MATHS MATE

COFFEE

trial pack

Includes:

How to use Maths Mate

Record keeping sheet: Term 1

Worksheet masters: Term 1, Sheets 1 to 4

Test masters: 1A & 1B

Worksheet answers: Term 1, Sheets 1 to 4

Test answers: 1A & 1B

Problem Solving Hints & Solutions

J. B. Wright & I. Tutos

HOW TO USE MATHS MATE

1. Students complete the **Maths Mate sheet.**
Parents sign the work.

2. Students correct their work in class. Students colour the circles to record their correct answers.

3. The student **record keeping sheets** are completed. Students can transfer their results directly from the worksheet to the results sheet.

4. **Testing** is available after every 4 Maths Mate sheets.

MATHS MATE — Test 1
Covering worksheets 1.1 - 1.4

Name:

1. [Long ×,÷]
   $648 \div 6 =$

2. [Decimal +,−]
   $6.25 + 7.35 =$

3. [Decimal ×,÷]
   $4.2 \times 1000 =$

4. [Fraction +,−]
   $\frac{6}{9} - \frac{3}{9} =$

5. [Fraction ×,÷]
   $\frac{5}{2} \times \frac{6}{7} =$

6. [Percentages]
   25% of 300 =

7. [Integer +,−]
   $(-4) - (+6) =$

8. [Integer ×,÷]
   $(+5) \times (+9) =$

9. [Rates / Ratios]
   It took Terry 10 minutes to cross the Seto-Ohashi bridge in Japan. How long is the bridge if he drove at an average of 78 km/h?
   km

10. [Indices]
    Evaluate $\frac{3^7}{3^5}$

11. [Square Roots / Surds]
    Evaluate $\sqrt{\frac{9}{16}}$

12. [Order of Operations]
    $6 \times (4 - 24 \div 8) =$

13. [Exploring Number]
    Write 0.5% as a fraction in simplest form.

14. [Scientific Notation]
    Express 8.3×10^5 as a basic numeral.

15. [Number Patterns]
    Complete the pattern:
    41, 37, 33, 29, ___ , ___

16. [Expressions]
    Select the two like terms:
    $4g^2$, 4 , g^2

17. [Substitution]
    If $y = 4x + 1$, find the value of y when $x = 5$

18. [Expansion]
    Expand $4(3a + 5)$

19. [Factorisation]
    Factorise $12p + 9pq$

20. [Equations]
    Solve for x: $2x - 4 = 12$

21. [Graphs & Functions]
    Complete the table for the rule $y = 2x - 4$

x	$y = 2x - 4$	(x , y)
1	$y = 2 \times 1 - 4$	$(1 , -2)$
2		
3		
4		
5		

22. [Units of Measurement / Time]
    How many hours from 0900 hours one day until 1400 hours the next?

page 1

23. [Perimeter]
    Find the perimeter of the floor rug.
    215 cm
    285 cm
    cm

24. [Area]
    Find the area of the obtuse-angled triangle.
    6.2 cm
    10 cm
    cm²

25. [Volume]
    Find the volume of the prism.
    12 mm
    $A = 25$ mm²
    mm³

26. [Surface Area]
    Find the total surface area of the rectangular prism.
    6 mm
    10 mm
    1.5 mm
    mm²

27. [Pythagoras / Trigonometry]
    Find the positive solution for a:
    $a^2 + 144 = 225$

28. [Shape / Location]
    Sketch and label as many different triangles as you can where one side is 5 cm long, one angle is 90° and another angle is 60°.
    [Drawings need not be to scale.]

29. [Angles]
    State whether the following angles are supplementary (S) or complementary (C):
    35°, 55°.

30. [Statistics]
    Which musician composed 12 times less symphonies than Mozart?

    Number of symphonies composed
    Bach
    Beethoven
    Brahms
    Liszt
    Mozart
    Schubert
    Tchaikovsky

31. [Probability]
    If the probability of a frost tomorrow is $\frac{1}{20}$, what is the probability of not having a frost?

32. [Problem Solving 1]
    Find the value of the sum:
    $(-1)^1 + (-1)^2 + (-1)^3 + \ldots + (-1)^{20}$

33. [Problem Solving 2]
    Deduce the answer to the following game of cows and bulls.
    [Reminder: A cow means a number is correct in value but in the wrong position, and a bull indicates that a number is both correct in value and in the correct position. i.e. 2 cows and 1 bull would indicate that all three numbers were correct but two were in the wrong positions.]

Guess	Cows	Bulls
4 3 8	–	2
1 2 0	–	1
3 2 4	1	–

page 2

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5. If a student is having difficulty with their problem solving strategies, then the **Problem Solving Hints & Solutions** can be used by teachers to develop students' problem solving skills.

1.3

32. **Hint:** *Distance travelled = Speed × Time*

$OR\ Time = \dfrac{Distance\ travelled}{Speed}$

Solution:
Time taken to travel 10 km at 60 km/h is
$\dfrac{10}{60} = \dfrac{1}{6}$ h $= \dfrac{1}{6} \times 60$ min = 10 min

Time taken to travel 10 km at 100 km/h is
$\dfrac{10}{100} = \dfrac{1}{10}$ h $= \dfrac{1}{10} \times 60$ min = 6 min

The time saved by travelling at 100 km/h is
10 min – 6 min = **4 min**
Definitely not worth the risk!

33. **Hint:** *Start with what you know. Work systematically. Use trial and error.*

Solution: Two cows in every row indicate that no numbers are in the right positions in any row.

6 is in all three guesses and in all three positions, so it can not be part of the solution.

9 can not be in positions 1 or 3, so it is in position 2.

7 can not be in positions 2 and 3, so it is in position 1.

1 can not be in positions 1 and 2, so it is in position 3.

So the answer is **791**.

MATHS MATE

COFFEE

Name: ....

Class: ....

Teacher: ....

Worksheet Results

Term 1

	Sheet 1	Sheet 2	Sheet 3	Sheet 4		Sheet 5	Sheet 6	Sheet 7	Sheet 8
NUMBER									
1. [Long ×,÷]	1	1	1	1		1	1	1	1
2. [Decimal +,−]	2	2	2	2		2	2	2	2
3. [Decimal ×,÷]	3	3	3	3		3	3	3	3
4. [Fraction +,−]	4	4	4	4		4	4	4	4
5. [Fraction ×,÷]	5	5	5	5		5	5	5	5
6. [Percentages]	6	6	6	6		6	6	6	6
7. [Integer +,−]	7	7	7	7		7	7	7	7
8. [Integer ×,÷]	8	8	8	8		8	8	8	8
9. [Rates / Ratios]	9	9	9	9		9	9	9	9
10. [Indices]	10	10	10	10		10	10	10	10
11. [Square Roots / Surds]	11	11	11	11		11	11	11	11
12. [Order of Operations]	12	12	12	12		12	12	12	12
13. [Exploring Number]	13	13	13	13		13	13	13	13
14. [Scientific Notation]	14	14	14	14		14	14	14	14
15. [Number Patterns]	15	15	15	15		15	15	15	15
ALGEBRA									
16. [Expressions]	16	16	16	16		16	16	16	16
17. [Substitution]	17	17	17	17		17	17	17	17
18. [Expansion]	18	18	18	18		18	18	18	18
19. [Factorisation]	19	19	19	19		19	19	19	19
20. [Equations]	20	20	20	20		20	20	20	20
21. [Graphs & Functions]	21	21	21	21		21	21	21	21
MEASUREMENT									
22. [Units of Measurement / Time]	22	22	22	22		22	22	22	22
23. [Perimeter]	23	23	23	23		23	23	23	23
24. [Area]	24	24	24	24		24	24	24	24
25. [Volume]	25	25	25	25		25	25	25	25
26. [Surface Area]	26	26	26	26		26	26	26	26
27. [Pythagoras / Trigonometry]	27	27	27	27		27	27	27	27
SPACE									
28. [Shape / Location]	28	28	28	28		28	28	28	28
29. [Angles]	29	29	29	29		29	29	29	29
STAT.									
30. [Statistics]	30	30	30	30		30	30	30	30
PROB.									
31. [Probability]	31	31	31	31		31	31	31	31
PROBLEM SOLVING									
32. [Problem Solving 1]	32	32	32	32		32	32	32	32
33. [Problem Solving 2]	33	33	33	33		33	33	33	33
Total Correct									

MATHS MATE

Term 1 - Sheet 1

COFFEE

Name: ....

Due Date: ..../ .... / ....

Parent's Signature: ....

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1. [Long ×,÷] *

$15 \times 35 =$

2. [Decimal +,−]

$6.25 + 9.45 =$

3. [Decimal ×,÷]

$5.7 \times 100 =$

4. [Fraction +,−]

$\dfrac{1}{9} + \dfrac{4}{9} =$

5. [Fraction ×,÷]

$\dfrac{3}{5} \times \dfrac{10}{7} =$

6. [Percentages] *

20% of $320 =$

7. [Integer +,−]

$(-5) - (+7) =$

8. [Integer ×,÷]

$(-2) \times (+6) =$

9. [Rates / Ratios] *

The fastest aircraft in the world is the X-15 rocket plane, with a climbing rate of 18 000 m per minute. At this rate how far can it climb in 10 seconds?

m

10. [Indices]

Evaluate 0.2^3

11. [Square Roots / Surds] *

Evaluate $\sqrt{\dfrac{4}{25}}$

12. [Order of Operations]

$4 \times 9 \div 3 =$

13. [Exploring Number]

Write 1.05 as a percentage.

14. [Scientific Notation]

Write 5.1×10^4 as a basic numeral.

15. [Number Patterns]

Complete the pattern:

8, 10, 12, 14, _____ , _____

16. [Expressions]

Select the like terms:

z , z^2 , $5z^2$

17. [Substitution] *

If $y = 2x - 1$, find the value of y when $x = 3$

18. [Expansion]

Expand $7(2s - 1)$

19. [Factorisation]

Factorise $14cd - 7c$

20. [Equations] *

Solve for x: $2x - 1 = 7$

21. [Graphs & Functions]

Complete the table for the rule $y = 2x + 4$

x	$y = 2x + 4$	(x , y)
0	$y = 2 \times 0 + 4$	$(0 , 4)$
1		
2		
3		
4		

22. [Units of Measurement / Time] *

How many hours from 8:00 am one day until 4:00 pm the next?

QUOTE OF THE WEEK: Genuine love is self replenishing. The more you nurture the spiritual growth of others, the more your own spiritual growth is nurtured. Scott Peck

23. [Perimeter] *

Find the perimeter of the blackboard.

110 cm

200 cm

cm

24. [Area] *

Find the area of the triangle.

4 mm

mm^2

25. [Volume] *

Find the volume of the prism.

2 cm

base area = 5 cm^2

cm^3

26. [Surface Area] *

Find the total surface area of the cube.

5 cm

cm^2
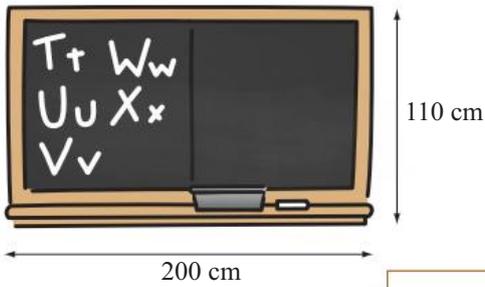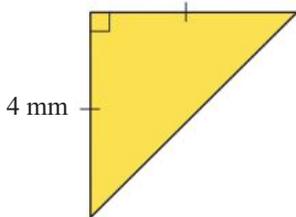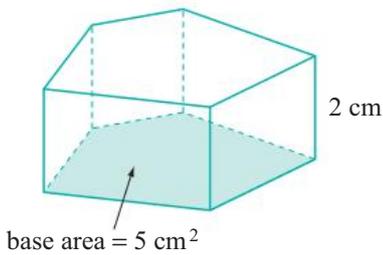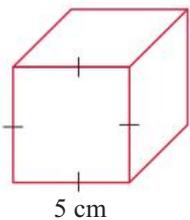
27. [Pythagoras / Trigonometry]

Find the positive solution for x:
$x^2 = 81$

28. [Shape / Location]

Draw a triangle with exactly one axis of symmetry. What type of triangle have you drawn?

29. [Angles]

What is the supplement of 123°?

30. [Statistics]

Which country has the highest current population growth?
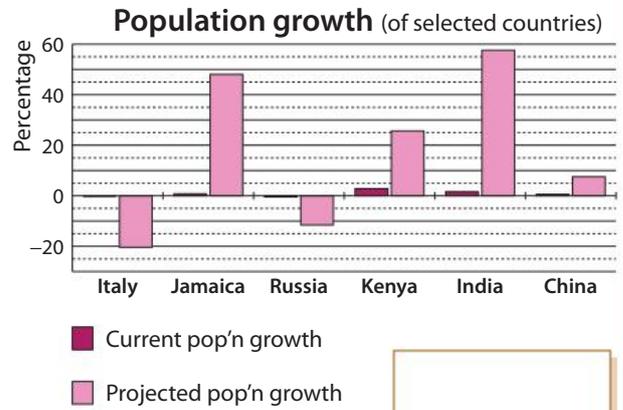
Population growth (of selected countries)

Percentage

60
40
20
0
−20

Italy   Jamaica   Russia   Kenya   India   China

■ Current pop'n growth

■ Projected pop'n growth

31. [Probability]

If the probability of receiving a message on the internet today is $\frac{8}{9}$, what is the probability of not receiving a message?

32. [Problem Solving 1] *

Find all the possible values for the integer n so that $\dfrac{7}{n-2}$ is also an integer.

33. [Problem Solving 2] *

Which number is greater:
$(-3)^{22}$ or $(-2)^{33}$?

MATHS MATE

Term 1 - Sheet 2

COFFEE

Name: ....

Due Date: .... / .... / ....

Parent's Signature: ....

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1. [Long ×,÷]

$234 \div 9 =$

2. [Decimal +,−]

$4.38 + 0.9 =$

3. [Decimal ×,÷]

$32 \div 1000 =$

4. [Fraction +,−] *

$\dfrac{6}{6} - \dfrac{2}{6} =$

5. [Fraction ×,÷] *

$\dfrac{2}{3} \div \dfrac{4}{5} =$

6. [Percentages] *

25% of $180 =$

7. [Integer +,−]

$(+9) - (+1) =$

8. [Integer ×,÷]

$(+8) \times (+2) =$

9. [Rates / Ratios] *

The fastest helicopter in the world is the '*Westland Lynx*', which can fly at a speed of 400 km/h. What distance can it fly in 12 minutes?

km

10. [Indices] *

Evaluate $3^2 \times 3^3$

11. [Square Roots / Surds]

Evaluate $\sqrt{81} \times \sqrt{81}$

12. [Order of Operations]

$6 \times (9 + 5) =$

13. [Exploring Number] *

Express 0.25% as a fraction in simplest form.

14. [Scientific Notation]

Express 8.6×10^{-3} as a basic numeral.

15. [Number Patterns]

Complete the pattern:

7, 11, 15, 19, ____ , ____

16. [Expressions]

Select the like terms:

$4q$, $8q^2$, $8q$

17. [Substitution] *

If $y = x^2 - x$, find the value of y when $x = 6$

18. [Expansion]

Expand $y(y + 2)$

19. [Factorisation]

Factorise $16ef^2 - 8fg + 24f$

20. [Equations] *

Solve for x: $3x + 3 = 21$

21. [Graphs & Functions]

Complete the table for the rule $y = -x + 1$

x	$y = -x + 1$	(x , y)
0	$y = 0 + 1$	$(0 , 1)$
1		
2		
3		
4		

22. [Units of Measurement / Time] *

How many months are there from September 1st 2009 until June 1st 2014?

QUOTE OF THE WEEK: Be nice to people on your way up because you'll meet 'em on your way down. Wilson Mizner

23. [Perimeter] *

Find the perimeter of the meat cleaver blade.

85 mm

235 mm

mm

24. [Area] *

Find the area of the shaded triangle.

3 cm

5 cm

cm^2

25. [Volume] *

Find the volume of the pentagonal prism.

12 cm

base area = 15 cm^2

cm^3

26. [Surface Area] *

Find the total surface area of the rectangular prism.

20 mm

100 mm

250 mm

mm^2
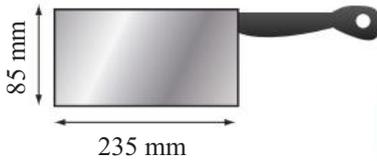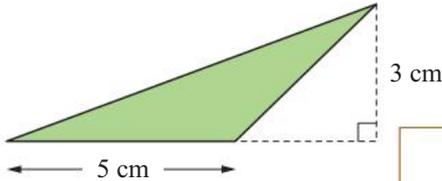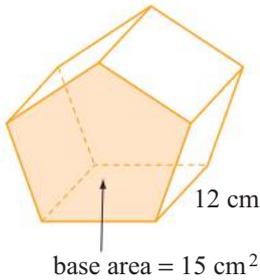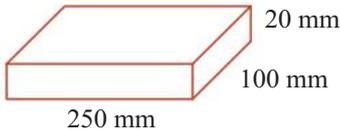
27. [Pythagoras / Trigonometry] *

Find the positive solution for c:

$c^2 = 0.6^2 + 0.8^2$

28. [Shape / Location]

Sketch and label as many different isosceles triangles as you can in which at least one side is 3 cm long and at least one angle is 30°.
[Drawings need not be to scale.]

29. [Angles] *

Find the value of $x°$.
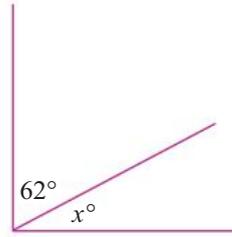
62°

$x°$

30. [Statistics]

For how many of the 25 weeks shown was Melbourne's average daily water consumption on or below its target of 155 litres per person?

Melbourne's daily water consumption

L/person/day

250
200
150
100
50
0

04 Dec 08 18 Dec 08 01 Jan 09 15 Jan 09 29 Jan 09 12 Feb 09 26 Feb 09 12 Mar 09 26 Mar 09 09 Apr 09 23 Apr 09 07 May 09 21 May 09

Week ending date
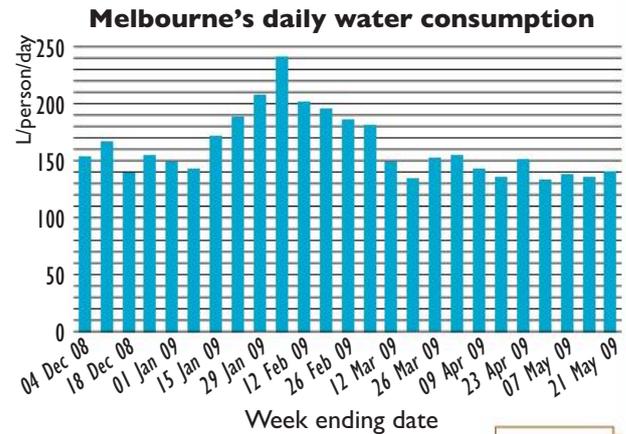
31. [Probability]

In a Lego toy, some bricks are red, some white and the rest are blue. One brick is chosen at random. If the probability of choosing a red brick is 0.38 and the probability of choosing a white brick is 0.17, what is the probability of choosing a blue brick?

32. [Problem Solving 1] *

$1 \times 3 \times .... \times 101 > 2 \times 4 \times .... \times 100$
True or false?

33. [Problem Solving 2] *

What is the smallest number which is reversed when 2 is added to its double?

23 24 25 26 27 28 29 30 31 32 33

MATHS MATE
Term 1 - Sheet 3

COFFEE

Name: ....

Due Date: .... / .... / ....

Parent's Signature: ....

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1. [Long ×,÷]
$438 \div 6 =$

2. [Decimal +,−]
$6.7 - 2.8 =$

3. [Decimal ×,÷]
$0.8 \div 100 =$

4. [Fraction +,−] *
$\dfrac{3}{4} + \dfrac{1}{4} =$

5. [Fraction ×,÷]
$\dfrac{1}{6} \times \dfrac{6}{7} =$

6. [Percentages] *
15% of $480 =$

7. [Integer +,−]
$(-9) + (-3) =$

8. [Integer ×,÷]
$(-12) \div (-3) =$

9. [Rates / Ratios] *
The fastest train in the world is the '*Train a Grande Vitesse*' in France. Find its average speed, in kilometres per hour, if it can travel 45 km in 5 minutes.

10. [Indices]
Evaluate $\dfrac{5^5}{5^2}$

11. [Square Roots / Surds]
Evaluate $\sqrt{1} \times \sqrt{1}$

12. [Order of Operations] *
$(4 + 11) - (9 - 6) =$

13. [Exploring Number]
Write 0.06 as a fraction in simplest form.

14. [Scientific Notation]
Express 4.005×10^2 as a basic numeral.

15. [Number Patterns]
Complete the pattern:
$\dfrac{1}{5}$, 1, 5, 25, ____ , ____

16. [Expressions]
Select the like terms:
$2x^2$, $2m$, x^2

17. [Substitution] *
If $y = 4(x - 2)$, find the value of y when $x = 2$

18. [Expansion]
Expand $3(4 - 2t)$

19. [Factorisation]
Factorise
$4ab + 6bc + 8bd$

20. [Equations] *
Solve for x:
$\dfrac{2x + 1}{3} = 5$

21. [Graphs & Functions]
Complete the table of values for the rule $y = 2x - 3$

x	$y = 2x - 3$	(x , y)
0	$y = 2 \times 0 - 3$	$(0 , -3)$
1		
2		
3		
4		

22. [Units of Measurement / Time] *
Find the time in hours and minutes from 1230 hours one day until 0620 hours the next.

h   min

QUOTE OF THE WEEK: Remember, no one can make you feel inferior without your consent. Eleanor Roosevelt

23. [Perimeter] *

Calculate the perimeter of the door.

95 cm

215 cm

$\boxed{\qquad}$ cm

24. [Area] *

Find the area of the parallelogram.

5 m

4 m

3 m

$\boxed{\qquad}$ m^2

25. [Volume] *

Find the volume of the prism.

20 cm

$A = 17$ cm^2

$\boxed{\qquad}$ cm^3

26. [Surface Area] *

Find the total surface area of the prism.

60 cm

50 cm

90 cm

$\boxed{\qquad}$ cm^2
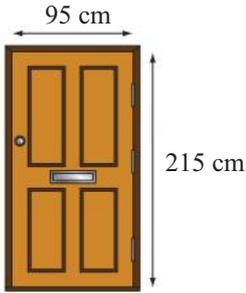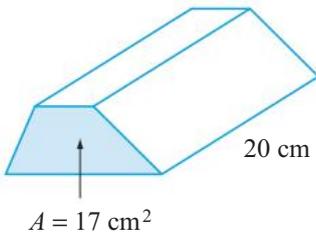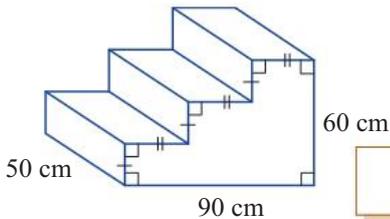
27. [Pythagoras / Trigonometry] *

Find the positive solution for b:
$64 + b^2 = 100$

$\boxed{\qquad}$

28. [Shape / Location]

Draw a triangle that has three axes of symmetry. What type of triangle have you drawn?

$\boxed{\qquad}$

29. [Angles]

State whether the following angles are supplementary (S) or complementary (C): 65°, 25°.

$\boxed{\qquad}$

30. [Statistics]

According to the pie chart, which source contributes closest to 25% of our space debris?

mission related debris

rocket bodies

anomalous debris

breakup debris
(accidental & intentional)

SPACE DEBRIS

satellite payloads

$\boxed{\qquad}$

31. [Probability]

Join the following probabilities to their best description: [One has been done for you.]

$Pr = \dfrac{1}{1000}$ $\boxed{A}$——$\boxed{1}$ once in a blue moon

$Pr = \dfrac{1}{2}$ $\boxed{B}$ $\boxed{2}$ in the box seat

$Pr = 0$ $\boxed{C}$ $\boxed{3}$ even chance

$Pr = \dfrac{3}{4}$ $\boxed{D}$ $\boxed{4}$ pigs might fly

32. [Problem Solving 1] *

How much time is saved by driving 10 km at 100 km/h instead of 60 km/h?

$\boxed{\qquad}$ min

33. [Problem Solving 2]

Deduce the answer to the following game of cows and bulls.

[Reminder: A cow means a number is correct in value but in the wrong position, and a bull indicates that a number is both correct in value and in the correct position. i.e. 2 cows and 1 bull would indicate that all three numbers were correct but two were in the wrong positions.]

Guess	Cows	Bulls
9 7 6	2	–
6 1 9	2	–
1 6 7	2	–

$\boxed{\qquad}$

MATHS MATE

Term 1 - Sheet 4

COFFEE

Name: ....

Due Date: .... / .... / ....

Parent's Signature: ....

1. [Long ×,÷]
$170 \div 5 =$

2. [Decimal +,−]
$4.2 - 3.9 =$

3. [Decimal ×,÷]
$1000 \times 0.02 =$

4. [Fraction +,−] *
$\dfrac{19}{13} - \dfrac{6}{13} =$

5. [Fraction ×,÷] *
$\dfrac{5}{4} \div \dfrac{3}{8} =$

6. [Percentages] *
5% of $\$15.00 =$

$

7. [Integer +,−]
$(-1) - (+9) =$

8. [Integer ×,÷]
$(-9) \div (+3) =$

9. [Rates / Ratios] *
The fastest electrically powered car in the world can travel 18 km in 10 minutes. Find its average speed in kilometres per hour.

10. [Indices]
Evaluate $\dfrac{2^{14}}{2^{10}}$

11. [Square Roots / Surds]
Evaluate $\sqrt{\dfrac{64}{25}}$

12. [Order of Operations] *
$3 \times 5 - (18 \div 3) =$

13. [Exploring Number]
Write $\dfrac{12.5}{10}$ as a percentage.

14. [Scientific Notation]
Express 0.1175 in scientific notation.

15. [Number Patterns]
Complete the pattern:
25, 21, 17, 13, ____ , ____

16. [Expressions]
Select the like terms:
$10k$, 10 , $3k^2$, 4

17. [Substitution] *
If $y = \dfrac{2x + 1}{3}$, find the value of y when $x = 7$

18. [Expansion]
Expand $x(x - 1)$

19. [Factorisation]
Factorise $4x^2 - 36x$

20. [Equations] *
Solve for x: $4x + 1 = 17$

21. [Graphs & Functions]
Complete the table of values for the rule $y = -2x + 1$

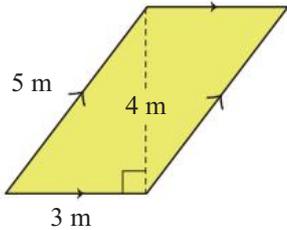| x	$y = -2x + 1$	(x , y)
0	$y = -2 \times 0 + 1$	$(0 , 1)$
1		
2		
3		
4		

22. [Units of Measurement / Time] *
Find the time in hours and minutes from 2330 hours one day until 1320 hours the next.

h   min

QUOTE OF THE WEEK: Time flies like an arrow; fruit flies like a banana. Groucho Marx

23. [Perimeter] *

Find the perimeter of the bulletin board.
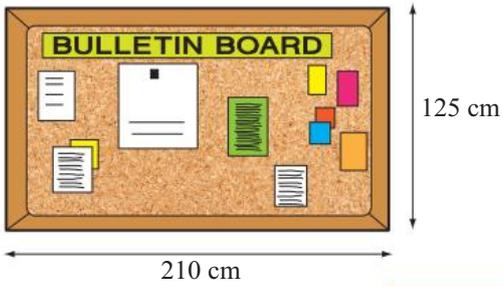
125 cm

210 cm

cm

24. [Area] *

Find the area of the triangle.

5 cm

9 cm

cm^2

25. [Volume] *

Find the volume of the prism.

8 cm

$A = 15\ cm^2$

cm^3

26. [Surface Area] *

Find the total surface area of the rectangular prism.

10 cm

2.5 cm

4 cm

cm^2
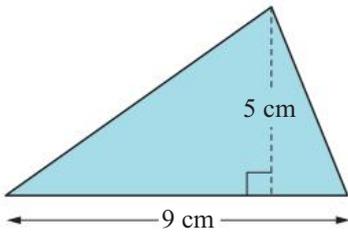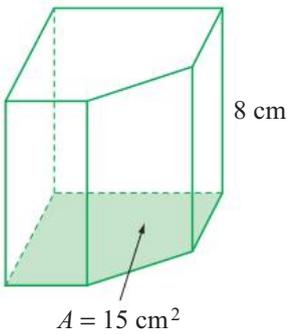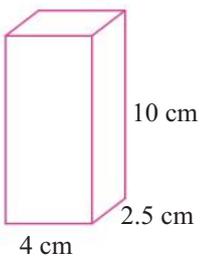
27. [Pythagoras / Trigonometry] *

Find the positive solution for a:
$a^2 + 225 = 625$

28. [Shape / Location]

What shape is the cross section produced by slicing through the points indicated on the cube?
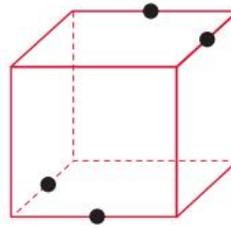
29. [Angles]

What is the complement of 34°?

30. [Statistics]

Which age group includes the largest group of people who only buy music in digital form?

Music buying by ages

18 - 35 yr   36 - 50 yr   51+ yr

CDs only
most CDs
most Digital
Digital only
half CDs - half digital

31. [Probability]

Join the following probabilities to their best description:

Pr = 62.5% ⬚A   ⬚1 a tossed coin lands tails up

Pr = 100% ⬚B   ⬚2 choosing a heart from a deck of 52 cards

Pr = 25% ⬚C   ⬚3 choosing a chocolate cookie from a box with 5 chocolate and 3 butter cookies

Pr = 50% ⬚D   ⬚4 the sun will rise in the east tomorrow

32. [Problem Solving 1] *
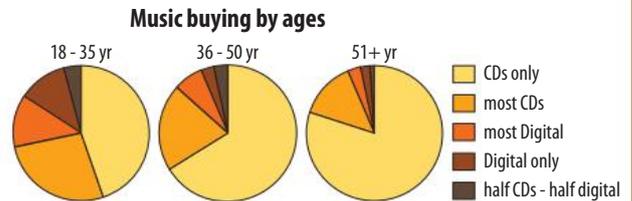
Find the value of the product:
$(-1)^1 \times (-1)^2 \times (-1)^3 \times \ .... \times (-1)^{30}$

33. [Problem Solving 2] *

Find the value of the product:

$$\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{5}\right)\left(1+\frac{1}{6}\right)$$

23 24 25 26 27   28 29   30   31   32 33

MATHS MATE

COFFEE

Test 1
Covering worksheets 1.1 - 1.4

Name: ....

1. [Long ×,÷]
$648 \div 6 =$

2. [Decimal +,–]
$6.25 + 7.35 =$

3. [Decimal ×,÷]
$4.2 \times 1000 =$

4. [Fraction +,–]
$\dfrac{6}{9} - \dfrac{3}{9} =$

5. [Fraction ×,÷]
$\dfrac{5}{2} \times \dfrac{6}{7} =$

6. [Percentages]
25% of $300 =$

7. [Integer +,–]
$(-4) - (+6) =$

8. [Integer ×,÷]
$(+5) \times (+9) =$

9. [Rates / Ratios]
It took Terry 10 minutes to cross the Seto-Ohashi bridge in Japan. How long is the bridge if he drove at an average of 78 km/h?

km

10. [Indices]
Evaluate $\dfrac{3^7}{3^5}$

11. [Square Roots / Surds]
Evaluate $\sqrt{\dfrac{9}{16}}$

12. [Order of Operations]
$6 \times (4 - 24 \div 8) =$

13. [Exploring Number]
Write 0.5% as a fraction in simplest form.

14. [Scientific Notation]
Express 8.3×10^5 as a basic numeral.

15. [Number Patterns]
Complete the pattern:
41, 37, 33, 29, ____ , ____

16. [Expressions]
Select the two like terms:
$4g^2$, 4 , g^2

17. [Substitution]
If $y = 4x + 1$, find the value of y when $x = 5$

18. [Expansion]
Expand $4(3a + 5)$

19. [Factorisation]
Factorise $12p + 9pq$

20. [Equations]
Solve for x: $2x - 4 = 12$

21. [Graphs & Functions]
Complete the table for the rule $y = 2x - 4$

x	$y = 2x - 4$	(x , y)
1	$y = 2 \times 1 - 4$	$(1 , -2)$
2		
3		
4		
5		

22. [Units of Measurement / Time]
How many hours from 0900 hours one day until 1400 hours the next?

23. [Perimeter]

Find the perimeter of the floor rug.

215 cm

285 cm

cm

24. [Area]

Find the area of the obtuse-angled triangle.

6.2 cm

10 cm

cm^2

25. [Volume]

Find the volume of the prism.

12 mm

$A = 25 \text{ mm}^2$

mm^3

26. [Surface Area]

Find the total surface area of the rectangular prism.

6 mm

1.5 mm

10 mm

mm^2

27. [Pythagoras / Trigonometry]

Find the positive solution for a:

$a^2 + 144 = 225$

28. [Shape / Location]

Sketch and label as many different triangles as you can where one side is 5 cm long, one angle is 90° and another angle is 60°.

[Drawings need not be to scale.]

29. [Angles]

State whether the following angles are supplementary (S) or complementary (C): 35°, 55°.

30. [Statistics]

Which musician composed 12 times less symphonies than Mozart?

Number of symphonies composed

31. [Probability]

If the probability of a frost tomorrow is $\frac{1}{20}$, what is the probability of not having a frost?

32. [Problem Solving 1]

Find the value of the sum:

$(-1)^1 + (-1)^2 + (-1)^3 + ... + (-1)^{50}$

33. [Problem Solving 2]

Deduce the answer to the following game of cows and bulls.

[Reminder: A cow means a number is correct in value but in the wrong position, and a bull indicates that a number is both correct in value and in the correct position. i.e. 2 cows and 1 bull would indicate that all three numbers were correct but two were in the wrong positions.]

Guess	Cows	Bulls
4 3 8	–	2
1 2 0	–	1
3 2 4	1	–

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MATHS MATE

COFFEE

Test 1
Covering worksheets 1.1 - 1.4

Name: ....

1. [Long ×,÷]
$639 \div 9 =$

2. [Decimal +,−]
$5.7 - 3.8 =$

3. [Decimal ×,÷]
$1000 \times 0.04 =$

4. [Fraction +,−]
$\dfrac{7}{10} + \dfrac{3}{10} =$

5. [Fraction ×,÷]
$\dfrac{2}{3} \div \dfrac{7}{9} =$

6. [Percentages]
75% of $200 =$

7. [Integer +,−]
$(+8) + (-3) =$

8. [Integer ×,÷]
$(+18) \div (-6) =$

9. [Rates / Ratios]
The average dive speed of a submarine is 37 km/h. At this rate how far can it travel in a 40 hour patrol?

km

10. [Indices]
Evaluate $\dfrac{5^6}{5^3}$

11. [Square Roots / Surds]
Evaluate $\sqrt{81} \div \sqrt{9}$

12. [Order of Operations]
$11 \times (3 + 7) =$

13. [Exploring Number]
Change 0.078 into a fraction in simplest form.

14. [Scientific Notation]
Express 4.2×10^{-3} as a basic numeral.

15. [Number Patterns]
Complete the pattern:
50, 44, 38, 32, ____ , ____

16. [Expressions]
Select the two like terms:
$3h^2$, 3 , $3h$, 2

17. [Substitution]
If $y = 3(x + 9)$, find the value of y when $x = 2$

18. [Expansion]
Expand $k(k - 2)$

19. [Factorisation]
Factorise $18y + 24z - 6w$

20. [Equations]
Solve for x: $3x - 2 = 19$

21. [Graphs & Functions]
Complete the table for the rule $y = -3x + 2$

x	$y = -3x + 2$	(x , y)
1	$y = -3 \times 1 + 2$	$(1 , -1)$
2		
3		
4		
5		

22. [Units of Measurement / Time]
How many months are there from January 1st 2010 until July 1st 2013?

23. [Perimeter]

Find the perimeter of the floor rug.

165 cm

165 cm

cm

24. [Area]

Find the area of the triangle.

15 mm   20 mm

12 mm

25 mm

mm^2

25. [Volume]
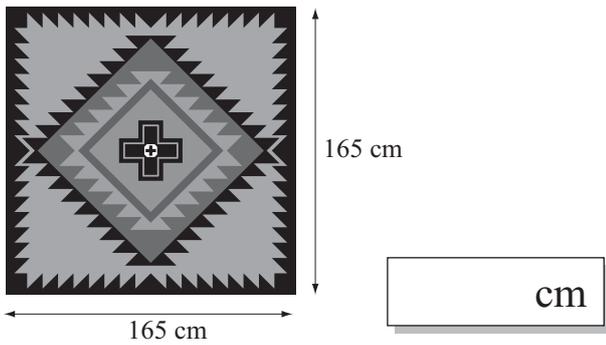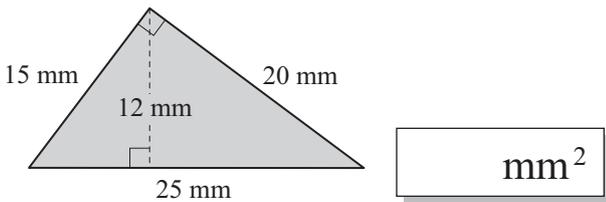
Find the volume of the prism.

$A = 7.6\ cm^2$

2 cm

cm^3

26. [Surface Area]

Find the total surface area of the rectangular prism.

3 m

0.5 m

2 m

m^2
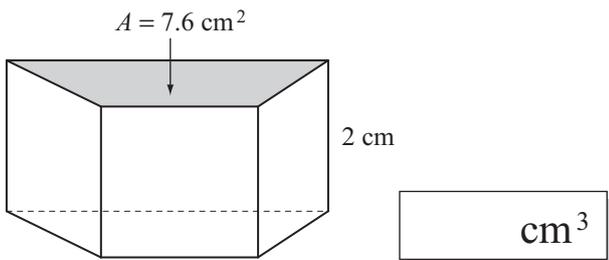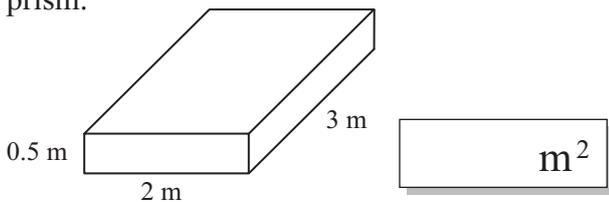
27. [Pythagoras / Trigonometry]

Find the positive solution for a:
$a^2 + 576 = 625$

28. [Shape / Location]

What shape is the cross section produced by slicing through the points indicated on the square pyramid?
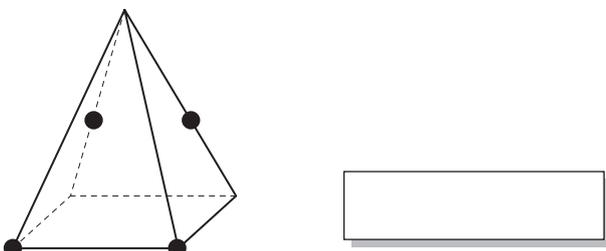
29. [Angles]

What is the supplement of 28°?

30. [Statistics]

How many of the countries shown recorded an average life expectancy between 75 and 80 years in 2020?

Average life expectancy 2020

Afghanistan
Australia
China
France
Indonesia
New Zealand
Russia
UK
USA
World

0 10 20 30 40 50 60 70 80
years

31. [Probability]

Join the following probabilities to their best description:

Pr = 0.1   A   1   certain to happen

Pr = 0   B   2   very unlikely to occur

Pr = 1   C   3   likely to occur

Pr = 0.8   D   4   will not happen

32. [Problem Solving 1]

Find the value of the product:
$(-1)^1 \times (-1)^2 \times (-1)^3 \times .... \times (-1)^{55}$

33. [Problem Solving 2]

Deduce the answer to the following game of cows and bulls.

[Reminder: A cow means a number is correct in value but in the wrong position, and a bull indicates that a number is both correct in value and in the correct position. i.e. 2 cows and 1 bull would indicate that all three numbers were correct but two were in the wrong positions.]

Guess	Cows	Bulls
2 3 8	–	–
3 4 9	2	–
3 9 6	2	–

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MATHS MATE

Term 1 - Sheet 1

Name: ....

Due Date: ..../ ..../ ....

Parent's Signature: ....

1. [Long ×,÷] *
$15 \times 35 =$ | **525**

2. [Decimal +,−]
$6.25 + 9.45 =$ | **15.7**

3. [Decimal ×,÷]
$5.7 \times 100 =$ | **570**

4. [Fraction +,−]
$\dfrac{1}{9} + \dfrac{4}{9} =$ | $\dfrac{5}{9}$

5. [Fraction ×,÷]
$\dfrac{3}{5} \times \dfrac{10}{7} =$ | $\dfrac{6}{7}$

6. [Percentages] *
20% of $320 =$ | **64**

7. [Integer +,−]
$(-5) - (+7) =$ | **−12**

8. [Integer ×,÷]
$(-2) \times (+6) =$ | **−12**

9. [Rates / Ratios] *
The fastest aircraft in the world is the X-15 rocket plane, with a climbing rate of $18\,000$ m per minute. At this rate how far can it climb in 10 seconds? | **3000 m**

10. [Indices]
Evaluate 0.2^3 | **0.008**

11. [Square Roots / Surds] *
Evaluate $\sqrt{\dfrac{4}{25}}$ | $\dfrac{2}{5}$

12. [Order of Operations]
$4 \times 9 \div 3 =$ | **12**

13. [Exploring Number]
Write 1.05 as a percentage. | **105%**

14. [Scientific Notation]
Write 5.1×10^4 as a basic numeral. | **51 000**

15. [Number Patterns]
Complete the pattern:
8, 10, 12, 14, | **16** , **18**

16. [Expressions]
Select the like terms:
z , z^2 , $5z^2$ | $z^2, 5z^2$

17. [Substitution] *
If $y = 2x - 1$, find the value of y when $x = 3$ | **5**

18. [Expansion]
Expand $7(2s - 1)$ | $14s - 7$

19. [Factorisation]
Factorise $14cd - 7c$ | $7c(2d - 1)$

20. [Equations] *
Solve for x: $2x - 1 = 7$ | **4**

21. [Graphs & Functions]
Complete the table for the rule $y = 2x + 4$

x	$y = 2x + 4$	(x , y)
0	$y = 2 \times 0 + 4$	$(0 , 4)$
1	$y = 2 \times 1 + 4$	$(1,6)$
2	$y = 2 \times 2 + 4$	$(2,8)$
3	$y = 2 \times 3 + 4$	$(3,10)$
4	$y = 2 \times 4 + 4$	$(4,12)$

22. [Units of Measurement / Time] *
How many hours from 8:00 am one day until 4:00 pm the next? | **32 hours**

QUOTE OF THE WEEK: Genuine love is self replenishing. The more you nurture the spiritual growth of others, the more your own spiritual growth is nurtured. Scott Peck

23. [Perimeter] *

Find the perimeter of the blackboard.

110 cm

200 cm

620 cm

24. [Area] *

Find the area of the triangle.

4 mm
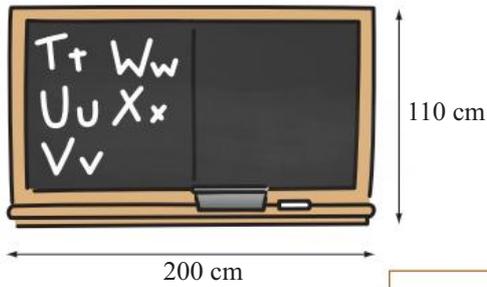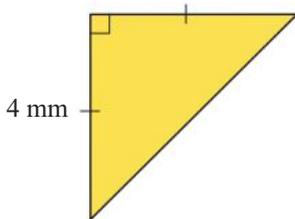
8 mm^2

25. [Volume] *

Find the volume of the prism.

2 cm

base area = 5 cm^2
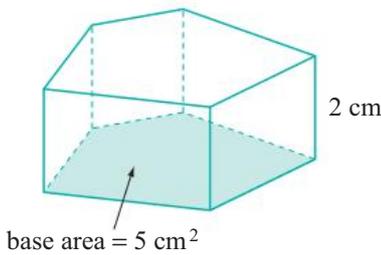
10 cm^3

26. [Surface Area] *

Find the total surface area of the cube.

5 cm
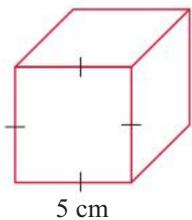
150 cm^2

27. [Pythagoras / Trigonometry]

Find the positive solution for x:
$x^2 = 81$

9

28. [Shape / Location]

Draw a triangle with exactly one axis of symmetry. What type of triangle have you drawn?
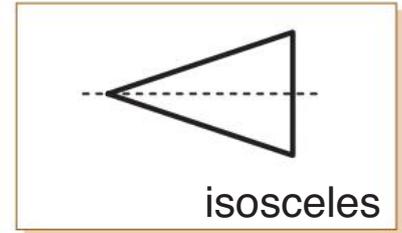
isosceles

29. [Angles]

What is the supplement of 123°?

57°

30. [Statistics]

Which country has the highest current population growth?

Population growth (of selected countries)

Italy Jamaica Russia Kenya India China

■ Current pop'n growth

■ Projected pop'n growth
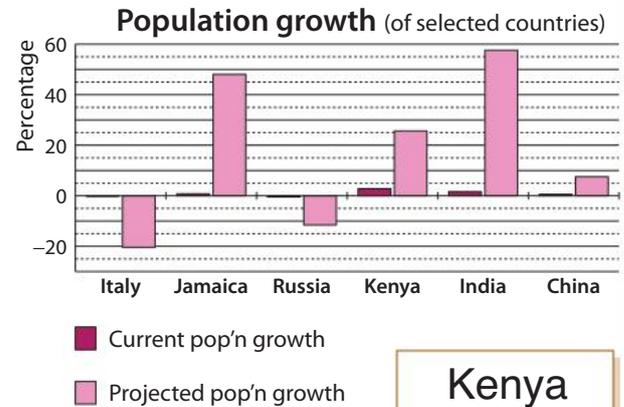
Kenya

31. [Probability]

If the probability of receiving a message on the internet today is $\frac{8}{9}$, what is the probability of not receiving a message?

$\frac{1}{9}$

32. [Problem Solving 1] *

Find all the possible values for the integer n so that $\frac{7}{n-2}$ is also an integer.

–5, 1, 3, 9

33. [Problem Solving 2] *

Which number is greater:
$(-3)^{22}$ or $(-2)^{33}$?

$(-3)^{22}$

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23 24 25 26 27   28 29   30   31   32 33

MATHS MATE

Term 1 - Sheet 2

COFFEE

Name: ....

Due Date: .... / .... / ....

Parent's Signature: ....

1. [Long ×,÷]
$234 \div 9 =$

26

2. [Decimal +,−]
$4.38 + 0.9 =$

5.28

3. [Decimal ×,÷]
$32 \div 1000 =$

0.032

4. [Fraction +,−] *
$\dfrac{6}{6} - \dfrac{2}{6} =$

$\dfrac{2}{3}$

5. [Fraction ×,÷] *
$\dfrac{2}{3} \div \dfrac{4}{5} =$

$\dfrac{5}{6}$

6. [Percentages] *
$25\% \text{ of } 180 =$

45

7. [Integer +,−]
$(+9) - (+1) =$

8

8. [Integer ×,÷]
$(+8) \times (+2) =$

16

9. [Rates / Ratios] *
The fastest helicopter in the world is the '*Westland Lynx*', which can fly at a speed of 400 km/h. What distance can it fly in 12 minutes?

80 km

10. [Indices] *
Evaluate $3^2 \times 3^3$

243

11. [Square Roots / Surds]
Evaluate $\sqrt{81} \times \sqrt{81}$

81

12. [Order of Operations]
$6 \times (9 + 5) =$

84

13. [Exploring Number] *
Express 0.25% as a fraction in simplest form.

$\dfrac{1}{400}$

14. [Scientific Notation]
Express 8.6×10^{-3} as a basic numeral.

0.0086

15. [Number Patterns]
Complete the pattern:

7, 11, 15, 19, __23__ , __27__

16. [Expressions]
Select the like terms:
$4q$, $8q^2$, $8q$

4q, 8q

17. [Substitution] *
If $y = x^2 - x$, find the value of y when $x = 6$

30

18. [Expansion]
Expand $y(y + 2)$

$y^2 + 2y$

19. [Factorisation]
Factorise $16ef^2 - 8fg + 24f$

$8f(2ef - g + 3)$

20. [Equations] *
Solve for x: $3x + 3 = 21$

6

21. [Graphs & Functions]
Complete the table for the rule $y = -x + 1$

x	$y = -x + 1$	(x , y)
0	$y = 0 + 1$	(0 , 1)
1	$y = -1 + 1$	(1,0)
2	$y = -2 + 1$	(2,−1)
3	$y = -3 + 1$	(3,−2)
4	$y = -4 + 1$	(4,−3)

22. [Units of Measurement / Time] *
How many months are there from September 1st 2009 until June 1st 2014?

57 months

QUOTE OF THE WEEK: Be nice to people on your way up because you'll meet 'em on your way down. Wilson Mizner

23. [Perimeter] *

Find the perimeter of the meat cleaver blade.

85 mm

235 mm

640 mm

24. [Area] *

Find the area of the shaded triangle.

3 cm

5 cm

7.5 cm²

25. [Volume] *

Find the volume of the pentagonal prism.

12 cm

base area = 15 cm²
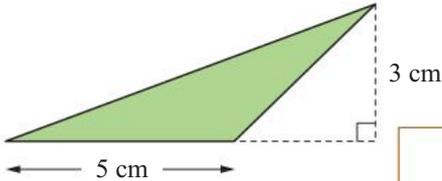
180 cm³

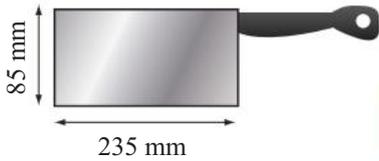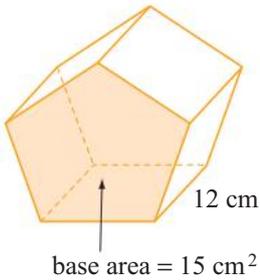**26.** [Surface Area] *

Find the total surface area of the rectangular prism.

20 mm

100 mm

250 mm
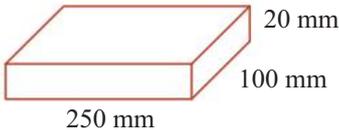
64 000 mm²

27. [Pythagoras / Trigonometry] *

Find the positive solution for c:
$c^2 = 0.6^2 + 0.8^2$

1

28. [Shape / Location]

Sketch and label as many different isosceles triangles as you can in which at least one side is 3 cm long and at least one angle is 30°.
[Drawings need not be to scale.]

30°

30°   30°
3 cm

30°
3 cm   3 cm

30°
3 cm   3 cm

3 cm   3 cm
30°   30°

29. [Angles] *

Find the value of $x°$.

62°
$x°$

28°

30. [Statistics]

For how many of the 25 weeks shown was Melbourne's average daily water consumption on or below its target of 155 litres per person?

Melbourne's daily water consumption

L/person/day

250
200
150
100
50
0

04 Dec 08 18 Dec 08 01 Jan 09 15 Jan 09 29 Jan 09 12 Feb 09 26 Feb 09 12 Mar 09 26 Mar 09 09 Apr 09 23 Apr 09 07 May 09 21 May 09

Week ending date
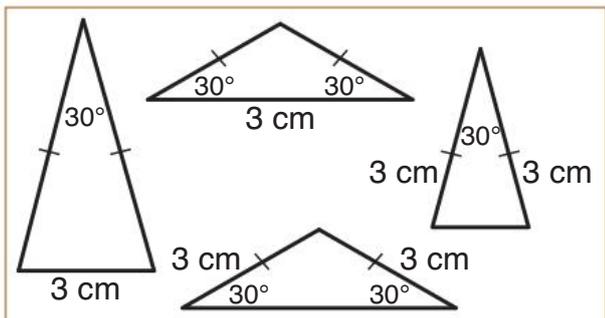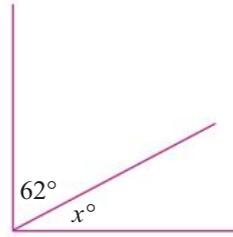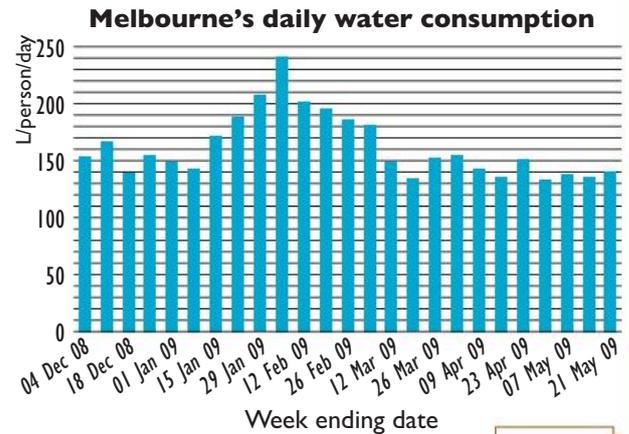
16

31. [Probability]

In a Lego toy, some bricks are red, some white and the rest are blue. One brick is chosen at random. If the probability of choosing a red brick is 0.38 and the probability of choosing a white brick is 0.17, what is the probability of choosing a blue brick?

0.45

32. [Problem Solving 1] *

$1 \times 3 \times .... \times 101 > 2 \times 4 \times .... \times 100$
True or false?

true

33. [Problem Solving 2] *

What is the smallest number which is reversed when 2 is added to its double?

25

MATHS MATE

Term 1 - Sheet 3

Name: ....

Due Date: ..../.........../...........

Parent's Signature: ....

1. [Long ×,÷]
$438 \div 6 =$
73

2. [Decimal +,−]
$6.7 - 2.8 =$
3.9

3. [Decimal ×,÷]
$0.8 \div 100 =$
0.008

4. [Fraction +,−] *
$\dfrac{3}{4} + \dfrac{1}{4} =$
1

5. [Fraction ×,÷]
$\dfrac{1}{6} \times \dfrac{6}{7} =$
$\dfrac{1}{7}$

6. [Percentages] *
15% of $480 =$
72

7. [Integer +,−]
$(-9) + (-3) =$
−12

8. [Integer ×,÷]
$(-12) \div (-3) =$
4

9. [Rates / Ratios] *
The fastest train in the world is the 'Train a Grande Vitesse' in France. Find its average speed, in kilometres per hour, if it can travel 45 km in 5 minutes.
540 km/h

10. [Indices]
Evaluate $\dfrac{5^5}{5^2}$
125

11. [Square Roots / Surds]
Evaluate $\sqrt{1} \times \sqrt{1}$
1

12. [Order of Operations] *
$(4 + 11) - (9 - 6) =$
12

13. [Exploring Number]
Write 0.06 as a fraction in simplest form.
$\dfrac{3}{50}$

14. [Scientific Notation]
Express 4.005×10^2 as a basic numeral.
400.5

15. [Number Patterns]
Complete the pattern:
$\dfrac{1}{5}$, 1, 5, 25, **125** , **625**

16. [Expressions]
Select the like terms:
$2x^2$, $2m$, x^2
$2x^2$, x^2

17. [Substitution] *
If $y = 4(x - 2)$, find the value of y when $x = 2$
0

18. [Expansion]
Expand $3(4 - 2t)$
$12 - 6t$

19. [Factorisation]
Factorise
$4ab + 6bc + 8bd$
$2b(2a + 3c + 4d)$

20. [Equations] *
Solve for x:
$\dfrac{2x + 1}{3} = 5$
7

21. [Graphs & Functions]
Complete the table of values for the rule
$y = 2x - 3$

x	$y = 2x - 3$	(x , y)
0	$y = 2 \times 0 - 3$	$(0 , -3)$
1	$y = 2 \times 1 - 3$	$(1, -1)$
2	$y = 2 \times 2 - 3$	$(2, 1)$
3	$y = 2 \times 3 - 3$	$(3, 3)$
4	$y = 2 \times 4 - 3$	$(4, 5)$

22. [Units of Measurement / Time] *
Find the time in hours and minutes from 1230 hours one day until 0620 hours the next.
17 h 50 min

QUOTE OF THE WEEK: Remember, no one can make you feel inferior without your consent. Eleanor Roosevelt

23. [Perimeter] *
Calculate the perimeter of the door.

95 cm

215 cm

620 cm

24. [Area] *
Find the area of the parallelogram.

5 m

4 m

3 m

12 m^2

25. [Volume] *
Find the volume of the prism.

20 cm

$A = 17$ cm^2
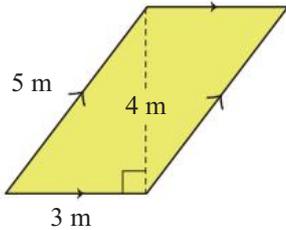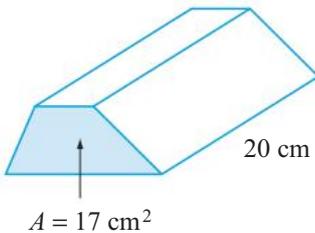
340 cm^3

26. [Surface Area] *
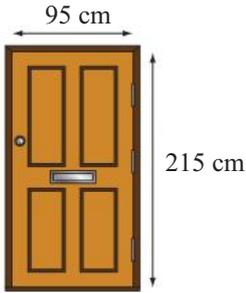Find the total surface area of the prism.

60 cm

50 cm

90 cm
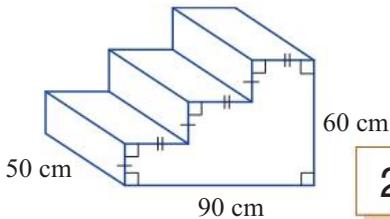
22 200 cm^2

27. [Pythagoras / Trigonometry] *
Find the positive solution for b:
$64 + b^2 = 100$

6

28. [Shape / Location]
Draw a triangle that has three axes of symmetry. What type of triangle have you drawn?

equilateral
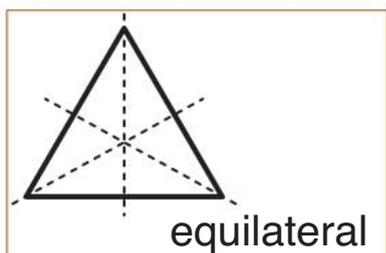
29. [Angles]
State whether the following angles are supplementary (S) or complementary (C): 65°, 25°.

C

30. [Statistics]
According to the pie chart, which source contributes closest to 25% of our space debris?

mission related debris

SPACE DEBRIS

rocket bodies

satellite payloads

anomalous debris

breakup debris
(accidental & intentional)
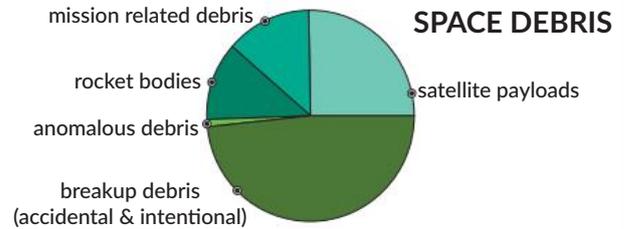
satellite payloads

31. [Probability]
Join the following probabilities to their best description: [One has been done for you.]

$Pr = \dfrac{1}{1000}$ A — 1   once in a blue moon

$Pr = \dfrac{1}{2}$ B   2   in the box seat

$Pr = 0$ C   3   even chance

$Pr = \dfrac{3}{4}$ D   4   pigs might fly

32. [Problem Solving 1] *
How much time is saved by driving 10 km at 100 km/h instead of 60 km/h?

4 min

33. [Problem Solving 2]
Deduce the answer to the following game of cows and bulls.
[Reminder: A cow means a number is correct in value but in the wrong position, and a bull indicates that a number is both correct in value and in the correct position. i.e. 2 cows and 1 bull would indicate that all three numbers were correct but two were in the wrong positions.]

Guess	Cows	Bulls
9 7 6	2	–
6 1 9	2	–
1 6 7	2	–

791

MATHS MATE

Term 1 - Sheet 4

COFFEE

Name: ....

Due Date: .... / .... / ....

Parent's Signature: ....

---

1. [Long ×,÷]
$170 \div 5 =$

> 34

2. [Decimal +,−]
$4.2 - 3.9 =$

> 0.3

3. [Decimal ×,÷]
$1000 \times 0.02 =$

> 20

4. [Fraction +,−] *
$\dfrac{19}{13} - \dfrac{6}{13} =$

> 1

5. [Fraction ×,÷] *
$\dfrac{5}{4} \div \dfrac{3}{8} =$

> $3\dfrac{1}{3}$

6. [Percentages] *
5% of $15.00 =

> $ 0.75

7. [Integer +,−]
$(-1) - (+9) =$

> −10

8. [Integer ×,÷]
$(-9) \div (+3) =$

> −3

9. [Rates / Ratios] *
The fastest electrically powered car in the world can travel 18 km in 10 minutes. Find its average speed in kilometres per hour.

> 108 km/h

10. [Indices]
Evaluate $\dfrac{2^{14}}{2^{10}}$

> 16

11. [Square Roots / Surds]
Evaluate $\sqrt{\dfrac{64}{25}}$

> $1\dfrac{3}{5}$

12. [Order of Operations] *
$3 \times 5 - (18 \div 3) =$

> 9

13. [Exploring Number]
Write $\dfrac{12.5}{10}$ as a percentage.

> 125%

14. [Scientific Notation]
Express 0.1175 in scientific notation.

> 1.175×10^{-1}

15. [Number Patterns]
Complete the pattern:
25, 21, 17, 13, __9__ , __5__

16. [Expressions]
Select the like terms:
$10k$, 10 , $3k^2$, 4

> 10, 4

17. [Substitution] *
If $y = \dfrac{2x + 1}{3}$, find the value of y when $x = 7$

> 5

18. [Expansion]
Expand $x(x - 1)$

> $x^2 - x$

19. [Factorisation]
Factorise $4x^2 - 36x$

> $4x(x - 9)$

20. [Equations] *
Solve for x: $4x + 1 = 17$

> 4

21. [Graphs & Functions]
Complete the table of values for the rule $y = -2x + 1$

x	$y = -2x + 1$	(x , y)
0	$y = -2 \times 0 + 1$	(0 , 1)
1	$y = -2 \times 1 + 1$	(1,−1)
2	$y = -2 \times 2 + 1$	(2,−3)
3	$y = -2 \times 3 + 1$	(3,−5)
4	$y = -2 \times 4 + 1$	(4,−7)

22. [Units of Measurement / Time] *
Find the time in hours and minutes from 2330 hours one day until 1320 hours the next.

> 13 h 50 min

QUOTE OF THE WEEK: Time flies like an arrow; fruit flies like a banana. Groucho Marx

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

23. [Perimeter] *

Find the perimeter of the bulletin board.

BULLETIN BOARD

125 cm

210 cm
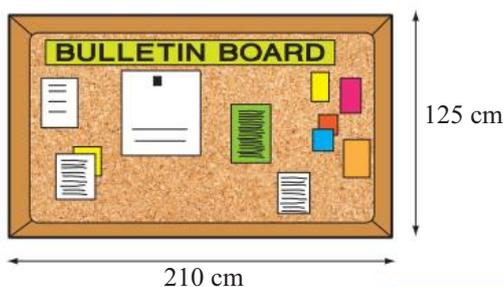
670 cm

24. [Area] *

Find the area of the triangle.

5 cm

9 cm

22.5 cm^2

25. [Volume] *

Find the volume of the prism.

8 cm

$A = 15$ cm^2
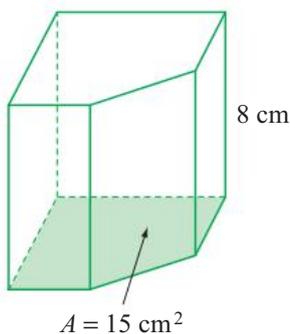
120 cm^3

26. [Surface Area] *

Find the total surface area of the rectangular prism.

10 cm

2.5 cm

4 cm
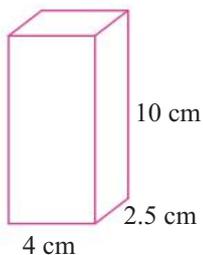
150 cm^2

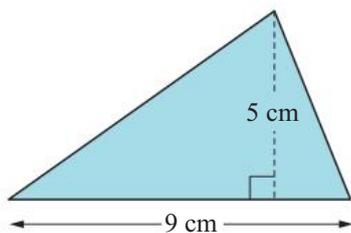**27.** [Pythagoras / Trigonometry] *

Find the positive solution for a:
$a^2 + 225 = 625$

20

28. [Shape / Location]

What shape is the cross section produced by slicing through the points indicated on the cube?
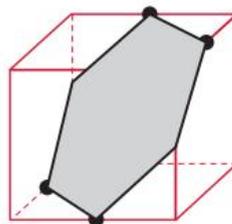
hexagon

29. [Angles]

What is the complement of 34°?

56°

30. [Statistics]

Which age group includes the largest group of people who only buy music in digital form?

Music buying by ages

18 - 35 yr   36 - 50 yr   51+ yr

CDs only
most CDs
most Digital
Digital only
half CDs - half digital
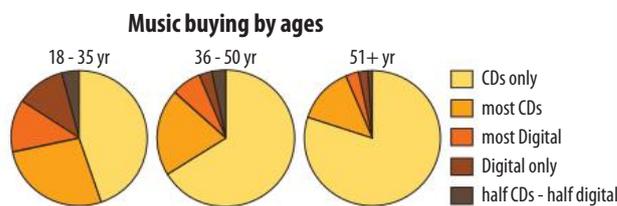
18 - 35 yr

31. [Probability]

Join the following probabilities to their best description:

Pr = 62.5%   [A]   [1]   a tossed coin lands tails up

Pr = 100%   [B]   [2]   choosing a heart from a deck of 52 cards

Pr = 25%   [C]   [3]   choosing a chocolate cookie from a box with 5 chocolate and 3 butter cookies

Pr = 50%   [D]   [4]   the sun will rise in the east tomorrow

32. [Problem Solving 1] *

Find the value of the product:
$(-1)^1 \times (-1)^2 \times (-1)^3 \times \text{........} \times (-1)^{30}$

−1

33. [Problem Solving 2] *

Find the value of the product:

$$\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{5}\right)\left(1+\frac{1}{6}\right)$$

3.5

MATHS MATE

COFFEE

Test 1
Covering worksheets 1.1 - 1.4

Name: _____

1. [Long ×,÷]
$648 \div 6 =$

$\boxed{108}$

2. [Decimal +,–]
$6.25 + 7.35 =$

$\boxed{13.6}$

3. [Decimal ×,÷]
$4.2 \times 1000 =$

$\boxed{4200}$

4. [Fraction +,–]
$\dfrac{6}{9} - \dfrac{3}{9} =$

$\boxed{\dfrac{1}{3}}$

5. [Fraction ×,÷]
$\dfrac{5}{2} \times \dfrac{6}{7} =$

$\boxed{2\dfrac{1}{7}}$

6. [Percentages]
25% of $300 =$

$\boxed{75}$

7. [Integer +,–]
$(-4) - (+6) =$

$\boxed{-10}$

8. [Integer ×,÷]
$(+5) \times (+9) =$

$\boxed{45}$

9. [Rates / Ratios]
It took Terry 10 minutes to cross the Seto-Ohashi bridge in Japan. How long is the bridge if he drove at an average of 78 km/h?

$\boxed{13 \ km}$

10. [Indices]
Evaluate $\dfrac{3^7}{3^5}$

$\boxed{9}$

11. [Square Roots / Surds]
Evaluate $\sqrt{\dfrac{9}{16}}$

$\boxed{\dfrac{3}{4}}$

12. [Order of Operations]
$6 \times (4 - 24 \div 8) =$

$\boxed{6}$

13. [Exploring Number]
Write 0.5% as a fraction in simplest form.

$\boxed{\dfrac{1}{200}}$

14. [Scientific Notation]
Express 8.3×10^5 as a basic numeral.

$\boxed{830\,000}$

15. [Number Patterns]
Complete the pattern:
41, 37, 33, 29, $\boxed{\underline{25}, \underline{21}}$

16. [Expressions]
Select the two like terms:
$4g^2 , 4 , g^2$

$\boxed{4g^2, g^2}$

17. [Substitution]
If $y = 4x + 1$, find the value of y when $x = 5$

$\boxed{21}$

18. [Expansion]
Expand $4(3a + 5)$

$\boxed{12a + 20}$

19. [Factorisation]
Factorise $12p + 9pq$

$\boxed{3p(4 + 3q)}$

20. [Equations]
Solve for x: $2x - 4 = 12$

$\boxed{8}$

21. [Graphs & Functions]
Complete the table for the rule $y = 2x - 4$

x	$y = 2x - 4$	(x , y)
1	$y = 2 \times 1 - 4$	$(1 , -2)$
2	$y = 2 \times 2 - 4$	$(2,0)$
3	$y = 2 \times 3 - 4$	$(3,2)$
4	$y = 2 \times 4 - 4$	$(4,4)$
5	$y = 2 \times 5 - 4$	$(5,6)$

22. [Units of Measurement / Time]
How many hours from 0900 hours one day until 1400 hours the next?

$\boxed{29 \ hours}$
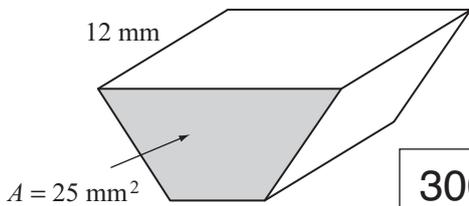
23. [Perimeter]

Find the perimeter of the floor rug.

215 cm

285 cm
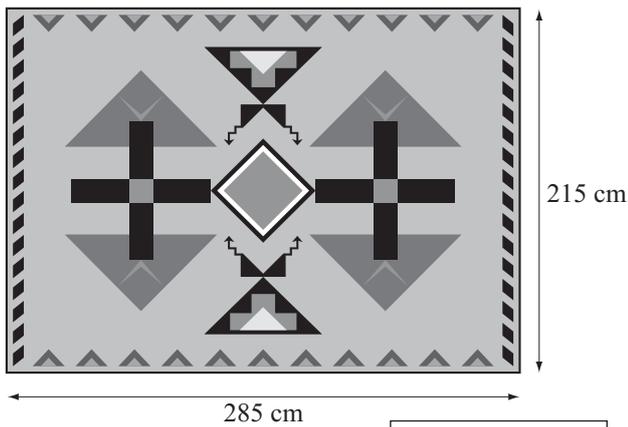
$$\boxed{1000 \text{ cm}}$$

24. [Area]

Find the area of the obtuse-angled triangle.

6.2 cm

10 cm

$$\boxed{31 \text{ cm}^2}$$

25. [Volume]

Find the volume of the prism.

12 mm

$A = 25 \text{ mm}^2$
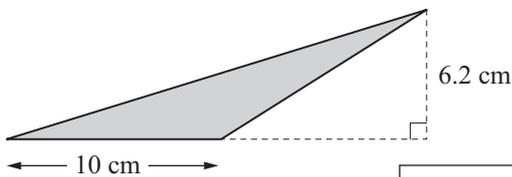
$$\boxed{300 \text{ mm}^3}$$

26. [Surface Area]

Find the total surface area of the rectangular prism.

6 mm

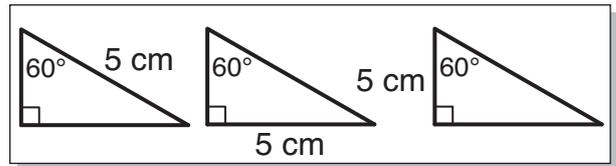1.5 mm

10 mm
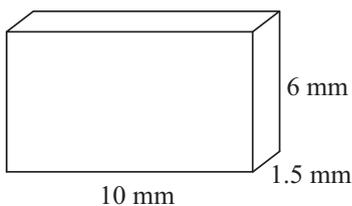
$$\boxed{168 \text{ mm}^2}$$

27. [Pythagoras / Trigonometry]

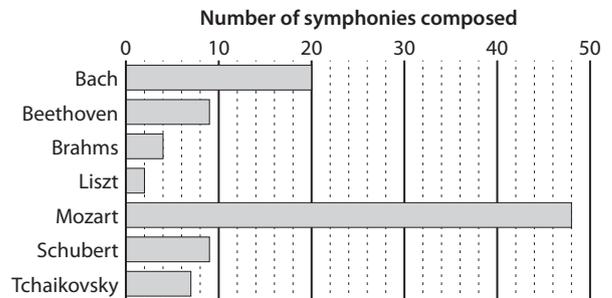Find the positive solution for a:
$a^2 + 144 = 225$

$$\boxed{9}$$

28. [Shape / Location]

Sketch and label as many different triangles as you can where one side is 5 cm long, one angle is 90° and another angle is 60°.
[Drawings need not be to scale.]

60° 5 cm   60°   5 cm 60°

5 cm

29. [Angles]

State whether the following angles are supplementary (S) or complementary (C): 35°, 55°.

$$\boxed{C}$$

30. [Statistics]

Which musician composed 12 times less symphonies than Mozart?

Number of symphonies composed

0   10   20   30   40   50

Bach
Beethoven
Brahms
Liszt
Mozart
Schubert
Tchaikovsky

$$\boxed{\text{Brahms}}$$

31. [Probability]

If the probability of a frost tomorrow is $\frac{1}{20}$, what is the probability of not having a frost?

$$\boxed{\frac{19}{20}}$$

32. [Problem Solving 1]

Find the value of the sum:
$(-1)^1 + (-1)^2 + (-1)^3 + ... + (-1)^{50}$

$$\boxed{0}$$

33. [Problem Solving 2]

Deduce the answer to the following game of cows and bulls.

[Reminder: A cow means a number is correct in value but in the wrong position, and a bull indicates that a number is both correct in value and in the correct position. i.e. 2 cows and 1 bull would indicate that all three numbers were correct but two were in the wrong positions.]

| Guess	Cows	Bulls
4 3 8	–	2
1 2 0	–	1
3 2 4	1	–

$$\boxed{138}$$

Coffee.Test 1A © Copyright. Not to be reproduced without permission. J. B. Wright - 2020

MATHS MATE

COFFEE

Test 1
Covering worksheets 1.1 - 1.4

Name: _____

1. [Long ×,÷]
$639 \div 9 =$
71

2. [Decimal +,−]
$5.7 - 3.8 =$
1.9

3. [Decimal ×,÷]
$1000 \times 0.04 =$
40

4. [Fraction +,−]
$\dfrac{7}{10} + \dfrac{3}{10} =$
1

5. [Fraction ×,÷]
$\dfrac{2}{3} \div \dfrac{7}{9} =$
$\dfrac{6}{7}$

6. [Percentages]
75% of $200 =$
150

7. [Integer +,−]
$(+8) + (-3) =$
5

8. [Integer ×,÷]
$(+18) \div (-6) =$
−3

9. [Rates / Ratios]
The average dive speed of a submarine is 37 km/h. At this rate how far can it travel in a 40 hour patrol?
1480 km

10. [Indices]
Evaluate $\dfrac{5^6}{5^3}$
125

11. [Square Roots / Surds]
Evaluate $\sqrt{81} \div \sqrt{9}$
3

12. [Order of Operations]
$11 \times (3 + 7) =$
110

13. [Exploring Number]
Change 0.078 into a fraction in simplest form.
$\dfrac{39}{500}$

14. [Scientific Notation]
Express 4.2×10^{-3} as a basic numeral.
0.0042

15. [Number Patterns]
Complete the pattern:
$50, 44, 38, 32,$ __26__ , __20__

16. [Expressions]
Select the two like terms:
$3h^2$, 3 , $3h$, 2
3, 2

17. [Substitution]
If $y = 3(x + 9)$, find the value of y when $x = 2$
33

18. [Expansion]
Expand $k(k - 2)$
$k^2 - 2k$

19. [Factorisation]
Factorise $18y + 24z - 6w$
$6(3y + 4z - w)$

20. [Equations]
Solve for x: $3x - 2 = 19$
7

21. [Graphs & Functions]
Complete the table for the rule $y = -3x + 2$

x	$y = -3x + 2$	(x , y)
1	$y = -3 \times 1 + 2$	$(1 , -1)$
2	$y = -3 \times 2 + 2$	$(2, -4)$
3	$y = -3 \times 3 + 2$	$(3, -7)$
4	$y = -3 \times 4 + 2$	$(4, -10)$
5	$y = -3 \times 5 + 2$	$(5, -13)$

22. [Units of Measurement / Time]
How many months are there from January 1st 2010 until July 1st 2013?
42 months

23. [Perimeter]

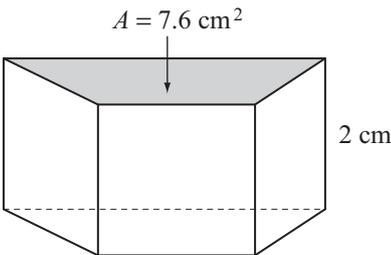Find the perimeter of the floor rug.
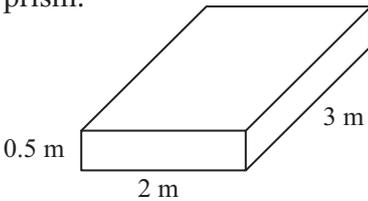
165 cm

165 cm

660 cm

24. [Area]

Find the area of the triangle.

15 mm   20 mm
12 mm
25 mm
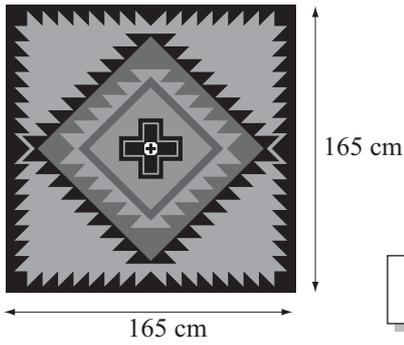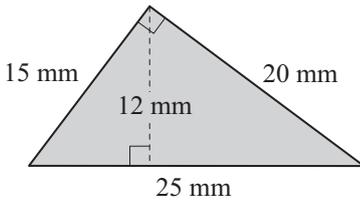
150 mm^2

25. [Volume]

Find the volume of the prism.

$A = 7.6$ cm^2

2 cm

15.2 cm^3

26. [Surface Area]

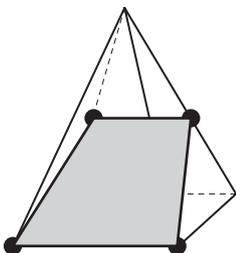Find the total surface area of the rectangular prism.

3 m
0.5 m
2 m

17 m^2

27. [Pythagoras / Trigonometry]

Find the positive solution for a:
$a^2 + 576 = 625$

7

28. [Shape / Location]

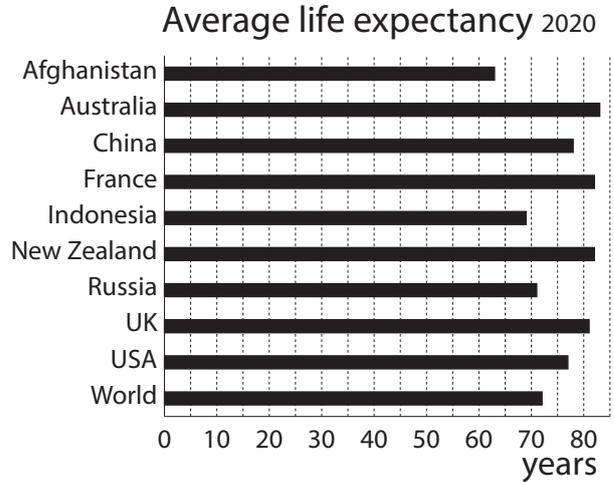What shape is the cross section produced by slicing through the points indicated on the square pyramid?

trapezium

29. [Angles]

What is the supplement of 28°?

152°

30. [Statistics]

How many of the countries shown recorded an average life expectancy between 75 and 80 years in 2020?

Average life expectancy 2020

Afghanistan	
Australia	
China	
France	
Indonesia	
New Zealand	
Russia	
UK	
USA	
World	

0 10 20 30 40 50 60 70 80
years

2

31. [Probability]

Join the following probabilities to their best description:

Pr = 0.1   A   1   certain to happen

Pr = 0   B   2   very unlikely to occur

Pr = 1   C   3   likely to occur

Pr = 0.8   D   4   will not happen

32. [Problem Solving 1]

Find the value of the product:
$(-1)^1 \times (-1)^2 \times (-1)^3 \times \ldots\ldots \times (-1)^{55}$

1

33. [Problem Solving 2]

Deduce the answer to the following game of cows and bulls.

[Reminder: A cow means a number is correct in value but in the wrong position, and a bull indicates that a number is both correct in value and in the correct position. i.e. 2 cows and 1 bull would indicate that all three numbers were correct but two were in the wrong positions.]

Guess	Cows	Bulls
2 3 8	–	–
3 4 9	2	–
3 9 6	2	–

964

23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33

MATHS MATE

1.1

32. **Hint:** *Discuss what an integer is. The fraction must equal an integer, so the numerator must be a multiple of the denominator.*
e.g. $\frac{7}{1} = 7$ or $\frac{7}{-1} = -7$
Solution:
$n - 2$ must equal $+1$, -1, $+7$ or -7.
The possible values for n are **–5**, **1**, **3** and **9**.

33. **Hint:** *Establish the rules:*

> When raising a negative number to a power:
> *RULE 1*: *If the index is an even number, then the result is always positive.*
> *RULE 2*: *If the index is an odd number, then the result is always negative.*

Solution:
Rule 1 ⟶ $(-3)^{22} = 3^{22} > 0$
Rule 2 ⟶ $(-2)^{33} = -2^{33} < 0$
A positive number is always greater than a negative number: $\qquad 3^{22} > -2^{33}$
so $\qquad (-3)^{22} > (-2)^{33}$
(–3)^{22} is greater.

1.2

32. **Hint:** *You could start multiplying the odd numbers and checking the result against the product of the even numbers. OR Consider the property of inequalities:*

> *If $\quad a > b$ and $c > d$*
> *then $\ a \times c > b \times d$ $\qquad$ for positive whole numbers.*

Solution: The product of the odd numbers 1 to 101 involves 50 terms if you exclude 1 which has no effect in the result of multiplication.
The product of the even numbers 2 to 100 also involves 50 terms.
Comparing respective terms from both sides of the inequality:

$$1 \ \times \ \boxed{3} \ \times \ \boxed{5} \ \times \ \boxed{7} \ \times \ ... \ \times \ \boxed{101}$$
$$2 \ \times \ \boxed{4} \ \times \ \boxed{6} \ \times \ ... \ \times \ \boxed{100}$$

Then

Term	Inequality
	1
(1)	3 > 2
(2)	5 > 4
⇓	⇓
(50)	101 > 100

Using $a \times c > b \times d$:
Then $\qquad (1 \times)\ 3 \times 5 \times .... \times 101 > 2 \times 4 \times .... \times 100$
and the statement is **true**.

33. **Hint:** *A number made up of two digits AB can be expanded as $10A + B$. e.g. $84 = 10 \times 8 + 4$*
Use trial and error.
Solution: The number must be at least a double digit.
If $\qquad AB = 10A + B$ is the two-digit number
then $\qquad BA = 10B + A$ is its reverse
When 2 is added to double AB, AB is reversed:
$\quad 2(10A + B) + 2 = 10B + A \qquad$ expand
$\quad\ 20A + 2B + 2 = 10B + A \qquad$ add like terms
$\qquad\qquad\quad 19A = 8B - 2 \qquad$ solve for A
$$A = \frac{8B - 2}{19}$$
$8B - 2$ must be a multiple of 19.
By trial and error we find $B = 5$ is the only solution.
Then $A = 2$ and the smallest number which is reversed when 2 is added to its double is **25**.

1.3

32. **Hint:** *Distance travelled = Speed × Time*
$OR\ Time = \dfrac{Distance\ travelled}{Speed}$
Solution:
Time taken to travel 10 km at 60 km/h is
$\dfrac{10}{60} = \dfrac{1}{6}$ h $= \dfrac{1}{6} \times 60$ min = 10 min
Time taken to travel 10 km at 100 km/h is
$\dfrac{10}{100} = \dfrac{1}{10}$ h $= \dfrac{1}{10} \times 60$ min = 6 min
The time saved by travelling at 100 km/h is
10 min − 6 min = **4 min**
Definitely not worth the risk!

33. **Hint:** *Start with what you know. Work systematically. Use trial and error.*
Solution: Two cows in every row indicate that no numbers are in the right positions in any row.
6 is in all three guesses and in all three positions, so it can not be part of the solution.
9 can not be in positions 1 or 3, so it is in position 2.
7 can not be in positions 2 and 3, so it is in position 1.
1 can not be in positions 1 and 2, so it is in position 3.
So the answer is **791**.

1.4

32. **Hint:** *Establish the facts:*

> *For even indices, the expansion of $(-1)^n$ is always $+1$*
> *For odd indices, the expansion of $(-1)^n$ is always -1*

Solution: There are 15 even and 15 odd indices in the product giving 15 terms of $+1$ and 15 terms of -1.
The product becomes:
$$\underbrace{1 \times 1 \times ... \times 1}_{15\ times} \times \underbrace{(-1) \times (-1) \times ... \times (-1)}_{15\ times} = 1 \times (-1) = -1$$
Multiplying an odd number of (-1's) always results in -1.
The product is **–1**.

1.4 (cont.)

33. **Hint:** *Sum the brackets and then simplify.*
Solution:
$$\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{5}\right)\left(1+\frac{1}{6}\right)$$
$$=\frac{3}{2}\times\frac{4}{3}\times\frac{5}{4}\times\frac{6}{5}\times\frac{7}{6}$$
$$=\frac{7}{2}$$
$$= \mathbf{3.5}$$

1.5

32. **Hint**: *Establish the rules:*

> *RULE 1:*
> *Integer (n) × 2 = 2n is always an even number.*
> *RULE 2:*
> *Even number + Odd number = Odd number*

Use trial and error.
Solution:
A) $n + 1$ can be odd or even.
i.e. $n = 6$, $n + 1 = 7$ or $n = 5$, $n + 1 = 6$
B) $2n$ is always an even number. (RULE 1)
C) $2n + 1$ means that 1 is added to an even number so the result is always an odd number. (RULE 2)
D) $2(n + 1)$ is always an even number. (RULE 1)
For any number multiplied by 2 the result is always an even number.
E) $3(n + 1)$ can be odd or even.
i.e. $n = 1$, $3(n + 1) = 6$ or $n = 2$, $3(n + 1) = 9$
So **C** must be an odd number.

33. **Hint:** *Determine the next palindromic number.*
$$Speed = \frac{Distance\ travelled}{Time}$$
Solution: The next palindromic number must be as close as possible to 15 951.
As a result, staying with the 1 in the tens of thousands (10 001) forces us to use 6 in the thousands and tens.
The lowest possible middle digit is a 0.
Therefore the next palindromic number is 16 061.
In 2 hours the car has travelled
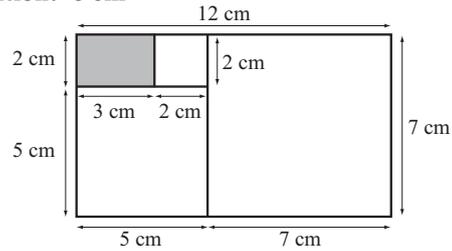16 061 − 15 951 = 110 km
Speed = Distance travelled / Time
Speed = $\frac{110}{2}$ = 55 km/h
The car's average speed is **55 km/h.**

1.6

32. **Hint:** *Knowing the unshaded blocks are squares, draw on the diagram adding in all the extra side lengths you can determine.*
Solution: 6 cm²

33. **Hint:** *Compare the number of single digit to double digit answers. What happens when you multiply by 1? Work on the lines with distinctive features.*
Solution: Having only 1 single digit answer, the multiplication table must be 5 or greater.
We know that B must be 1 because E × B = E.
Having only 1 double digit answer that starts with 1, the multiplication table must be that of 7, 8 or 9.
It can't be the 9× multiplication table because 9 × 9 = 81 and E × E = HI doesn't end in 1.
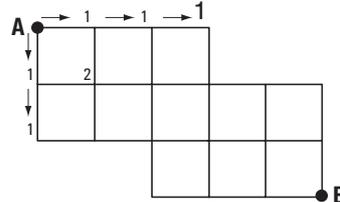It can't be the 8× multiplication table because there is an answer that ends in 1.
So it is the **7×** multiplication table.

1.7

32. **Hint:** *Look for a pattern working one intersection at a time from A. Consider the simpler problems first:*
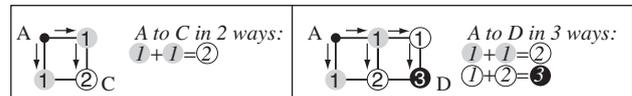

Solution: Working from A consider all the points on the grid that give only one possible path to that intersection. Mark them with 1.

Use this pattern to establish the rule for finding the number of paths from A to any intersection on the grid:
'Add the number of paths from the intersections immediately up and left.'
Apply this rule to every intersection on the grid until you reach B.
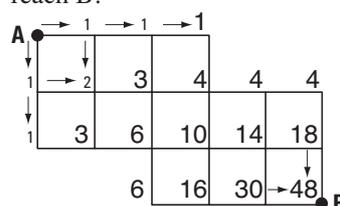
The final addition at intersection B is: 18 + 30 = 48
Movement from A to B can be done in **48** ways.