaning five.	See *pentagon*
pentagon	• A *polygon* with 5 sides.	 Pentagon  Regular pentagon
pentagonal prism	• A *three dimensional* shape. Two identical, *parallel bases* are *pentagons*. Five *faces* are *rectangles*.	
pentagonal pyramid	• A *three dimensional* shape. *Base* is a *pentagon*. Five *faces* are *triangles*.	
per	• For each. • Can be written as a forward slash (/).	5 kilometres per hour or 5 km/h means 5 km travelled for each hour.
percentage	• Out of 100 • 'Per' means for each, 'cent' means 100.	$59\% = \frac{59}{100} = 0.59$

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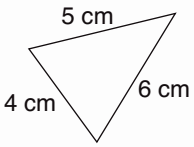
perimeter

• The distance around the outside of a shape.

Add the length of all sides.

Perimeter = 4 + 5 + 6 = 15 cm

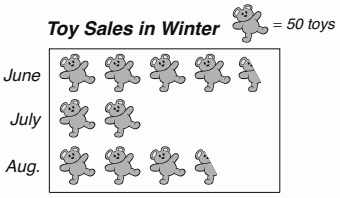


perspective

• The appearance of objects affected by size and *position*.

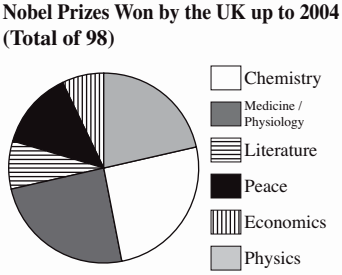
pictograph

• A *graph* that uses pictures or symbols to represent *data*.



pie chart

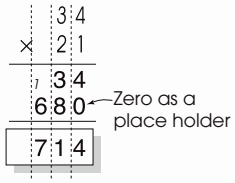
• A *graph* that represents *data* as a *sector* of a *circle*.



place holder

• Minds a spot in a number.

Zeros are used as place holders in long multiplication algorithms.



place value

• Value according to position in a number.

954
5 is in the tens place
5 has a value of 50

millions	*hundreds of thousands*	*tens of thousands*	*thousands*	*hundreds*	*tens*	*units*	*decimal point*	*tenths*	*hundredths*	*thousandths*
1 000 000	*100 000*	*10 000*	*1000*	*100*	*10*	*1*	•	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

plane

• A flat surface.

plus (+)

• Another word for *addition*. To add.

2 cows plus 3 cows gives you 5 cows.

2 + 3 = 5

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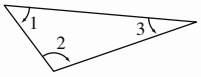
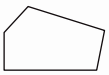
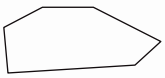
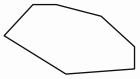
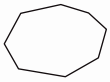
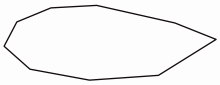
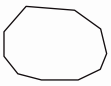
pm **(p**ost **m**eridiem**)**	• The *time* from midday to midnight.	Every night Jimmy starts reading at 9 pm.
polygon	• A closed *two-dimensional* shape for which all sides are line segments. 3 or more *sides* and *angles*.	'Poly' means many 'gon' means angle. triangle (3 angles)

polygon (many angles)	**regular polygon** (all sides and all angles are equal)	Number of Sides	Number of Interior angles
Triangle  3 angles	Equilateral triangle	3	3
Quadrilateral 4 angles	Square	4	4
Pentagon  5 angles	Regular pentagon	5	5
Hexagon  6 angles	Regular hexagon	6	6
Heptagon  7 angles	Regular heptagon	7	7
Octagon  8 angles	Regular octagon	8	8
Nonagon  9 angles	Regular nonagon	9	9
Decagon  10 angles	Regular decagon	10	10

polyhedron	• A *three dimensional* shape. Four or more *faces*. Described by their *faces*, *edges* and *vertices*.	'Poly' means many 'hedron' means faces. tetrahedron (4 faces)
position	• Where something is in relation to things around it.	In, on, under, behind, next to.
positive numbers	• A number that is *greater than* zero.	+1, +2, +3, +4, +5, ... are positive numbers.
possible	• Can happen.	 landing on a head

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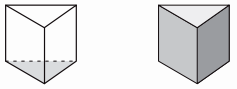
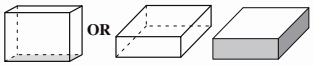
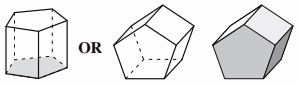
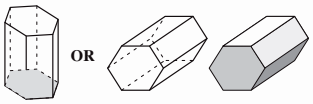
power	• An expression, such as 4^3, in which the *base* (4) is multiplied by itself a number of times equal to the *exponent* (3).	4^3 or 4 to the power of 3 is $4 \times 4 \times 4 = 64$
powers of ten	• 1 followed by a certain number of zeros.	10, 100, 1000, 10 000..... are powers of 10
previous	• The one before.	If the current year is 2014, the previous year is 2013.
prime number	• A *whole number* that has exactly two *factors*, 1 and itself. • 1 is not a prime number.	59 is a prime number as its only factors are 1 and 59. The prime numbers between 0 and 100 are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97.
prism	• A *three dimensional* shape. Two *parallel bases* are the same.	

prism	Properties	Number of			Examples
		Faces	Edges	Vertices	
Triangular Prism	Bases are triangles Lateral faces are rectangles	5	9	6	
Square Prism	Bases are squares Lateral faces are rectangles	6	12	8	
Rectangular Prism	Bases are rectangles Lateral faces are rectangles	6	12	8	
Pentagonal Prism	Bases are pentagons Lateral faces are rectangles	7	15	10	
Hexagonal Prism	Bases are hexagons Lateral faces are rectangles	8	18	12	

product	• The result when two or more numbers are multiplied.	The product of 4 and 5 is 20: $4 \times 5 = 5 \times 4 = 20$
profit	• What is gained, less any expenses. Profit = Revenue – Expense.	Revenue from a business activity is $20. If the expenses are $15 then the profit would be $5.

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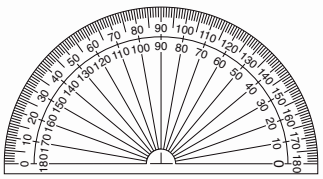
proper fraction

• Any *fraction* in which the *numerator* is *less than* the *denominator*.

$\frac{5}{8}$ the numerator is 5
the denominator is 8
5 < 8 so
$\frac{5}{8}$ is a proper fraction.

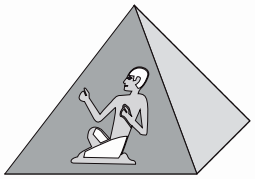
protractor

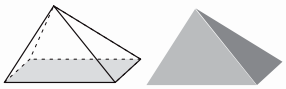
• A semi-circular tool used to measure *degrees*. There are 180° on a protractor.



pyramid

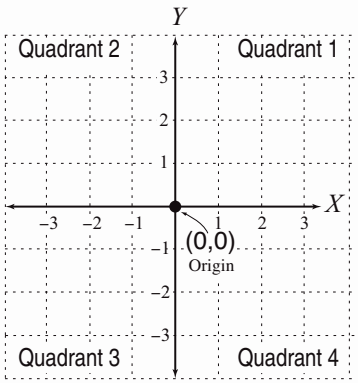
• A *three dimensional* shape.
One *base* is a *polygon*.
All other *faces* are *triangles* that meet at one point called *vertex*.
A pyramid is named for the shape of its base.



pyramid	Properties	Number of			Examples
		Faces	Edges	Vertices	
Triangular Pyramid	Base is a triangle Lateral faces are triangles	4	6	4	
Square Pyramid	Base is a square Lateral faces are triangles	5	8	5	
Rectangular Pyramid	Base is a rectangle Lateral faces are triangles	5	8	5	
Pentagonal Pyramid	Base is a pentagon Lateral faces are triangles	6	10	6	
Hexagonal Pyramid	Base is a hexagon Lateral faces are triangles	7	12	7	

quadrant

• Any *quarter* of a *plane* divided by an *x-axis* and a *y-axis*.



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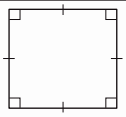
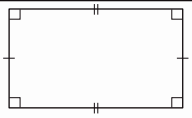
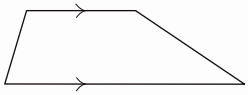
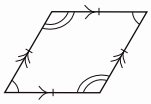
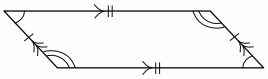
quadrilateral

• A *polygon* with 4 *sides*.

'Quad' means 4
'lateral' means side.

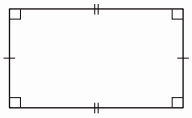
quadrilateral	Sides	Interior angles	Diagram
Square	4 sides of equal length	4 right angles	
Rectangle	Opposite sides of equal length	4 right angles	
Trapezium	2 opposite sides parallel		
Rhombus	4 sides of equal length and opposite sides parallel	Opposite angles equal	
Parallelogram	Opposite sides of equal length and opposite sides parallel	Opposite angles equal	

quarter

• One of four equal parts of a group or object
• Written as the *fraction* $\frac{1}{4}$.

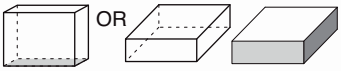
rectangle

• A special *parallelogram*.
Four *right angles*.



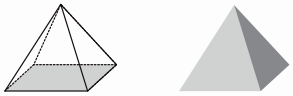
rectangular prism

• A *three dimensional* shape.
Six rectangular faces.



rectangular pyramid

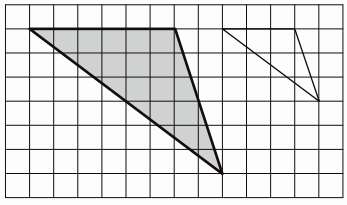
• A *three dimensional* shape.
One *rectangular base*.
All the other *faces* are *triangles*.



reduction

• Make smaller or decrease.

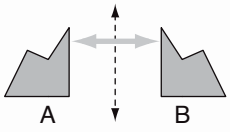
The original triangle has been reduced to make it 2× smaller.



reflection

• A movement that *flips* a figure across a line so that the figure is in the mirror image *position*.

Shape B is a reflection of shape A.



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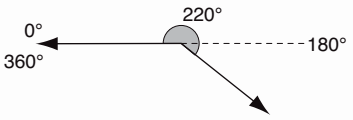
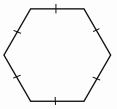
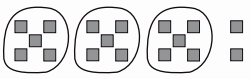
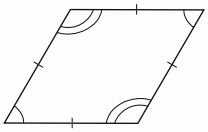
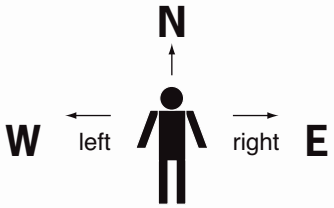
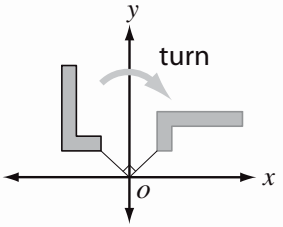
reflex angle	• An *angle* measuring greater than 180° and less than 360°.	
regular shape	• A shape with all *side*s and all *angles equal*.	A regular hexagon has 6 equal sides and 6 equal angles.  Regular hexagon
remainder	• The amount left over when one number cannot be *divided* exactly by another.	17 ÷ 5 = 3 with 2 remainder. 
reversible	• Able to be turned in the *opposite* way.	The process of freezing the water is reversible: water ⟶ ice ⟶ water
rhombus	• A special *parallelogram*. Four *equal sides*. *Opposite angles equal*.	
right	• The *direction* to the *east* of your body if you are facing *north*.	
right angle	• An *angle* measuring exactly 90°. It is marked with a corner.	
Roman numerals	• Numeral system invented by the ancient Romans.	I = 1 V = 5 X = 10 L = 50 C = 100 D = 500 M = 1000
rotation	• A movement that turns a shape about a fixed *point* (the centre of rotation) by a given *angle* (the angle of rotation).	The centre of rotation is the origin *O* and the angle of rotation is 90°. 

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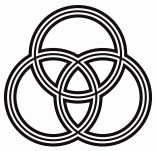
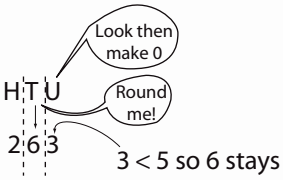
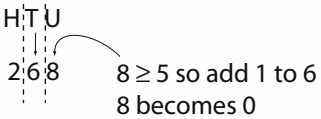
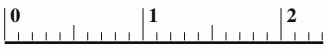
rotational symmetry	• A shape has rotational symmetry if a *rotation* of 180° or less produces an image that fits exactly on the original shape.	This shape has rotational symmetry because after a rotation of 120° it looks identical to the original. 
round	• To *approximate* a number to a given *place value*. Look at the next *digit* after the given place value you are rounding to. If this digit is less than 5, keep the digit in the given place value the same. If this digit is greater than or equal to 5, add 1 to the digit in the given place value. Then make the digit you were looking at zero.	Round 263 to the nearest 10:  Round 268 to the nearest 10: 
row	• A *horizontal* line of *data* in a *table*.	Netball: Aust v NZ → NZ / Quarters | Shooting chances | Actual goals | Success % 1st | 9 | 9 | 100 2nd | 14 | 13 | 92.85 3rd | 23 | 20 | 86.95 4th | 18 | 17 | 94.44
scale	• A key on a *scale drawing/map* that tells how the drawing's *dimensions* and life size dimensions are related. • Set of marks on a line.	If the scale on a map is 1 cm : 10 m then every cm on the drawing represents 10 m in real life. 
scale drawing	• Changing the size of an object but not the shape.	A life size staple. The staple scaled by 50%.
second	• The *position* after *first*.	1st, **2nd**.....
second (s)	• A very short unit of *time*.	There are 60 seconds in 1 minute.
segment	• Two *points* and all points on the *line* between the two points. Part of a line.	Segment $\overline{AB}$
seventh	• The *position* after *sixth*.	1st, 2nd, 3rd, 4th, 5th, 6th, **7th**.....

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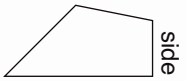
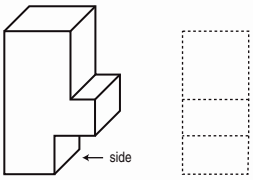
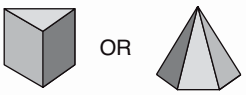
shortest	• Having the smallest *length*.	Sam is the shortest in the class.
side	• One of the lines that form a *polygon*.	
side view	• What you see of an object looking from a side *perspective*. • *Three-dimensional* objects have 3 views: front, top and side.	
simplest form of a fraction	• A *fraction* is in its simplest form when the only number that divides into both the *numerator* and the *denominator* is 1.	The simplest form of $\frac{6}{9}$ is $\frac{2}{3}$. (Divide 6 and 9 by 3. 2 and 3 can only be divided by 1 so they can not be reduced.)
simplify	• To reduce to the *simplest form*.	To simplify the ratio 14:6 divide both sides by 2. 14:6 simplified is 7:3.
sixth	• The *position* after *fifth*.	1st, 2nd, 3rd, 4th, 5th, **6th**.....
size	• How big an object is.	The size of the wave is 2 metres.
slide	• Move without changing direction.	
smallest to largest	• Ranking in order from the littlest to the biggest.	
solid	• A *three dimensional* shape that encloses a part of space.	
south	• A *compass direction*.	
southeast	• A *compass direction*.	
southwest	• A *compass direction*.	

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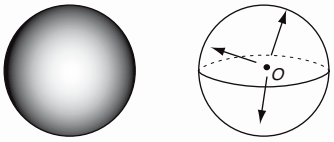
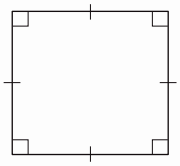
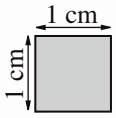
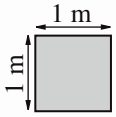
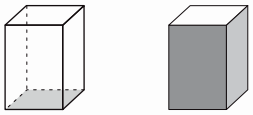
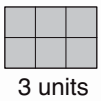
sphere	• A set of *points* in space of equal distance from the central point.	
square	• A *rectangle* with all *sides* of equal length.	
square number	• A number that results from multiplying another number by itself.	$4 \times 4 = 16$ 16 is a square number.
square centimetre	• A *unit* of *area* equal to 1 *centimetre* by 1 centimetre.	
square metre	• A *unit* of *area* equal to 1 *metre* by 1 metre.	
square prism	• A *three dimensional* shape. Two identical square *bases*. All the other faces *rectangles*.	
square pyramid	• A *three dimensional* shape. One square *base*. All the other faces are *triangles*.	
square units	• A *unit* of *area* equal to the area of a square with side lengths of 1 unit.	$\boldsymbol{A} = lw$ $\boldsymbol{A} = 3 \times 2$ $\boldsymbol{A} = 6$  2 units 3 units Area = 6 square units
squared	• Multiplying a number by itself. A number raised to the second *power*.	4 squared written as 4^2: $4^2 = 4 \times 4 = 16$
straight angle	• An *angle* measuring 180°.	
subtract	• To take away or *minus*.	If you subtract 10 from 15 you are left with 5: $15 - 10 = 5$
sum	• The result when two or more numbers are added.	The sum of 20 and 6 is 26: $20 + 6 = 6 + 20 = 26$

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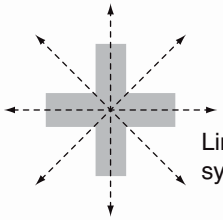
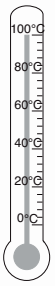
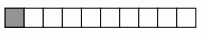
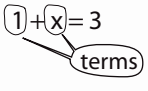
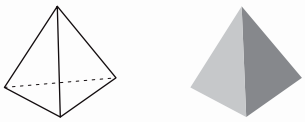
symmetry	• A shape has a *line of symmetry* when a line can be drawn through the shape so that one side of the shape is the mirror image of the other.	There are 3 kinds of symmetry: horizontal symmetry vertical symmetry rotational symmetry 
table	• *Data* organised in *columns* and *rows*.	Netball: Aust v NZ NZ / Quarters: Shooting chances / Actual goals / Success % 1st: 9 / 9 / 100 2nd: 14 / 13 / 92.85 3rd: 23 / 20 / 86.95 4th: 18 / 17 / 94.44
temperature	• How hot or cold a thing is. • Temperature is measured in *degrees* Celsius (°C) with a *thermometer*.	100°C is the temperature at which water boils. 
tens	• The *place value* between the *units* and *hundreds*.	1825.763 has 2 tens. thousands: 1 / hundreds: 8 / tens: 2 / units: 5 . tenths: 7 / hundredths: 6 / thousandths: 3
tenth	• One part out of 10 parts of one whole.	
tenths	• The *place value* after the *decimal point* between the *units* and *hundredths*.	1825.763 has 7 tenths. thousands: 1 / hundreds: 8 / tens: 2 / units: 5 . tenths: 7 / hundredths: 6 / thousandths: 3
term	• A number or unknown amount.	
tetrahedron	• A *three dimensional*, *regular* shape. The *base* is an *equilateral triangle*. Three faces are *equilateral triangles*.	

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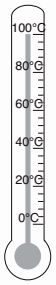
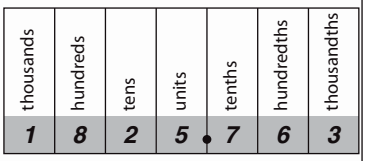
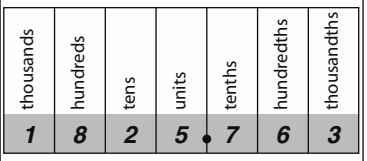
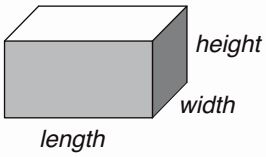
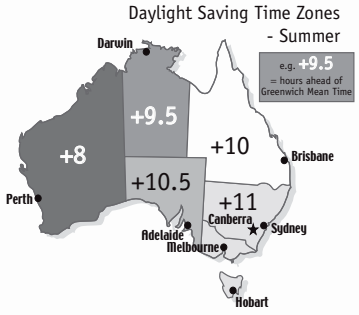
thermometer	• An instrument used to measure *temperature*.	
third	• The *position* after *second*.	1st, 2nd, **3rd**.....
thousands	• The *place value* between *hundreds* and tens of thousands.	1825.763 has 1 thousand. 
thousandth	• One part out of 1000 parts of one whole.	One gram is a thousandth of a kilogram.
thousandths	• The *place value* after *hundredths*.	1825.763 has 3 thousandths. 
three dimensional (3D)	• Able to be measured in three directions namely *length*, *width* and *height*.	
time	• The continuum from past to present to future.	The time is 9:25 am.
time zone	• Regions of different times around the world. Based on Greenwich Mean Time (GMT), each 15° of longitude away from Greenwich, England represents 1 hour of time.	NSW time is 3 hours ahead of WA time during daylight saving. 
tonne (t)	• A *unit* of *measurement* for *mass equal* to 1000 *kilograms*.	The humpback whale can weigh 58 tonnes.

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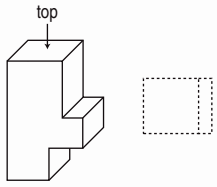
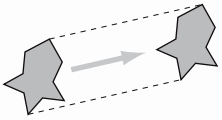
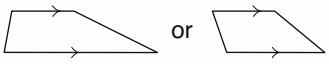
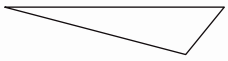
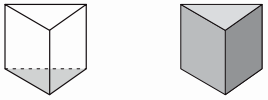
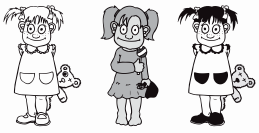
top view	• What you see of an object looking from a top *perspective*. • *Three-dimensional* objects have 3 views: front, top and side.	
total	• The whole lot. • The *sum* of two or more quantities.	The total of 2 and 7 and 3 is 12: 2 + 7 + 3 = 12
transformation	• A movement of a shape in a *coordinate plane*. Types of transformations are *translations*, *reflections* and *rotations*.	See *translation*, *reflection* and *rotation*
translation	• A movement that *slides* a shape without lifting or changing *direction*. The shape is unchanged.	
trapezium	• A *quadrilateral*. Two *opposite sides* are *parallel*.	
tri	• Prefix meaning three.	A tricycle has 3 wheels.
trial and error	• To try repeatedly and learn from mistakes.	This sum can be solved using trial and error. TWO + TWO FOUR
triangle	• A *polygon* with 3 straight *sides*.	
triangular prism	• A *three dimensional* shape. Two identical triangular *bases*. Three rectangular faces.	
triangular pyramid	• A *three dimensional* shape. One triangular *base*. The other three faces are *triangles*.	
triple	• Multiply by three.	Children × 3 = triplets! 

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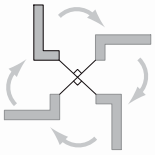
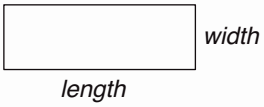
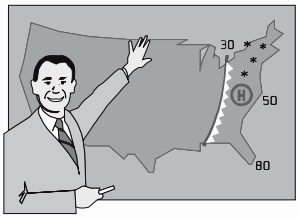
turn	• To *rotate* about a point.	
twenty-four hour time	• Time told in 24 hour lots using 4 *digits*.	Nine thirty is 0930 or 09:30 Two thirty is 1430 or 14:30
twice	• Two times.	Sam has $5 and Jo has $10. Jo has twice as much as Sam.
two dimensional (2D)	• Able to be measured in 2 *directions* (*length* and *width*).	
uncertain	• Not sure it will happen.	 It will rain tomorrow?
unit	• One.	The unit of measurement for length is metre (m).
units	• The *place value* before the decimal point between the *tens* and *tenths*.	1825.763 has 5 units.

thousands	hundreds	tens	units	tenths	hundredths	thousandths
1	*8*	*2*	*5* .	*7*	*6*	*3*

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units of measurement

• Standard amount or quantity.

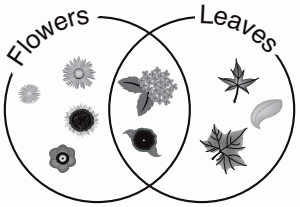
unit	Abbreviation	Examples	Used for measuring.....
• millimetre	mm	thickness of a plank of wood	LENGTH distance - length, width, height, diameter, perimeter
• centimetre	cm	width of a photo frame	
• metre	m	length of a lap of a stadium	
• kilometre	km	distance between two cities	
• gram	g	weight of an egg	MASS weight - people, animals, objects
• kilogram	kg	weight of a bag of apples	
• tonne	t	weight of an elephant	
• millilitre	mL	liquid in a glass	CAPACITY quantity - liquids
• litre	L	liquid in a bucket	
• megalitre	ML	liquid in a water tower	
• square centimetre	cm^2	area of a Maths book cover	AREA surface - objects
• square metre	m^2	area of basketball court	

unlikely

• Probably will not happen.

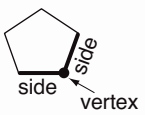
Venn diagram

• A diagram using shapes to show the relationship between sets of objects.

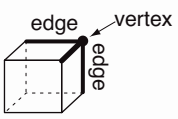


vertex

• (pl. **vertices**) The point at which two *sides* (of a *polygon*) or three *edges* (of a *solid*) meet.



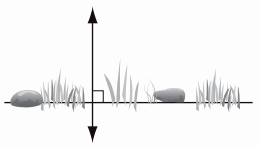
Polygon



Solid

vertical line

• A line at right angles to the horizon.



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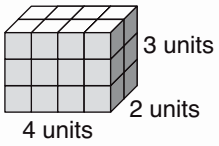
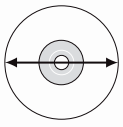
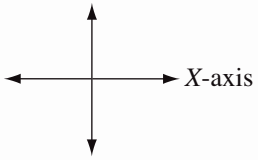
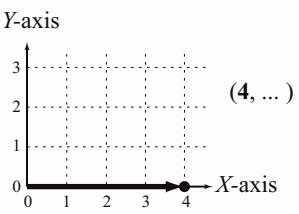
volume	• The amount of space that a *solid* occupies. Volume is measured in cubic units. e.g. cubic centimetres (cm^3) or cubic metres (m^3).	Volume of a rectangular prism is calculated by multiplying length by width by height: $V = lwh$ $V = 4 \times 2 \times 3$ $V = 24$ Volume = 24 cubic units 
week	• A *unit* of *time* equal to 7 days; Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.	Roger was on holidays for one week (seven days).
weight	• The heaviness of an object. Equals the *mass* of an object times the force of gravity. This means that weight changes with any change in gravity.	A 3 kg brick weighs: 3 kg on Earth, about 0.5 kg on the moon, 0 kg in space.
west	• A *compass direction*.	The sun sets in the west.
whole numbers	• The *counting numbers* from zero to infinity.	0, 1, 2, 3, 4, 5, ... are whole numbers.
width	• How wide an object is. The sideways *dimension*.	The width of the CD is 12 cm.  12 cm
***x*-axis**	• The *horizontal* axis.	
***x*-coordinate**	• The *first* number in an ordered pair. The position of a point along the *X*-axis.	

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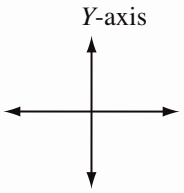
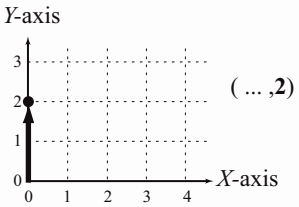
y-axis	• The *vertical* axis.	
y-coordinate	• The *second* number in an ordered pair. The position of a point along the *Y*-axis.	
year	• A *unit* of *time* equal to 365 days. (366 in a leap year).	1st of January to the 31st of December.

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SYMBOLS

+	plus or add
−	minus or subtract
×	multiplied by, times, lots of
÷	divided by, into groups of
=	equals, is equal to
≠	is not equal to
≈	is approximately equal to
<	is less than, $4 < 6$
>	is greater than, $8 > 5$
≤	is less than or equal to
≥	is greater than or equal to
%	percentage, $12\% = \frac{12}{100}$
.	decimal point as in 7.9
( )	parentheses, or brackets - a grouping symbol
$\frac{4}{7}$	fraction, $4 \div 7$, four sevenths

right angle

parallel lines

lines of equal length

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Adding and subtracting 0

Adding and subtracting 0 to any number leaves the number unchanged.

$$3 + 0 = 3 \qquad 3 - 0 = 3$$
$$2.5 + 0 = 2.5 \qquad 2.5 - 0 = 2.5$$
$$\frac{4}{9} + 0 = \frac{4}{9} \qquad \frac{4}{9} - 0 = \frac{4}{9}$$

0 used in decimals

0's can be added when needed after the last digit and the decimal point.

$$4 = 4.000$$

0's can be added when needed before the first digit of the decimal number.

$$4 = 4.0 = 0004.0$$

By convention, decimal numbers less than 1 are written with a 0 before the decimal point.

$$.4 = 0.4$$

0 as a probability

When the probability of an event is 0, the event is 'impossible'.

0 in words

Some of the words used to represent 0 are: nought, nil, none, nothing, zilch, zip.

Multiplying by 0

The product of any number and 0 is 0

$$7 \times 0 = 0$$
$$81.6 \times 0 = 0$$
$$\frac{3}{5} \times 0 = 0$$

Dividing by 0

Dividing by 0 is meaningless.

$4 \div 0$ and $\frac{3}{0}$ are meaningless operations.

Power of 0

Any number raised to the power of 0 is 1

$$1^0 = 1$$
$$(0.5)^0 = 1$$
$$(-24)^0 = 1$$

0 as the result of a sum

The sum of any number, except zero, and its opposite is 0

$$4 + (-4) = 0$$
$$2.6 + (-2.6) = 0$$
$$\frac{5}{8} + (-\frac{5}{8}) = 0$$

0 facts

0 is a whole number and a digit but is neither a positive nor a negative number.

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Multiplying by 1

Any number multiplyed by 1 remains unchanged.

$$3 \times 1 = 3$$
$$2.5 \times 1 = 2.5$$
$$\frac{4}{9} \times 1 = \frac{4}{9}$$

Dividing by 1

Any number divided by 1 remains unchanged.

$$7 \div 1 = 7$$
$$81.6 \div 1 = 81.6$$
$$\frac{3}{5} \div 1 = \frac{3}{5}$$

1 as a fraction

1 can be renamed as a fraction whenever the numerator is the same as the denominator.

$1 = \frac{2}{2}$ $1 = \frac{3}{3}$ $1 = \frac{4}{4}$ $1 = \frac{5}{5}$

Power of 1

Any number raised to the power of 1 remains unchanged

$$7^1 = 7$$
$$(6.8)^1 = 6.8$$
$$(-4)^1 = -4$$

1 as a probability

When the probability of an event is 1, the event is 'certain' to happen.

1 as a percentage

1 is the same as 100%.

$$1 = \frac{100}{100} = 100\%$$

1 as a denominator

Any whole number can be written as a fraction with denominator 1

$$20 = \frac{20}{1}$$

1 as the result of a product

The product of any number, except zero, and its reciprocal is 1

$$4 \times \frac{1}{4} = 1$$

1 in words

Some of the words used to represent 1 are: one, a, an, each, single, unit.

1 facts

1 is a whole number and a digit but not a prime number.

1 is a factor of any whole number.

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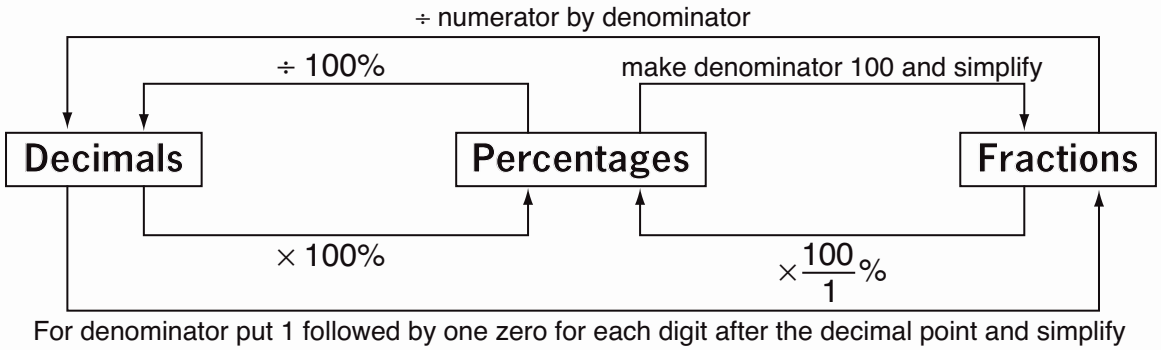
NUMBER FACTS (3)

Place Value

millions	*hundreds of thousands*	*tens of thousands*	*thousands*	*hundreds*	*tens*	*units*	*decimal point*	*tenths*	*hundredths*	*thousandths*
1,000,000	*100,000*	*10,000*	*1000*	*100*	*10*	*1*	•	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Decimals / Fractions / Percentages



For denominator put 1 followed by one zero for each digit after the decimal point and simplify

Fraction	Decimal	Percentage
$\frac{1}{1}$	1	100%
$\frac{1}{2}$	0.5	50%
$\frac{1}{4}$	0.25	25%
$\frac{3}{4}$	0.75	75%

Fraction	Decimal	Percentage
$\frac{1}{5}$	0.2	20%
$\frac{2}{5}$	0.4	40%
$\frac{3}{5}$	0.6	60%
$\frac{4}{5}$	0.8	80%

Prime numbers < 100

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97

Operation terminology

Addition: sum, all together, in total, more than
Subtraction: difference, less than, change
Multiplication: product, times, lots of
Division: a fraction (half, third, quarter) of, quotient

Order of operations

1) Simplify inside all brackets first.
2) Evaluate powers and square roots.
3) Do all multiplications or divisions in order from left to right.
4) Do all additions or subtractions in order from left to right.

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MEASUREMENT FACTS (1)

CONVERSIONS

Length

10 millimetres (mm) = 1 centimetre (cm)

100 cm = 1 metre (m)

1000 mm = 1 metre (m)

1000 m = 1 kilometre (km)

Area

100 square mm (mm^2) = 1 square cm (cm^2)

10 000 cm^2 = 1 square metre (m^2)

10 000 m^2 = 1 hectare (ha)

Mass

1000 milligrams (mg) = 1 gram (g)

1000 g = 1 kilogram (kg)

1000 kg = 1 tonne (t)

Liquid Capacity

1000 millilitres (mL) = 1 litre (L)

1000 L = 1 kilolitre (kL)

1000 kL = 1 megalitre (ML)

Time

60 seconds (s) = 1 minute (min)

60 minutes (min) = 1 hour (h)

24 hours (h) = 1 day

7 days = 1 week

2 weeks = 1 fortnight

4 weeks (approx.) = 1 month

365 = 1 year

52 weeks (approx.) = 1 year

12 months = 1 year

366 days = 1 leap year

10 years = 1 decade

100 years = 1 century

Temperature - degrees Celcius (°C)

0°C = freezing point of water

100°C = boiling point of water

37°C = human body temperature

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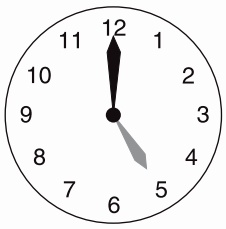
MEASUREMENT FACTS (2)

TIME

O'CLOCK



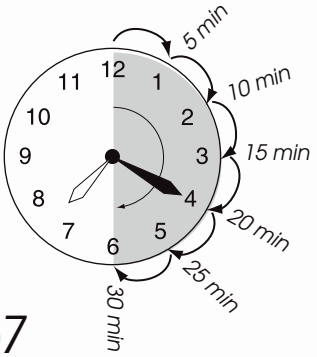
BIG HAND
on 12
LITTLE HAND
on the hour

five o'clock

5:00

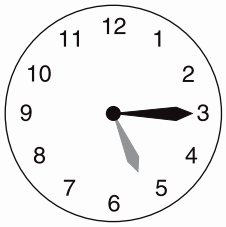
ANALOGUE - PAST

PAST -
big hand to the right



20 minutes past 7

A QUARTER PAST



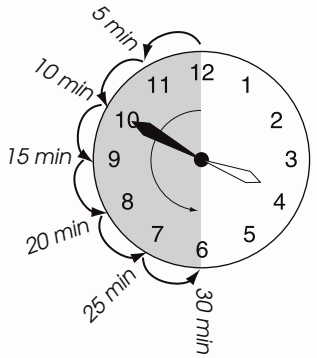
BIG HAND
on 3
LITTLE HAND
past the hour

a quarter past five

5: 15

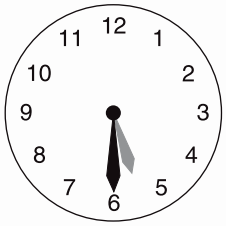
ANALOGUE - TO

TO -
big hand to the left



10 minutes to 4

HALF PAST

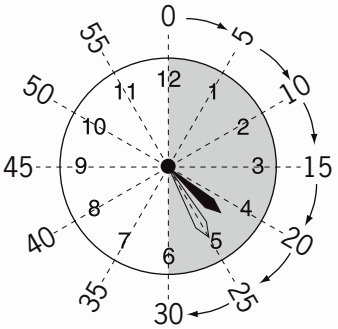


BIG HAND
on 6
LITTLE HAND
half way past
the hour

half past five

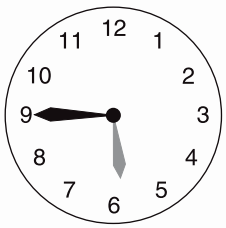
5:30

DIGITAL - PAST



4:25

A QUARTER TO

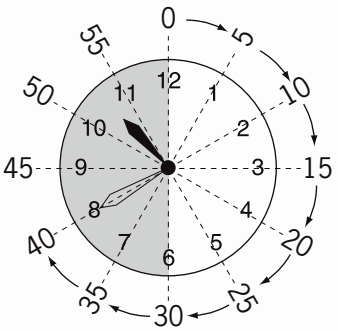


BIG HAND
on 9
LITTLE HAND
before the hour

a quarter to six

5:45

DIGITAL - TO



10:40

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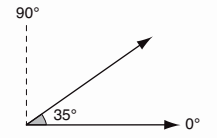
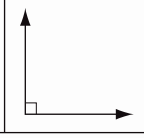
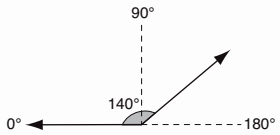
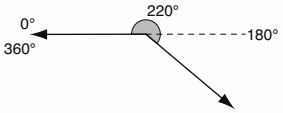
GEOMETRY FACTS

2D shapes

Acute	Right	Obtuse	Straight	Reflex	Revolution
< 90°	90°	more than 90° less than 180°	180°	more than 180° less than 360°	360°
					

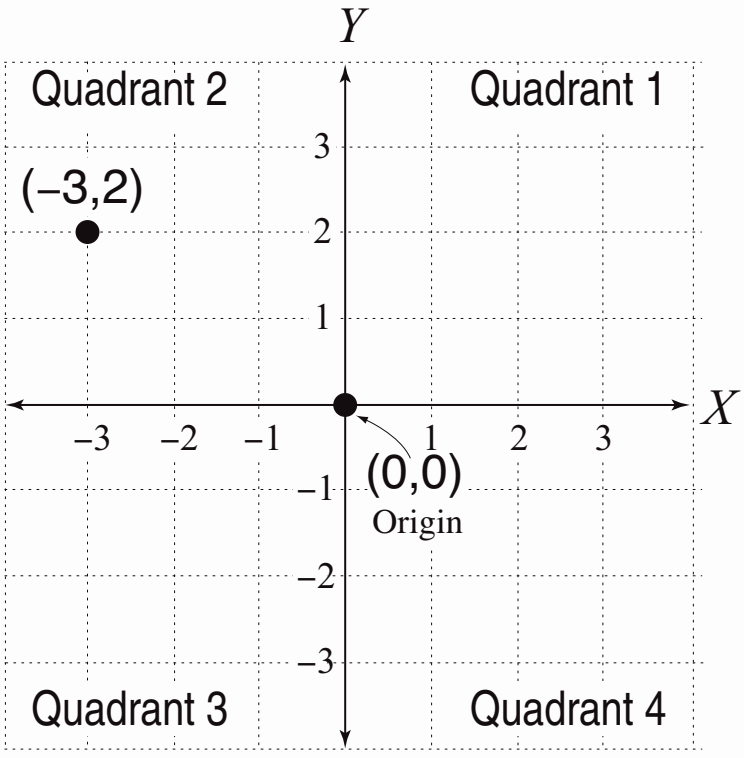
Triangle types

Sides and angles	Triangle type
no equal sides/angles	**scalene**
two equal sides/angles	**isosceles**
three equal sides/angles	**equilateral**

Angles	Triangle type
all acute angles	**acute-angled**
one right angle	**right-angled**
one obtuse angle	**obtuse-angled**

Quadrants

There are 4 quadrants in a Cartesian plane.
In this Cartesian plane coordinates (–3,2) are in quadrant 2.



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ANSWERS

1. [+ Whole Numbers to 10] page 1

Skill 1.1 a) 10, 8, 7, 5, 4, 9, 11, 3, 6, 12
b) 9, 13, 7, 16, 12, 14, 10, 11, 15, 8
c) 7, 13, 12, 6, 15, 8, 11, 10, 9, 14
d) 10, 17, 11, 15, 18, 9, 12, 14, 16, 13

Skill 1.2 a) 10, 9, 6, 12, 7, 8, 5, 11, 14, 13
b) 14, 13, 9, 15, 17, 8, 12, 11, 16, 10
c) 13, 15, 18, 17, 9, 16, 11, 12, 10, 14
d) 12, 14, 7, 15, 10, 8, 13, 11, 6, 9

Skill 1.3 a) 13, 18, 11, 19, 17, 12, 15, 10, 16, 14
b) 15, 14, 10, 16, 18, 9, 13, 12, 17, 11
c) 16, 18, 11, 19, 14, 12, 17, 15, 10, 13
d) 13, 9, 22, 15, 17, 14, 18, 11, 20, 16
e) 16, 15, 17, 12, 18, 20, 24, 13, 19, 11

Skill 1.4 a) 9, 15, 7, 8, 10, 12, 14, 6, 13, 11
b) 11, 12, 6, 5, 9, 14, 8, 7, 13, 10
c) 10, 15, 13, 17, 11, 18, 14, 19, 12, 16
d) 4, 11, 9, 5, 12, 10, 6, 8, 3, 7

2. [– Whole Numbers to 10] page 5

Skill 2.1 a) 6, 4, 3, 1, 10, 5, 7, 9, 2, 8
b) 7, 1, 5, 4, 0, 2 ,8, 9, 3, 6
c) 7, 3, 2, 6, 5, 8, 1, 10, 9, 4
d) 4, 1, 5, 9, 2, 3, 6, 8, 10, 7

Skill 2.2 a) 2, 1, 8, 4, 9, 10, 7, 3, 6, 5
b) 7, 0, 5, 1, 3, 4, 9, 6, 2, 8
c) 7, 9, 2, 6, 3, 10, 5, 1, 4, 8
d) 6, 8, 1, 9, 4, 2, 7, 5, 10, 3

Skill 2.3 a) 8, 3, 10, 6, 2, 7, 4, 5, 1, 9
b) 10, 9, 5, 1, 3, 4, 8, 7, 2, 6
c) 1, 3, 6, 4, 9, 7, 2, 10, 5, 8
d) 1, 6, 5, 9, 10, 3, 7, 4, 2, 8

Skill 2.4 a) 7, 10, 4, 9, 3, 6, 8, 1, 5, 2
b) 5, 9, 10, 2, 7, 3, 6, 8, 4, 1
c) 3, 5, 1, 4, 7, 8, 2, 6, 10, 9
d) 11, 8, 2, 4, 0, 3, 10, 7, 9, 5
e) 7, 2, 10, 4, 3, 8, 5, 6, 9, 11

Skill 2.5 a) 9, 5, 7, 8, 10, 2, 4, 6, 3, 1
b) 3, 4, 8, 7, 1, 6, 10, 9, 5, 2
c) 5, 10, 8, 2, 6, 3, 9, 4, 7, 1
d) 10, 7, 5, 1, 8, 6, 2, 4, 9, 3

3. [× Whole Numbers to 10] page 11

Skill 3.1 a) 3, 8, 10, 4, 1, 6, 2, 9, 5, 7
b) 100, 40, 90, 30, 50, 70, 10, 20, 80, 60
c) 60, 20, 100, 90, 70, 30, 50, 10, 40, 80

Skill 3.2 a) 25, 5, 30, 10, 35, 20, 45, 15, 50, 40
b) 15, 40, 25, 45, 5, 50, 35, 10, 30, 20

Skill 3.3 a) 10, 16, 4, 14, 6, 2, 12, 20, 18, 8
b) 12, 40, 20, 16, 36, 28, 8, 24, 4, 32
c) 24, 32, 8, 20, 12, 40, 16, 28, 4, 36

Skill 3.4 a) 18, 12, 30, 3, 15, 24, 21, 27, 9, 6
b) 3, 15, 27, 24, 12, 21, 6, 30, 18, 9

Skill 3.5 a) 72, 32, 56, 16, 40, 48, 80, 24, 8, 64
b) 21, 42, 14, 56, 70, 7, 35, 28, 63, 49
c) 54, 36, 30, 48, 6, 24, 18, 42, 60, 12
d) 36, 18, 81, 9, 63, 27, 72, 45, 54, 90

Skill 3.6 a) 36, 45, 18, 63, 54, 81, 90, 9, 27, 72
b) 27, 90, 54, 18, 9, 72, 45, 36, 81, 63

4. [÷ Whole Numbers to 10] page 17

Skill 4.1 a) 7, 5, 2, 1, 4, 3, 9, 6, 8, 10
b) 10, 1, 7, 3, 6, 4, 9, 5, 2, 8
c) 2, 3, 10, 7, 5, 6, 4, 8, 1, 9

Skill 4.2 a) 8, 1, 3, 10, 6, 2, 7, 9, 5, 4
b) 2, 6, 7, 3, 1, 4, 10, 8, 5, 9
c) 3, 8, 5, 7, 10, 1, 6, 9, 4, 2
d) 8, 10, 2, 5, 3, 7, 1, 4, 6, 9

5. [Large Number +] page 19

Skill 5.1 a) 87, b) 79, c) 58, d) 157, e) 589, f) 986, g) 4987, h) 8389
i) 656, j) 589, k) 999, l) 8798, m) 4778, n) 3989, o) 7779
p) 7698

Skill 5.2 a) 93, b) 86, c) 140, d) 564, e) 295, f) 591, g) 1806, h) 7590
i) 621, j) 1183, k) 802, l) 4083, m) 3766, n) 7321, o) 8030
p) 7477

Skill 5.3 a) 91, b) 70, c) 482, d) 564, e) 575, f) 463, g) 842, h) 983

6. [Large Number –] page 23

Skill 6.1 a) 44, b) 9, c) 542, d) 405, e) 16, f) 411, g) 680, h) 122
i) 571, j) 216, k) 3421, l) 1011, m) 6357, n) 2300, o) 1331
p) 3622, q) 8215, r) 3424, s) 2311, t) 6113

Skill 6.2 a) 604, b) 405, c) 156, d) 554, e) 5556, f) 2349, g) 5543
h) 3260, i) 2156, j) 2626, k) 4555, l) 3296

Skill 6.3 a) 83, b) 26, c) 45, d) 12, e) 74, f) 37, g) 33, h) 26, i) 395
j) 491, k) 843, l) 737, m) 458, n) 781, o) 795, p) 1589

7. [Powers of 10 ×,÷] page 27

Skill 7.1 a) 700, b) 250, c) 2240, d) 3700, e) 2500, f) 7300, g) 8000
h) 10 900, i) 39 000, j) 60 000, k) 850 000, l) 247 000

Skill 7.2 a) 560, b) 1380, c) 4700, d) 20 950, e) 4700, f) 7500
g) 5000, h) 95 300, i) 60 000, j) 34 000, k) 70 200
l) 58 100, m) 98 000, n) 70 000, o) 950 000, p) 326 000

Skill 7.3 a) 8, b) 7, c) 85, d) 9, e) 5, f) 24, g) 132, h) 980, i) 15

Skill 7.4 a) 60, b) 9, c) 33, d) 160, e) 550, f) 4, g) 8, h) 95, i) 71
j) 459, k) 9, l) 74

8. [Large Number ×,÷] page 31

Skill 8.1 a) 97, b) 88, c) 69, d) 26, e) 90, f) 82, g) 86, h) 64, i) 369
j) 664, k) 808, l) 336, m) 680, n) 393, o) 846, p) 966

Skill 8.2 a) 400, b) 360, c) 188, d) 195, e) 108, f) 161, g) 288, h) 492
i) 328, j) 1035, k) 2863, l) 3212, m) 1080, n) 1701, o) 3690
p) 2610

Skill 8.3 a) 714, b) 480, c) 1032, d) 4402, e) 2610, f) 6716, g) 1748
h) 3168

Skill 8.4 a) 20, b) 23, c) 23, d) 12, e) 100, f) 400, g) 303, h) 110
i) 102, j) 132, k) 142, l) 122, m) 2000, n) 4000, o) 1430
p) 3021, q) 4432, r) 2403, s) 1003, t) 1012, u) 1322
v) 4102, w) 2102, x) 1233

Skill 8.5 a) 51, b) 72, c) 74, d) 80, e) 53, f) 74, g) 34, h) 48, i) 300
j) 900, k) 265, l) 867, m) 2027, n) 1375, o) 1203, p) 1030

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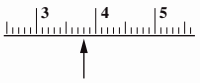
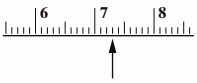
9. [Decimals] page 37

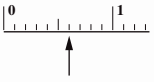
Skill 9.1 a) 47 hundredths = 0.47, b) 35 hundredths = 0.35
c) 6 tenths = 0.6, d) 8 tenths = 0.8
e) 23 hundredths = 0.23, f) 19 hundredths = 0.19
g) 5 tenths = 0.5, h) 76 hundredths = 0.76
i) 4 hundredths = 0.04
j) 4 tenths + 6 hundredths = 0.46
k) 9 tenths + 1 hundredth = 0.91
l) 3 tenths + 2 hundredths = 0.32
m) 6 tenths + 6 hundredths = 0.66
n) 8 tenths + 3 hundredths = 0.83
o) 2 tenths + 7 hundredths = 0.27
p) 7 tenths + 0 hundredths = 0.70
q) 5 tenths + 4 hundredths = 0.54
r) 7 tenths + 8 hundredths = 0.78
s) 1 tenth + 0 hundredths = 0.10
t) 2 tenths + 9 hundredths = 0.29
u) 6 tenths + 5 hundredths = 0.65

Skill 9.2 a) 0.2, b) 0.7, c) 0.9, d) 3.2, e) 4.1, f) 5.8, g) 6.1, h) 0.06
i) 0.03, j) 0.24, k) 0.71, l) 0.66, m) 2.31, n) 5.69, o) 1.12

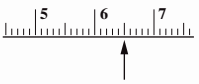
Skill 9.3 a) 4.4 m, b) 0.7 m, c) 1.9 m, d) 2.7 cm, e) 1.2 m, f) 1.6 cm
g) 3.4 m, h) 2.3 m

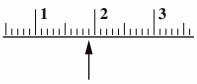
i) 

j) 

k) 

l)

m) 

n) 

Skill 9.4 a) $0.24, b) $0.31, c) $0.59, d) $1.00, e) $9.00, f) $4.00
g) $1.26, h) $4.59, i) $7.46, j) $0.90, k) $0.30, l) $0.50
m) $2.06, n) $7.04, o) $8.01, p) $0.08, q) $0.04, r) $0.03

Skill 9.5 a) B and C, b) C and D, c) B and D, d) A and D, e) B and D
f) A and B

Skill 9.6 a) $6.25, b) $8.00, c) $6.60, d) $5.10, e) $5.45, f) $8.35

Skill 9.7 a) $1.55, b) $2.70, c) $7.95, d) $9.10, e) $5.35, f) $1.15

Skill 9.8 a) $5.00, b) $6.80, c) $4.35, d) $11.80, e) $6.50, f) $5.15
g) $8.45, h) $10.20, i) 2.14, j) 8.04, k) 8.70, l) 7.55, m) 7.71
n) 9.52, o) 10.91, p) 9.45, q) 11.28, r) 8.10, s) 6.24, t) 4.56
u) 18.46, v) 14.28, w) 13.53, x) 31.01, y) 8.86, z) 12.76
A) 8.29, B) 16.51, C) 39.86, D) 24.04, E) 66.40, F) 68.03

Skill 9.9 a) 3.85, b) 1.73, c) 3.15, d) 0.98, e) 1.17, f) 6.67, g) 5.51
h) 3.82, i) 2.57, j) 0.77, k) 2.26, l) 0.78, m) 12.75, n) 12.46
o) 16.34, p) 9.37

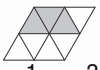
Skill 9.10 a) 1.7, b) 0.5, c) 6.2, d) 3.1, e) 2.75, f) 8.65, g) 5.39, h) 3.73
i) 2.82, j) 4.66, k) 1.17, l) 6.28

Skill 9.11 a) $14.30, b) $17.05, c) $4.09, d) $2.73, e) $2.18, f) $10.91
g) $4.55, h) $12.27

Skill 9.12 a) 53, b) 62, c) 97, d) 18, e) 7, f) 1, g) 41.8, h) 50.6, i) 37.9
j) 10.3, k) 27.4, l) 95.6, m) 270, n) 910, o) 830, p) 50
q) 470, r) 90, s) 625, t) 781, u) 439

Skill 9.13 a) 60.3, b) 84.8, c) 36.9, d) 68.4, e) 72.3, f) 37.8, g) 89.6
h) 32.8, i) 5.15, j) 6.08, k) 7.53, l) 4.92, m) 5.06, n) 9.78
o) 12.09, p) 30.06

10. [Fractions] page 53

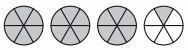
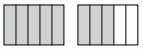
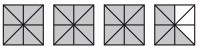
Skill 10.1 a) $\frac{2}{5}$, b) $\frac{3}{11}$, c) $\frac{4}{7}$, d) $\frac{3}{5}$, e) $\frac{3}{4}$, f)
g) , h)  , i) , j)

Skill 10.2 a) $\frac{2}{3}$, b) $\frac{1}{4}$, c) $\frac{1}{2}$, d) $\frac{2}{5}$, e) $\frac{2}{7}$, f) $\frac{5}{6}$, g) $\frac{1}{3}$, h) $\frac{4}{5}$, i) $\frac{5}{8}$, j) $\frac{2}{9}$

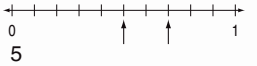
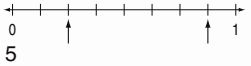
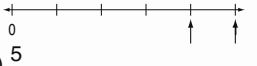
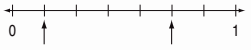
Skill 10.3 a) A and C, b) B and D, c) A and B, d) C and D
e) $\frac{8}{8}$, f) $\frac{7}{7}$, g) $\frac{5}{5}$, h) $\frac{9}{9}$, i) $\frac{12}{12}$, j) $\frac{4}{4}$, k) $\frac{15}{15}$, l) $\frac{3}{3}$

Skill 10.4 a) $\frac{1}{2}$, b) $\frac{5}{6}$, c) $\frac{1}{4}$, d) $\frac{2}{5}$, e) $\frac{5}{7}$, f) $\frac{1}{3}$, g) $\frac{5}{8}$, h) $\frac{3}{10}$

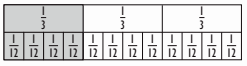
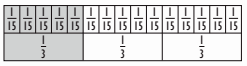
Skill 10.5 a) $2\frac{1}{2}$, b) $1\frac{3}{4}$, c) $2\frac{3}{5}$, d) $3\frac{5}{6}$, e) $4\frac{1}{4}$, f) $1\frac{3}{5}$, g) $6\frac{5}{6}$, h) $3\frac{3}{7}$

Skill 10.6 a) b)
c) d) 
e)  f) 
g) h)

Skill 10.7 a) $\frac{5}{8}$ b) $\frac{4}{4}$
c) $\frac{4}{6}$ d) $\frac{8}{10}$
e) $\frac{3}{8}$, f) $\frac{5}{7}$, g) $\frac{5}{9}$, h) $\frac{1}{6}$

Skill 10.8 a) < b) >
c) $\frac{4}{6}$ d) $\frac{7}{10}$ 
e) $\frac{7}{8}$  f) $\frac{5}{5}$ 
g) $\frac{5}{7}$  h) $\frac{5}{6}$

Skill 10.9 a) >, b) >, c) <, d) <, e) >, f) <, g) <, h) >

Skill 10.10 a) 6 b) 6
c) 4  d) 3
e) 2 f) 1
g) 1  h) 3
i) 20, j) 9, k) 3, l) 3, m) 4, n) 2, o) 4, p) 1, q) 2, r) 28, s) 12
t) 30

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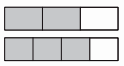
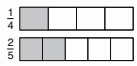
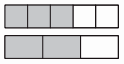
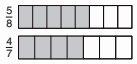
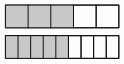
10. [Fractions] (cont.)

Skill 10.11 a) $\frac{3}{4}$  b) $\frac{2}{5}$ 

c) $\frac{3}{5}$  d) $\frac{7}{8}$

e) $\frac{5}{6}$ f) $\frac{4}{7}$ 

g) $\frac{3}{5}$  h) $\frac{3}{4}$

i) <, j) >, k) >, l) >, m) <, n) <, o) >, p) <

Skill 10.12 a) $\frac{2}{3}$, b) $\frac{5}{7}$, c) $\frac{4}{5}$, d) $\frac{7}{9}$, e) $\frac{5}{6}$, f) $\frac{3}{4}$, g) $\frac{4}{5}$, h) $\frac{3}{8}$, i) $\frac{4}{9}$
j) $\frac{7}{8}$, k) $\frac{7}{10}$, l) $\frac{11}{12}$, m) $\frac{6}{7}$, n) $\frac{7}{9}$, o) $\frac{2}{5}$, p) $\frac{12}{13}$, q) $\frac{9}{10}$
r) $\frac{10}{11}$

Skill 10.13 a) $\frac{1}{3}$, b) $\frac{3}{5}$, c) $\frac{4}{9}$, d) $\frac{3}{7}$, e) $\frac{3}{8}$, f) $\frac{1}{5}$, g) $\frac{3}{10}$, h) $\frac{5}{12}$, i) $\frac{5}{11}$
j) $\frac{10}{17}$, k) $\frac{7}{15}$, l) $\frac{4}{13}$, m) $\frac{8}{15}$, n) $\frac{11}{18}$, o) $\frac{3}{20}$, p) $\frac{3}{4}$, q) $\frac{6}{9}$, r) $\frac{3}{6}$

Skill 10.14 a) $\frac{2}{3}$, b) $\frac{2}{3}$, c) $\frac{3}{4}$, d) $\frac{1}{2}$, e) $\frac{1}{3}$, f) $\frac{4}{7}$, g) $\frac{5}{6}$, h) $\frac{3}{5}$, i) $\frac{1}{5}$
j) $\frac{3}{5}$, k) $\frac{2}{5}$, l) $\frac{2}{7}$, m) A and C, n) C and D, o) B and D

Skill 10.15 a) 21, b) 20, c) 25, d) 25, e) 8, f) 70, g) 8, h) 200

Skill 10.16 a) $2\frac{8}{10}$, b) $5\frac{6}{7}$, c) $5\frac{7}{8}$, d) $8\frac{7}{10}$, e) $4\frac{3}{5}$, f) $7\frac{5}{6}$, g) $6\frac{5}{9}$
h) $4\frac{6}{7}$, i) $5\frac{7}{11}$, j) $8\frac{3}{4}$, k) $6\frac{5}{9}$, l) $8\frac{5}{7}$, m) $4\frac{7}{8}$, n) $7\frac{10}{11}$
o) $7\frac{3}{6}$, p) $6\frac{7}{12}$, q) $6\frac{9}{14}$, r) $8\frac{7}{8}$

Skill 10.17 a) $2\frac{4}{10}$, b) $3\frac{5}{7}$, c) $3\frac{1}{8}$, d) $3\frac{7}{10}$, e) $2\frac{2}{5}$, f) $1\frac{2}{6}$, g) $2\frac{5}{9}$
h) $4\frac{1}{7}$, i) $2\frac{4}{11}$, j) $1\frac{1}{4}$, k) $2\frac{2}{9}$, l) $4\frac{3}{7}$, m) $1\frac{1}{6}$, n) $1\frac{1}{8}$
o) $4\frac{1}{3}$, p) $3\frac{5}{12}$, q) $2\frac{5}{7}$, r) $3\frac{4}{15}$, s) $2\frac{5}{8}$, t) $3\frac{5}{11}$, u) $1\frac{3}{6}$

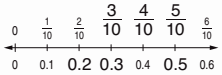
11. [Decimals/Fractions] page 73

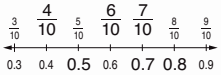
Skill 11.1 a) 80, b) 10, c) 100, d) 60, e) 70, f) 300, g) 20, h) 40
i) 50, j) 600

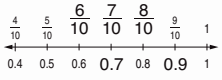
Skill 11.2 a) 6, 6, b) 3, 3, c) 9, 9, d) 5, 5, e) 1, 1, f) 7, 7, g) 8, 8, h) 3,3
i) 4, 4, j) 38, 38, k) 12, 12, l) 6, 6, m) 19, 19, n) 9, 9
o) 76, 76, p) 2, 2, q) 44, 44, r) 93, 93, s) 1, 1, t) 47, 47
u) 29, 29

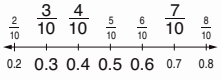
Skill 11.3 a) C, b) B, c) C, d) 0.6, e) 0.1, f) 0.08, g) 0.27, h) 0.5
i) 0.147, j) 0.09, k) 0.13, l) 0.068, m) 0.7, n) 0.13, o) 0.403

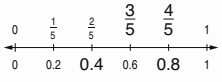
Skill 11.4 a) $\frac{5}{10}$, b) $\frac{9}{10}$, c) $\frac{7}{10}$, d) A, e) A, f) C, g) C, h) A , i) B, j) $\frac{3}{10}$
k) $\frac{7}{100}$, l) $\frac{41}{100}$, m) $\frac{17}{100}$, n) $\frac{6}{1000}$, o) $\frac{57}{1000}$, p) $\frac{43}{100}$
q) $\frac{6}{100}$, r) $\frac{52}{1000}$, s) $\frac{9}{10}$, t) $\frac{24}{100}$, u) $\frac{125}{1000}$

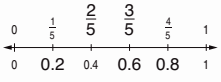
Skill 11.5 a) 
0 0.1 0.2 0.3 0.4 0.5 0.6

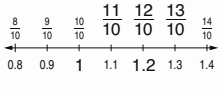
b) 
0.3 0.4 0.5 0.6 0.7 0.8 0.9

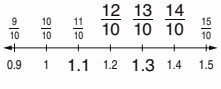
c) 
0.4 0.5 0.6 0.7 0.8 0.9 1

d) 
0.2 0.3 0.4 0.5 0.6 0.7 0.8

e) 
0 0.2 0.4 0.6 0.8 1

f) 
0 0.2 0.4 0.6 0.8 1

g) 
0.8 0.9 1 1.1 1.2 1.3 1.4

h) 
0.9 1 1.1 1.2 1.3 1.4 1.5

Skill 11.6 a) 5.7, b) 2.46, c) 3.9, d) 3.02, e) 6.3, f) 3.5, g) 2.2, h) 4.5
i) 3.6, j) 1.25, k) 2.8, l) 6.75

Skill 11.7 a) 1.5, b) 3.5, c) 8.5, d) 0.25, e) 4.25, f) 7.25, g) 5.75
h) 1.75, i) 6.75, j) 6.1, k) 2.3, l) 9.7, m) 2.2, n) 5.4, o) 4.6

Skill 11.8 a) 2.7, b) 1.5, c) 3.8, d) 1.36, e) 2.45, f) 1.6, g) 5.5, h) 4.5
i) 1.8

Skill 11.9 a) $\frac{2}{5}$, b) $\frac{3}{4}$, c) $\frac{4}{5}$, d) $\frac{1}{5}$, e) $\frac{3}{20}$, f) $\frac{9}{25}$, g) $\frac{1}{2}$, h) $\frac{9}{20}$, i) $\frac{3}{50}$
j) $\frac{31}{50}$, k) $\frac{22}{25}$, l) $\frac{3}{25}$

Skill 11.10 a) 50%, b) 75%, c) 60%, d) 90%, e) 0.1, f) 0.25, g) 0.75
h) 0.15, i) 40%, j) 60%, k) 25%, l) 45%, m) $\frac{1}{4}$, n) $\frac{3}{4}$, o) $\frac{1}{2}$
p) $\frac{3}{10}$, q) $\frac{1}{10}$, r) $\frac{1}{5}$

Skill 11.11 a)

Decimal	Fraction	Percentage
0.5	$\frac{50}{100}$ OR $\frac{1}{2}$	50%

b)

Decimal	Fraction	Percentage
0.45	$\frac{45}{100}$	45%

c)

Decimal	Fraction	Percentage
0.51	$\frac{51}{100}$	51%

d)

Decimal	Fraction	Percentage
0.85	$\frac{85}{100}$ OR $\frac{17}{20}$	85%

e)

Decimal	Fraction	Percentage
0.9	$\frac{90}{100}$ OR $\frac{9}{10}$	90%

f)

Decimal	Fraction	Percentage
0.23	$\frac{23}{100}$	23%

g)

Decimal	Fraction	Percentage
0.2	$\frac{20}{100}$ OR $\frac{1}{5}$	20%

h)

Decimal	Fraction	Percentage
0.75	$\frac{75}{100}$ OR $\frac{3}{4}$	75%

i)

Decimal	Fraction	Percentage
0.8	$\frac{80}{100}$ OR $\frac{4}{5}$	80%

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12. [Place Value] page 85

Skill 12.1 a) ones, b) tens, c) hundreds, d) hundreds, e) 1, f) 4, g) 2 h) 1, i) 3, j) 4, k) 2, l) 6, m) 9, n) 7, o) 2, p) 1, q) 2, r) 9 s) 7, t) 0, u) 7, v) 2, w) 9, x) 5, y) 2, z) 5

Skill 12.2 a) 500, b) 70, c) $\frac{6}{10}$, d) $\frac{3}{100}$, e) 4, f) $\frac{8}{100}$, g) A, h) B, i) A, j) B k) B, l) B

Skill 12.3 a) false, b) true, c) true, d) true, e) false, f) true, g) true h) false, i) 223, j) 125, k) 788, l) 7557, m) 2131, n) 7374 o) 13 094, p) 40 554

Skill 12.4 a) 75, 72, 57, 25, 22, b) 37, 38, 77, 78, 83, 87 c) 44, 42, 24, 22, 14, 12, d) 34, 35, 45, 46, 54, 55 e) 787, 786, 777, 776, 768, f) 456, 465, 546, 556, 564 g) 3030, 3020, 3001, 2300, h) 1001, 1011, 1101, 1111 i) 9510, 9501, 9105, 9015, j) 4066, 4606, 4640, 6046

Skill 12.5 a) 1.26, b) 6.07, c) 6.84, d) 2.93, e) 8.421, f) 6.903 g) 2.048, h) 1.615, i) 0.471, j) 3.436

Skill 12.6 a) 6.38, b)15.4, c) 2.22, d) 13.78, e) 12.32, f) 1.07 g) 13.094, h) 0.895, i) false, j) false, k) true, l) false, m) true n) false

Skill 12.7 a) 3, 3.3, 3.5, 5.3, 5.5, b) 2.2, 2.1, 2.01, 1.2, 1.1 c) 6, 6.6, 6.7, 7.6, 7.7, d) 9.9, 9.4, 9, 4.9, 4.4 e) 44.2, 42.4, 42.0, 40.4, 40.2, f) 0.55, 5, 5.05, 5.5, 5.55 g) 3.04, 3.41, 3.43, 4, 4.13, h) 6.32, 3.62, 3.6, 2.63, 2.62 i) 8.6, 8.06, 8, 6.8, 6.08, j) 4.74, 4.77, 7.44, 7.47, 7.77

Skill 12.8 a) 60, b) 70, c) 370, d) 690, e) 800, f) 3150, g) 800, h) 200 i) 500, j) 2500, k) 2300, l) 5500, m) 1800, n) 4500

Skill 12.9 a) 4, b) 10, c) 4, d) 6, e) 16, f) 15, g) 13, h) 11, i) 73, j) 41 k) 31, l) 30, m) 48, n) 29, o) 60, p) 6

Skill 12.10 a) 1500, b) 100, c) 170, d) 80, e) 700, f) 200, g) 2400 h) 1200

Skill 12.11 a) 3.9, b) 4.5, c) 6.3, d) 27.9, e) 15.8, f) 45.1, g) 8.0, h) 1.0 i) 3.79, j) 9.11, k) 7.25, l) 2.58, m) 3.05, n) 8.97

Skill 12.12 a) 14, b) 2, c) 10, d) 14, e) 26 m, f) 5, g) $30, h) $50

13. [Operations] page 99

Skill 13.1 a) false, b) true, c) true, d) false, e) true, f) false, g) 8, h) 6 i) 1, j) 2, k) 5, l) 9, m) 6, n) 10, o) 19, p) 14, q) 12, r) 18 s) 31, t) 28, u) 7

Skill 13.2 a) false, b) true, c) true, d) false, e) true, f) false, g) 8, h) 2 i) 1, j) 6, k) 12, l) 10, m) 3, n) 18, o) 12, p) 18, q) 17, r) 15 s) 4, t) 10, u) 7

Skill 13.3 a) true, b) false, c) true, d) true, e) false, f) true, g) 8, h) 5 i) 3, j) 0, k) 0, l) 1, m) 0, n) 2, o) 0, p) A, q) C, r) B, s) A t) C, u) C

Skill 13.4 a) true, b) true, c) false, d) true, e) false, f) true, g) 2, h) 7 i) 4, j) 1, k) 1, l) 8, m) A, n) C, o) C, p) C, q) B, r) B

Skill 13.5 a) 14, b) 8, c) 1, d) 11, e) 12, f) 19, g) 13, h) 2, i) 4, j) 10 k) 9, l) 10, m) 9, n) 5, o) 3, p) 30, q) 5, r) 2, s) 5, t) 1, u) 2 v) 16, w) 3, x) 2

Skill 13.6 a) 43, b) 31, c) 17, d) 15, e) 23, f) 24, g) 20, h) 18, i) 21 j) 20, k) 14, l) 25, m) 16, n) 45, o) 32, p) 9, q) 18, r) 24

Skill 13.7 a) 5, b) 13, c) 20, d) 1, e) 6, f) 21, g) 9, h) 13, i) 19, j) 4, k) 9 l) 13, m) 2, n) 11, o) 5, p) 12, q) 8, r) 0, s) 15, t) 51, u) 21

Skill 13.8 a) 14, b) 2, c) 4, d) 3, e) 24, f) 5, g) 28, h) 8, i) 4, j) 15, k) 3 l) 6, m) 20, n) 26, o) 15, p) 11, q) 0, r) 1, s) 18, t) 5, u) 21

14. [Exploring Numbers] page 107

Skill 14.1 a) 6354, b) 218, c) 927, d) 8406, e) 3013, f) 7008, g) 440 h) 2022, i) 80 000, j) 70 900, k) 16 203, l) 96 000 m) 400 000, n) 500 001

Skill 14.2 a) thirty-five, b) eighty-two, c) sixty-nine, d) sixteen e) twenty-three, f) seventy-four, g) eleven, h) forty-eight

Skill 14.3 a) six hundred and ten, b) eight hundred, c) four hundred d) one hundred and sixty, e) two hundred and ninety f) seven hundred and thirty-eight g) six hundred and fifty-seven, h) nine hundred and one i) three hundred and six, j) five hundred and eighty-two

Skill 14.4 a) three thousand and eighteen, b) six thousand c) four thousand, three hundred d) seven thousand, five hundred e) eight thousand and seventy, f) nine thousand and ninety g) five thousand and two, h) four thousand and six i) two thousand and fifty-nine j) three thousand and twenty-one

Skill 14.5 a) 15, b) 7, c) 14, d) 258, e) 921, f) 359, g) 15, 13, 11 h) 5, 7, 9, i) 14, 12, 10, 8, j) 1346, k) 9823, l) 5687, m) 9156 n) 5341, o) 8732

Skill 14.6 a) 12,14, b) 15, 18, c) 44, 55, d) 32, 40, e) 24, 28, f) 42, 49 g) 80, 85, h) 27, 30, i) 110, 120, j) 54, 63, k) 70, 77 l) 72, 84, m) 54, 60, n) 120, 132

Skill 14.7 a) 3, b) 6, c) 4, d) 5, e) 6, f) 9, g) 11, h) 7, i) B, j) B, k) A l) A, m) 2, 3, 4, n) 3, 5, 9

Skill 14.8 a) 5, b) 8, c) 19, d) 12, e) 7, f) 27, g) 31, h) 45, i) 4, 6 j) 11, 13, k) 8, 9, 10, 12, l) 17, 19, 23 m) 14, 15, 16, 18, 20, 21, 22, n) 29, 31

Skill 14.9 a) twenty-seven thousand and six b) thirteen thousand, c) sixty thousand d) seventy-nine thousand, e) forty-five thousand f) twenty-one thousand and one g) eighteen thousand and four h) ten thousand and sixteen

Skill 14.10 a) one hundred thousand and thirty b) four hundred thousand c) six hundred thousand d) eight hundred thousand and fifty e) two hundred thousand and eighty f) five hundred and thirty thousand and fourteen g) seven hundred and thirty thousand and four h) two hundred thousand and one

Skill 14.11 a) A, b) B, c) A, d) A, e) B, f) B, g) B, h) A

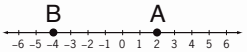
Skill 14.12 a) +20, b) +7, c) −16, d) +10, e) −42, f) +800, g) +11, h) +4 i) −6, j) −2, k) +25, l) −4

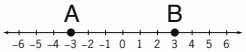
Skill 14.13 a) −2, 3, b) −4, 6

c)

d)

e) 6, −1, f) 1, 0

g) 

h) 

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15. [Number Patterns / Eqns.] page 121

Skill 15.1 a) 25, 29, b) 34, 39, c) 23, 26, d) 56, 66, e) 38, 45
f) 50, 59, g) 35, 41, h) 45, 52, i) 54, 56, j) 47, 55

Skill 15.2 a) 19, b) 6, c) 8, d) 18, e) 12, f) 9, g) 8, h) 15, i) 17, j) 13
k) 10, l) 14, m) 24, n) 22, o) 40

Skill 15.3 a) 10, 3, b) 6, 4, c) 12, 6, d) 8, 3, e) 11, 3, f) 31, 27
g) 27, 24, h) 72, 63, i) 37, 27, j) 26, 22

Skill 15.4 a) 23, b) 16, c) 20, d) 4, e) 7, f) 9, g) 14, h) 7, i) 18, j) 32
k) 36, l) 47, m) 27, n) 45, o) 47

Skill 15.5 a) 512, 2048, b) 16, 32, c) 81, 243, d) 144, 288
e) 240, 480, f) 162, 486, g) 256, 1024, h) 30 000, 300 000
i) 250, 1250, j) 2500, 12 500

Skill 15.6 a) 4, 2, b) 14, 7, c) 16, 4, d) 30, 6, e) 12, 4, f) 15, 5
g) 6, 2, h) 60, 6, i) 40, 8, j) 8, 2

Skill 15.7 a) 5, b) 8, c) 9, d) 8, e) 7, f) 6, g) 9, h) 11, i) 10, j) 10, k) 3
l) 4, m) 12, n) 20, o) 4

Skill 15.8 a) 25, 30, b) 32, 44, c) 2, 0, d) 47, 65, e) 6, 0, f) 27, 29
g) 28, 39, h) 45, 50, i) 18, 6, j) 16, 5

Skill 15.9 a) 3, 2.2, b) 9.5, 11, c) 7.3, 7.9, d) 3.2, 2.8, e) 9, 10.2
f) 7.5, 7, g) $\frac{6}{7}, \frac{7}{7}$, h) $\frac{17}{6}, \frac{14}{6}$, i) $\frac{42}{12}, \frac{37}{12}$, j) $\frac{15}{4}, \frac{11}{4}$
k) $2\frac{6}{9}, 2\frac{7}{9}$, l) $3\frac{5}{8}, 3\frac{6}{8}$

Skill 15.10 a) 24, b) 18, c) 24, d) 30, e) 28, f) 36, g) 40, h) 66, i) 90
j) 32, k) 42, l) 80

16. [Units of Measurement] page 131

Skill 16.1 a) litres, b) millilitres, c) metres, d) tonnes, e) kilometres
f) metres, g) millilitres, h) tonne

Skill 16.2 a) 1 (a bird bath), b) 3 (a dozen eggs, a block of chocolate a loaf of bread), c) 2 (a doona, a cinema screen)
d) 2 (a person, a furnace), e) 3 (a helium balloon, a Great Dane, a motorbike)
f) 1 (Centre court - Wimbledon)
g) 3 (a salad, an ice cream, a glass of tap water)
h) 1 (a baby's bottle)

Skill 16.3 a) 10 m, b) 10 cm, c) 3000 m, d) 600 mm, e) 15 m
f) 10 000 mm, g) 8 km, h) 90 cm, i) 24 mm, j) 3750 m
k) 190 cm, l) 1360 mm, m) 8 m, n) 240 mm, o) 10 100 m
p) 6550 m, q) 18 km, r) 480 cm, s) 2 km, t) 4000 cm
u) 900 mm, v) 3000 mm

w) 60 m (6 km) 60 000 cm

x) (3 m) 20 000 mm 1000 cm

y) 2 km 200 m (2000 cm)

z) (3000 m) 2 km 10 000 cm

Skill 16.4 a) 20 000 g, b) 1000 kg, c) 13 t, d) 4000 g, e) 1000 g
f) 3000 kg, g) 70 t, h) 22 kg, i) 500 g, j) 2300 kg, k) 4600 g
l) 900 kg, m) 3150 g, n) 1420 kg, o) 4003 g, p) 8 t
q) 7200 g, r) 2800 kg, s) 19 kg, t) 2 t, u) 6000 kg, v) 3 kg

w) 20 kg (2 t) 2000 g

x) 3000 kg 30 t (30 000 g)

y) (13 000 g) 0.5 t 750 kg

z) 4 t 400 000 g (40 000 kg)

Skill 16.5 a) 20 L, b) 1000 mL, c) 5 L, d) 3000 L, e) 78 L, f) 2600 mL
g) 5800 mL, h) 700 mL, i) 14 L, j) 4000 L, k) 11 L
l) 1900 mL, m) 40 000 mL, n) 100 L, o) 12 L, p) 10 000 mL

q) (60 000 mL) 50 L 7.5 L

r) 1000 mL 9 L (900 mL)

s) 4000 mL (3.5 L) 40 L

t) (28 L) 2800 mL 3000 mL

Skill 16.6 a) 300 m, b) 4, c) 12, d) 15, e) 6000 mL, f) 500, g) 10
h) 5, i) 340 m, j) 160

17. [Time] page 141

Skill 17.1 a) twenty-five past two, b) half past twelve
c) twenty-five to three, d) twenty past five

Skill 17.2 a) 5:50, b) 2:25, c) 5:15, d) 3:40, e) 9:45, f) 9:08

Skill 17.3 a) , b) , c)

d) , e) , f)

Skill 17.4 a) 30 years, b) 1 day, c) 31 days, d) 75 min, e) 8 weeks
f) 150 s, g) 500 years, h) 3 h, i) 730 days, j) 56 days

Skill 17.5 a) Wednesday, b) Monday, c) morning, d) morning
e) 11:10 pm, f) 1:00 am, g) 04:00, h) 14:55, i) 3:25 pm
j) 8:30 pm, k) 5:25 pm, l) 1:25 pm, m) 12:25 pm
n) 2:00 pm, o) 9:54 pm, p) 30.34 s, q) 11:30 am
r) 4 h 3 min, s) 1:20 pm, t) 7:35 am

Skill 17.6 a) 1 weekend (96 h) 3 days

b) 3 months 100 days (15 weeks)

c) 1 fortnight 4 weeks (12 days)

d) (15 months) 1 year 245 days

e) 250 mins (1500 s) 4 h

r) quarter of an hour 10 mins (500 s)

g) (1000 h) 2 weeks 9 days

h) 2.5 h 300 min (2000 s)

i) 6000 s (106 min) $1\frac{1}{2}$ h

j) (2500 min) 2 days 50 h

Skill 17.7 a) 1 h 55 min, b) 4:52 am, c) Saturday, d) WA, e) 7:50 pm
f) 8:52 am

18. [Measuring] page 149

Skill 18.1 a) 90 mm (accept 85 to 95 mm)
b) 3 cm (accept 2.5 to 3.5 cm)
c) 80 mm (accept 75 to 85 mm)
d) 90 mm (accept 85 to 95 mm)
e) 6 cm (accept 5.5 to 6.5 cm)
f) 45 mm (accept 40 to 50 mm)

Skill 18.2 a) 4 cm, b) 3 cm, c) 20 mm, d) 13°C, e) 98 km/h, f) 36 mL

Skill 18.3 a) 18 cm, b) 12 cm, c) 12 cm, d) 12 cm, e) 14 cm, f) 16 cm
g) 14 cm, h) 18 cm, i) 12 cm, j) 16 cm

Skill 18.4 a) 8, b) 15, c) 8 cm^2, d) 10 cm^2, e) 8 cm^2, f) 10 cm^2
g) 8 cm^2, h) 7 cm^2, i) 7 cm^2, j) 18 cm^2, k) 10 cm^2
l) 9 cm^2, m) B, n) A, p) C, q) B

Skill 18.5 a) 12, b) 20, c) 6 cm^2, d) 9 cm^2, e) 8 cm^2, f) 15 cm^2

Skill 18.6 a) 4, b) 2, c) 3, d) 9

Skill 18.7 a) 32, b) 18, c) 36 cm^3, d) 60 cm^3, e) 40 cm^3, f) 54 cm^3
g) 27 cm^3, h) 30 cm^3

Skill 18.8 a) B, b) B, c) A, d) B

Skill 18.9 a) 6 cm, b) 16 cm, c) 18 cm, d) 9 cm, e) 12 cm, f) 13 cm

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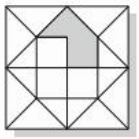
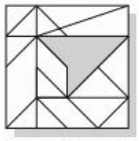
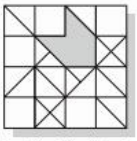
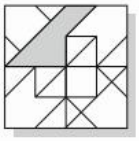
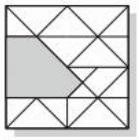
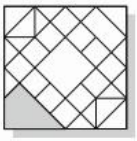
19. [Shapes] page 159

Skill 19.1 a) less than, b) greater than, c) equal to, d) greater than
e) less than, f) less than

Skill 19.2 a)  , b) , c)

d)  , e)  , f) 

g)  , h) 

Skill 19.3 a) , b) , c) , d) , e)

f) , g) , h) , i) , j)

k) , l)

Skill 19.4 a) 3, b) 4, c) 10, d) 4, e) 6, f) 5, g) 9, h) 8, i) 4, j) 7

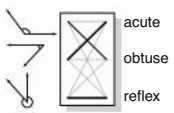
Skill 19.5 a) C, b) B, c) D, d) C, e) A, f) B, g) C, h) B

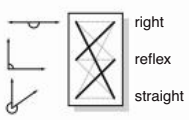
Skill 19.6 a) 4, b) 8, c) 12, d) 7, e) triangle, f) rectangle, g) 6, h) A

Skill 19.7 a) 165°, b) 110°, c) 30°, d) 140°, e) 25°, f) 120°

Skill 19.8 a) A, b) C

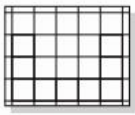
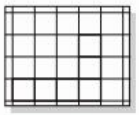
c) d)

e) 

f) 

Skill 19.9 a) triangle, b) hexagon, c) A, d) A, e) pentagon
f) rectangle, g) A, h) B

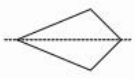
Skill 19.10 a) B, b) A, c) B, d) C, e) B, f) C, g) cube
h) hexagonal prism, i) triangular prism, j) rectangular prism
k) rectangular prism, l) hexagonal pyramid

Skill 19.11 a) C, b) B, c)  d) 

20. [Location / Transformation] page 171

Skill 20.1 a) C, b) B, c) C, d) A, e) B, f) A

Skill 20.2 a) 2 , b) 1 , c) 4

d) 8 , e) 4 , f) 1 

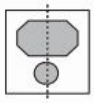
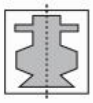
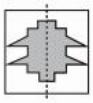
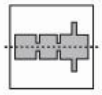
g) 1 , h) 8

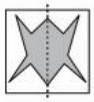
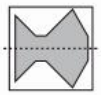
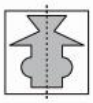
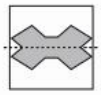
Skill 20.3 a) south, b) south, c) Cairns, d) west

Skill 20.4 a) Two Independence Square, b) Hume Street
c) Hindmarsh Square, d) E 16th Avenue

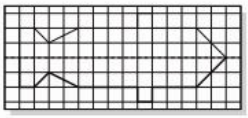
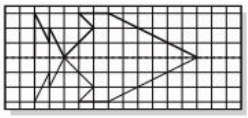
Skill 20.5 a) pig, b) grocer, c) Marble Arch, d) sacristy

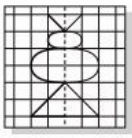
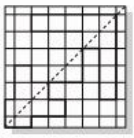
Skill 20.6 a) F3, b) kangaroo, c) D2, d) F1, e) B3, f) D1, g) mermaid
h) A3, i) A1 and C2, j) A3 and C2

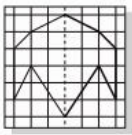
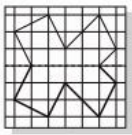
Skill 20.7 a)  , b)  , c)  , d) 

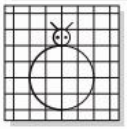
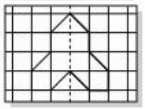
e)  , f)  , g)  , h) 

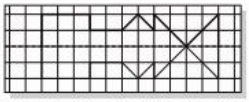
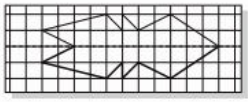
Skill 20.8 a) 600 m, b) 600 km, c) 400 km, d) 3000 km, e) 6 m
f) 600 km, g) B, h) 300 m, i) 750 m, j) 800 m

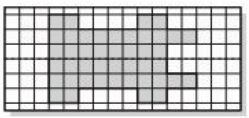
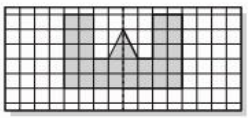
Skill 20.9 a)  b) 

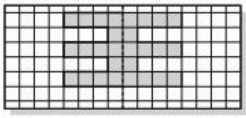
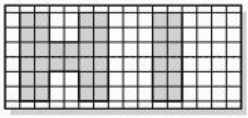
c)  d) 

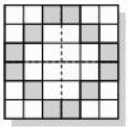
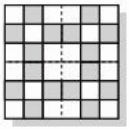
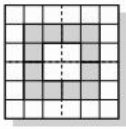
e)  f) 

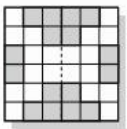
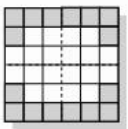
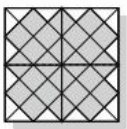
g)  h) 

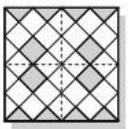
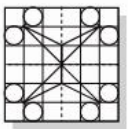
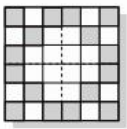
i)  j) 

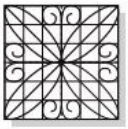
k)  l) 

m)  n) 

o)  p)  q) 

r)  s)  t) 

u)  v)  w) 

x) 

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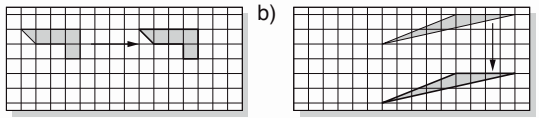
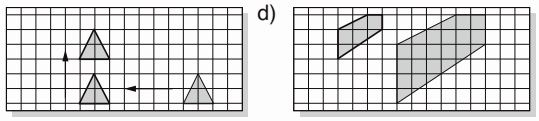
20. [Location / Transformation] (cont.)

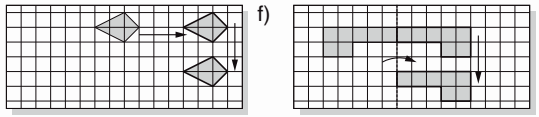
Skill 20.10 a) b)



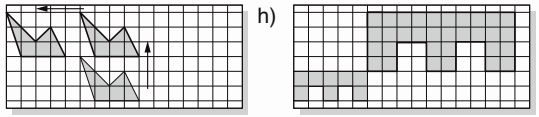
c) d)



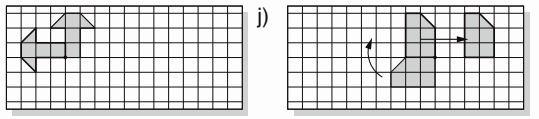
e) f)



g) h)



i) j)



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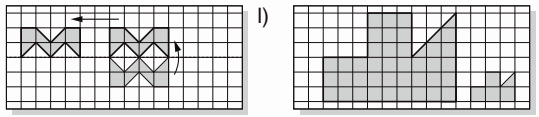
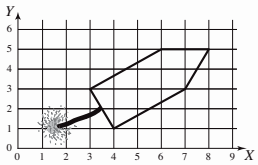


Skill 20.11 a) A, b) C, c) A, d) C, e) C, f) C, g) C, h) B

Skill 20.12 a) umpire = (6,4) football = (5,1)
b) ship = (2,2) tugboat = (5,1), c)



d) IRONMAN

Skill 20.13 a) S,Z, b) (5,–3), c) P,B,T, d) (–6,–2)

Skill 20.14 a) 6 units, b) 3 units, c) 6 units, d) 20 units, e) 28 units
f) 24 units

21. [Statistics / Probability] page 191

Skill 21.1 a) Australia, b) silver, c) tin, d) Xia
e) musical/recording, f) fat

Skill 21.2 a) iron, b) 6, c) 8, d) 30%, e) healthcare, f) $10

Skill 21.3 a) 8, b) 10, c) Warsaw, d) 2 400 000

Skill 21.4 a) Discovery, b) Sydney Opera House, c) 23, d) 2015 e) 50
f) 2, g) New York and Moscow, h) 3, i) Secret seven
j) Warren Buffet

Skill 21.5 a) WA, b) AT - AT, c) Alpha, X, d) 187 km

Skill 21.6 a) 50 km/h, b) Adelaide, c) Jupiter, d) 80 kg, e) 7, f) 3
g) Lleyton Hewitt, h) Playhouse, i) Tokyo, j) Antarctica

Skill 21.7 a) 2, b) Kenya, c) Japan, d) vet

Skill 21.8 a) will not, b) is certain to, c) B, d) A, e) B, f) C
g) is likely to, h) will not, i) will not, j) is certain to

Skill 21.9 a) 11, b) 13, c) 4, d) 20, e) 7, f) 8, g) 10, h) 10

Skill 21.10 a) A, b) A, c) A, d) C, e) C, f) B

Skill 21.11 a) $\frac{1}{13}$, b) $\frac{1}{4}$, c) $\frac{7}{11}$, d) $\frac{1}{4}$, e) $\frac{1}{2}$, f) $\frac{1}{3}$, g) $\frac{1}{2}$, h) 1, i) $\frac{5}{16}$
j) $\frac{1}{3}$, k) $\frac{2}{3}$, l) $\frac{1}{2}$, m) $\frac{1}{4}$, n) $\frac{1}{10}$

Skill 21.12 a) 25%, b) walls, c) 1, d) 18 - 25 years

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