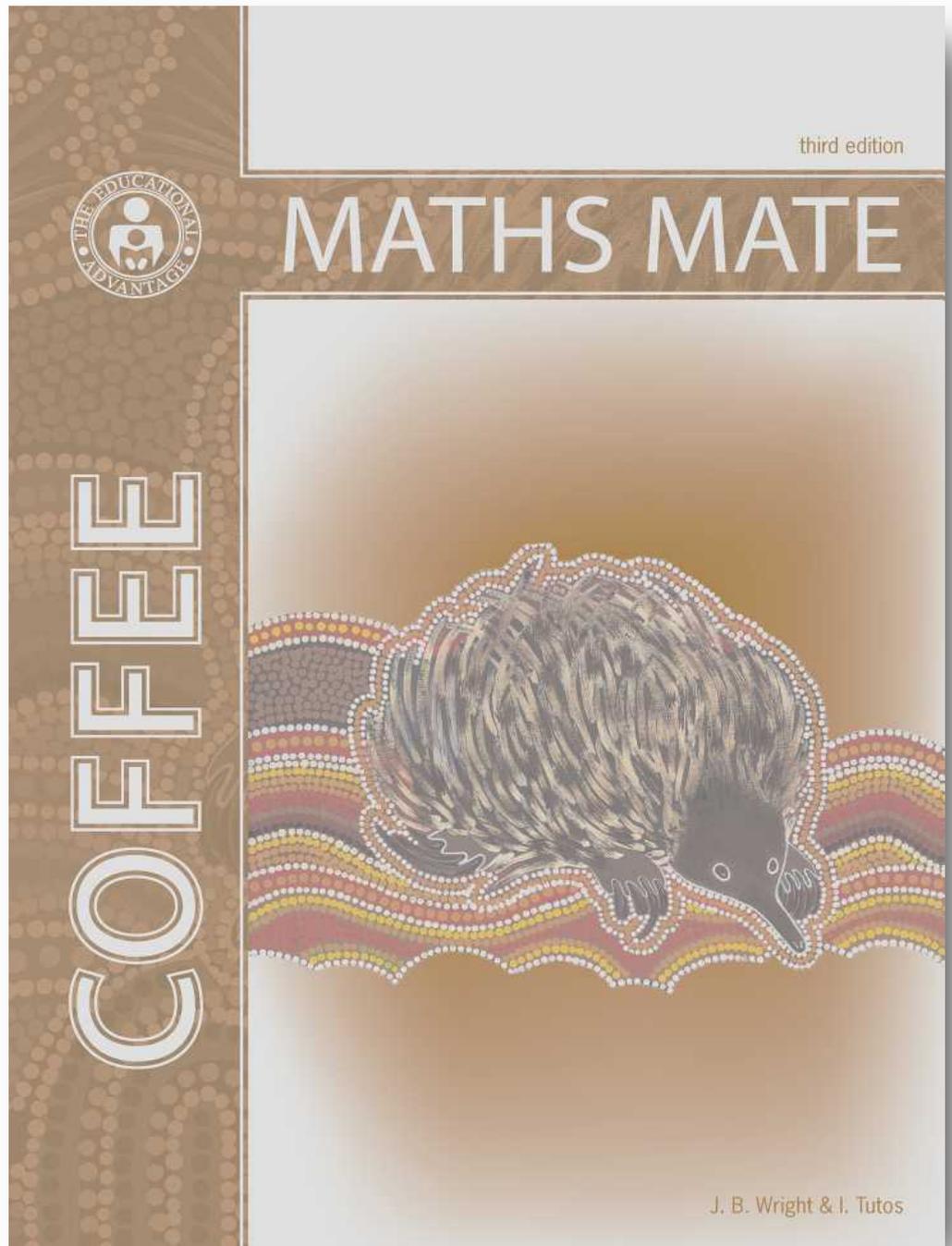


MATHS MATE

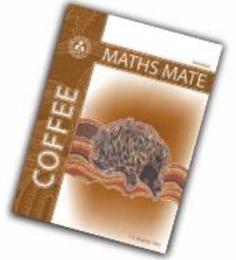


third edition



MATHS MATE

Teacher Resource Coffee (Maths Mate year 9 advanced)



- ▶ Teacher's Guide to the Use of Maths Mate
- ▶ Student Workbook Answers
- ▶ Student Workbook Short Answers
- ▶ Problem Solving Hints & Solutions
- ▶ Test Masters
- ▶ Test Answers
- ▶ Record Keeping Sheets
- ▶ **www.mathsmate.net**

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MATHS MATE



Teacher Resource



Teacher's Guide to the Use of Maths Mate

pages i - viii



Student Pad Answers

pages 3 - 72



Student Pad Short Answers

pages 1 - 8



Problem Solving Hints & Solutions

pages 1 - 16



Test Masters

pages 1 - 32



Test Answers

pages 1 - 32



Record Keeping Sheets

pages 1 - 10

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J. B. Wright & I. Tutos

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Preface

The Maths Mate Review Program is designed to be used in schools by students from years 3 to 10 (Australia) and years 4 to 11 (New Zealand). Emphasis is placed on the review and gradual development of basic skills.

It is not expected that all students will be able to complete every question from week one. Some questions have been designed to offer a real challenge. However, a major strength of the program is that students are consistently confronted with problems relating to their understanding of the same basic skill, encouraging them to see the need to master that skill in order to progress.

RECOMMENDED GRADE / YEAR LEVEL INDICATOR

	AUS 1	2	3	4	5	6	7	8	9	10	11	12
Orange Student Workbook - 2nd Ed.												
Rose Student Workbook - 2nd Ed.												
Yellow Student Workbook - 5th Ed.												
Red Student Workbook - 5th Ed.												
Blue Student Workbook - 6th Ed.												
Green Student Workbook - 6th Ed.												
Mauve Student Workbook - 6th Ed.												
Coffee Student Workbook - 3rd Ed.												
Lime Student Workbook - 6th Ed.												
Silver Student Workbook - 3rd Ed.												

NZ Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 Y10 Y11 Y12 Y13

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Maths Mate Coffee cover painting

Echidna - 2003
 Acrylic on canvas 45 x 60 cm
 by Australian artist Susan Betts - Kokata, Mirning and Wirangu.

'Echidna' was purchased by The Educational Advantage who have been kindly given permission to reproduce the painting. This contemporary Aboriginal artwork combines traditional and modern techniques. Susan's rich and vibrant art reflects the Australian landscape and wildlife, both flora and fauna.

PREFACE

The Author

Joseph Wright has taught in a number of schools throughout Australia and also in the United States of America. His experiences led him to the firm belief that there was a real need for a Mathematics program which was based on a constant review of the basic skills which students acquire. The Maths Mate Program was designed to meet that need.

Acknowledgements

“The completion of this project was made possible by the hard work and inspiration of Joanna Tutos, Lou McKenna and Julie Moyle. Thanks to John and Wilma McCormack and the many colleagues and friends who contribute to the overall program. Special thanks to my wife Trish and our children, Peter, David, Rebecca, Paul and Anthony for their investment of time, energy, encouragement and faith.”



Preface

The Maths Mate Program has been designed to be used in schools by students from Years 3 to 10 (Australia) and Years 4 to 11 (New Zealand). Emphasis is placed on the review and gradual development of basic skills so that students keep their skills up to date and teachers need to spend less class time on revision when starting new or subsequent topics.

The program is designed to have students complete eight worksheets each term. It is not expected that all students will be able to complete every question from week one. Some questions have been designed to offer a real challenge. However, a major strength of the program is that students are consistently confronted with problems dealing with their understanding of the same basic skills, encouraging them to see the need to master those skills in order to progress.

Maths Mate is a very comprehensive program which is not only structured to help students see a logical progression in their work but also to make life easier for teachers. Easy to use record keeping sheets have been provided on the Teacher Resource PDF. The tests, which are given twice a term, provide a very good indication of individual student strengths and weaknesses and this information can also be very valuable for addressing specific problems as well as assessing progress.

Aims of the Maths Mate Program

- Provide students with regular work that helps maintain and develop skills acquired throughout the year.
- Present a structured approach so that students can see their development in specific skill areas.
- Encourage students to take responsibility for their own learning.
- Provide a challenging level of work for all students.
- Encourage parental involvement in the learning process.
- Assist teachers in the diagnosis of student strengths and weaknesses.
- Provide teachers with a concrete method of assessing students' effort and progress on a regular basis.
- Provide a consistent review program which ensures students are regularly being exposed to the Mathematical skills appropriate to their ability level.

A Teacher's Guide to the successful Implementation of the
MATHS MATE PROGRAM

The Maths Mate Program offers many valuable benefits, including the aspects of parental involvement, systemised revision, individual and group diagnostics, enhanced professional standing for teachers, and most importantly, improved efficiency in student learning. However, a number of these factors may be negated or even lost if an individual teacher or school does not effectively implement the program. The Maths Mate Program was designed with an awareness of the increasing time demands placed on classroom teachers by ever-changing curriculum development and more involved assessment and reporting procedures. Maths Mate is a dynamic tool for classroom teachers designed to effectively improve student outcomes in Mathematics, to report accurately on these and to do so within a manageable time frame.

This guide was written to assist with the implementation of Maths Mate. This first page sets out the planning and preparation required by the Head of Mathematics and/or Maths Mate Coordinator, where one is appointed, before beginning the program. The following pages are a guide for classroom teachers using the program.

SUGGESTIONS FOR PREPARATION AND ORGANISATION:

Make sure parents are given advanced notice of the implementation of the Program. This might include an introduction at Parent Information meetings at the end of the year in preparation for the next.

At the start of the new school year a letter should be sent home to parents (see PDF ~ Teacher's Guide to the use of Maths Mate, or the editable word.doc, or www.mathsmate.co.nz ~ Downloads). Parental involvement should be encouraged. Their checking to see that work is completed weekly, and their signing of each sheet, should be stressed as important to the program's success. (A follow up reminder later in the year should also be considered.)

If you are fortunate enough to have audio visual screens in your classrooms, you might consider showing the answers from the Student Workbook Answers PDF files.

Thoroughly brief teachers on the use and advantages to them of the Maths Mate Program. Greater commitment will be given by all teachers if they are aware of the goals underlying the program and have a thorough understanding of the most efficient ways of implementation.

Give a demonstration of marking and recording procedures. The pages that follow may be of assistance here.

Important: If the school has purchased the student workbooks for the students, you may be able to organise the separation of the workbooks (see page iv) prior to the start of the year, perhaps even at the end of the current year.

Reminder: The Teacher Resource PDF will be replaced free of charge when a class set of a revised edition is purchased.



It is often possible for The Educational Advantage to send a representative of the Maths Mate Program to visit your school. Should you consider this assistance advantageous, please contact us to arrange a visit.

Phone: 03 9899 9065 (Australia)

Email: info@mathsmate.net

Phone: 07 929 4063 (New Zealand)

Email: info@mathsmate.co.nz

A Teacher's Guide to the Use of the
MATHS MATE PROGRAM

The effective use of Maths Mate requires some good house-keeping on the part of teachers involved.

STARTING THE YEAR:

Each student will receive a Maths Mate Student Workbook appropriate to his or her level. This workbook will contain 32 worksheets of increasing difficulty. (Having 8 worksheets per term allows some flexibility to schools.)

Collect the workbooks from the students on the first day of the year. Use a class list to be sure that any student who has not yet obtained a copy is identified.

Organise for the pages of the student workbooks to be separated so that class sets of each worksheet can be placed in manila folders or plastic pockets for distribution to students on a weekly basis. (The help of teacher assistants, students or a parent support group may be useful here.) This avoids problems with a student losing a workbook and having trouble completing Maths Mate work for the remainder of the year. The covers can be used as a colourful divider to mark a section for Maths Mate work should the students be using a binder.

At the start of the year, brief your class on the advantages of the program. 'Sell' them the gains they can make with its effective use. Emphasise that, because of the nature of human memory, this program with its systematic, cyclic revision allows for maximum 'absorption' of learned procedures and for the strong reinforcement of important skills. These skills are a necessary prerequisite to problem-solving. Also explain that this is one of their responsibilities in the 'Teaching-Learning Process' and that as they progress further through the educational system, they will need to accept greater personal responsibility for their own learning.

Ensure that you take the time to fully explain the use of the program, how it will be marked, the recording process of results.

See that each child receives a letter to parents informing them of the Maths Mate Program. Stress the parental involvement and the need for signatures on each sheet and see that you collect all the return slips for your class.

When submitting work, students might be asked to attach a separate sheet showing appropriate steps in their working. If the question can be answered in a single step, there is little to be gained from asking students to copy the question. If an intermediate step is required to obtain the answer, the student should set the question out appropriately. Such questions are marked with an asterisk ' * ' to indicate to students that working is expected to be shown.

Emphasise that all problems on the worksheets and test sheets are designed to be attempted without the aid of a calculator. Students are unlikely to become confident Mathematicians if they do not have a reasonable background of basic skills.

It is important to explain your expectations to the class. Naturally these will be relative to their level of mathematical ability. Some class members may be expected to attempt all questions including the problems at the end whereas others may only be expected to complete the sheets in part (but encouraged to go further when possible).

Also explain that the material covered in each worksheet may not necessarily reflect the work being undertaken in class at the time. The work covered by the Maths Mate Program should, with minor exceptions, be revision of work introduced in previous years of study. The exceptions will depend to some degree on the background of your students.

STARTING EACH TERM:

At the start of every term give each student a new *Worksheet Results* sheet located at the beginning of each term in the Student Workbook. Explain the importance of the upkeep of this document and how it may be used to identify which skills they have acquired and which skills they still need to learn and practise. Providing a new sheet each term gives you a chance to further encourage students to make a fresh start and to set new goals for the term.

A hard copy of this profile sheet is best kept by the class teacher and handed back to the students every week for them to update during the correction process. Extra copies can be made for those students who would like to have a copy of their own to show their parents (see PDF ~ Record Keeping Sheets, pages 1 to 4, or www.mathsmate.co.nz ~ Downloads).

SUGGESTIONS FOR PREPARATION AND ORGANISATION:

Get the students into a routine early. Assign the Maths Mate worksheet at the same time each week and have it returned on the same day the following week.

On the date worksheets are due, the teacher and students correct answers together in class. When marking, have students correct their own work by reading the answers to them or use an overhead screen. Having students correct their own work is less about saving the teacher's time for more important work, but more about building the process of developing in students responsibility for their own learning. It also means that students end up with a much clearer idea of the areas in which they need to concentrate their efforts.

When giving the answers, avoid pausing to discuss the answers at this stage. By using the numbered squares at the base of the worksheets to record correct responses, the time taken to transfer results to the *Worksheet Results* sheet can be minimised (see Fig. 1). The squares at the base of each worksheet can be rotated and aligned with those on the *Worksheet Results* sheet to enable a quick transfer of the correct responses.

Should there be need for explanation of one or more answers or perhaps how a problem was solved, you can decide on the relative worth to the class and commit appropriate time on that basis. After the correction has been completed, it can be valuable to spend time on a problem that has clearly attracted the class's attention while they are focused on it and their interest is high. On the other hand, care needs to be taken to ensure extended periods of time are not spent catering to individual needs with the bulk of the class waiting.

Remember to check the *Problem Solving Hints & Solutions* (see PDF ~ Problem Solving Hints & Solutions, pages 1 to 16). They supply teachers with ready answers to the more challenging problem solving questions found at the end of each Maths Mate worksheet. They also contain helpful hints for developing students' problem solving skills.

Have the students fill in their *Worksheet Results* sheets.

MATHS MATE		Name: <i>Tim Winkels</i>
		Class: <i>9B</i>
Worksheet Results		Teacher: <i>Ms Bourke</i>
Term: _____		
	Sheet 1	Sheet 2
	Sheet 3	Sheet 4
	Sheet 5	Sheet 6
	Sheet 7	Sheet 8
	Sheet 9	Sheet 10
	Sheet 11	Sheet 12
	Sheet 13	Sheet 14
	Sheet 15	Sheet 16
	Sheet 17	Sheet 18
	Sheet 19	Sheet 20
	Sheet 21	Sheet 22
	Sheet 23	Sheet 24
	Sheet 25	Sheet 26
	Sheet 27	Sheet 28
	Sheet 29	Sheet 30
	Sheet 31	Sheet 32
	Sheet 33	Sheet 34
	Sheet 35	Sheet 36
	Sheet 37	Sheet 38
	Sheet 39	Sheet 40
	Sheet 41	Sheet 42
	Sheet 43	Sheet 44
	Sheet 45	Sheet 46
	Sheet 47	Sheet 48
	Sheet 49	Sheet 50
	Sheet 51	Sheet 52
	Sheet 53	Sheet 54
	Sheet 55	Sheet 56
	Sheet 57	Sheet 58
	Sheet 59	Sheet 60
	Sheet 61	Sheet 62
	Sheet 63	Sheet 64
	Sheet 65	Sheet 66
	Sheet 67	Sheet 68
	Sheet 69	Sheet 70
	Sheet 71	Sheet 72
	Sheet 73	Sheet 74
	Sheet 75	Sheet 76
	Sheet 77	Sheet 78
	Sheet 79	Sheet 80
	Sheet 81	Sheet 82
	Sheet 83	Sheet 84
	Sheet 85	Sheet 86
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	Sheet 89	Sheet 90
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	Sheet 99	Sheet 100
	Sheet 101	Sheet 102
	Sheet 103	Sheet 104
	Sheet 105	Sheet 106
	Sheet 107	Sheet 108
	Sheet 109	Sheet 110
	Sheet 111	Sheet 112
	Sheet 113	Sheet 114
	Sheet 115	Sheet 116
	Sheet 117	Sheet 118
	Sheet 119	Sheet 120
	Sheet 121	Sheet 122
	Sheet 123	Sheet 124
	Sheet 125	Sheet 126
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	Sheet 603	Sheet 604
	Sheet 605	Sheet 606
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	Sheet 631	Sheet 632
	Sheet 633	Sheet 634
	Sheet 635	Sheet 636
	Sheet 637	Sheet 638
	Sheet 639	Sheet 640
	Sheet 641	Sheet 642
	Sheet 643	Sheet 644
	Sheet 645	Sheet 646
	Sheet 647	Sheet 648
	Sheet 649	Sheet 650
	Sheet 651	Sheet 652
	Sheet 653	Sheet 654
	Sheet 655	Sheet 656
	Sheet 657	Sheet 658
	Sheet 659	Sheet 660
	Sheet 661	Sheet 662
	Sheet 663	Sheet 664



Class: 9B

Teacher: Ms Bourke

Worksheet Number	Student Name	Score	Weeks										
			1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8			
1	ASHTON Darcy	15 ✓											
2	BAKER Stobhan	28 × L											
3	BOURKE Louise	26 ✓											
4	CROSS Chris	14 ✓											
5	DWYER Jim	31 ×											
6	FIORE Ella	22 ✓											
7	FREEMAN Warren	17 ✓											
8	HAHN Kim	21 ✓											
9	HU Joanna	26 ✓											
10	JILBERT Luke	19 × L											
11	KEUNEMAN John	22 ✓											
12	McKENNA Joseph	18 ✓											
13	MOYLE Brendan	24 ✓											
14	MOYLE Emily	27 ✓											
15	NESBIT Peter	32 ✓											
16	RYAN Jacinta	21 × L											
17	RYAN Madeline	19 ✓											
18	SETON Elizabeth	24 ×											
19	TUTOS Alexander	22 ✓											
20	WINKELS Tim	19 ×											
21	WRIGHT Anthony	28 ✓											
22	WRIGHT Paul	20 ✓											
23	YEO Tania	27 ✓											
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													

✓ - Signed by parent L - Work handed in late × - Not signed by parent

Understand that any question on the Maths Mate worksheets is part of a set of four similar questions in the term. For example, consider sheets 1, 2, 3 and 4 in MM Coffee (year 9) term 1. Question 12 on each sheet is similar in design, content and degree of difficulty. This grouping of question style is also true for the next set of four worksheets and so on. Thus the Maths Mate tests (see PDF ~ Test Masters, pages 1 to 32) also reflect this grouping of question style and substance.

Collect the students' Maths Mate worksheets and attached working, the Worksheet Results sheets.

Enter Maths Mate results onto your Worksheet Record, see Fig. 2 (see also PDF ~ Record Keeping Sheets, pages 7 to 10, or www.mathsmate.co.nz ~ Downloads). Firstly, a record of the total number of correct answers for each week can be written. The presence of a parent's signature may also be noted to monitor whether work was attempted by the student at home. Late work can also be noted. This system is explained at the base of the Worksheet Record sheet.

It is important that students are encouraged to complete every Maths Mate worksheet to maintain the effectiveness of the program.

Fig. 2 - Sample Worksheet Record sheet

AFTER EVERY FOUR WORKSHEETS:

Tests are given twice a term. These tests take the same format as the worksheets and are based on the previous four worksheets. A and B tests are provided to allow alternate students to have a different test, thereby ensuring scores accurately reflect the student's own work. (The two tests can be distinguished by their label at the base of the second page, e.g. Coffee~Test 3A and Coffee~Test 3B.) The tests serve a number of purposes. They give the teacher a more accurate indication of the student's abilities in conditions where the child does not have the assistance of a parent or tutor. They also help to motivate students to correct their work accurately and increase their desire to learn the required skills. Without the tests, students may become comfortable with seeking assistance to achieve high scores, unaware of the importance of fully understanding their work.

It is at this point that teachers record accurately how students are performing in each area of skill. A *Test Results* sheet is provided (see PDF ~ Record Keeping Sheets, page 5, or www.mathsmate.co.nz ~ Downloads). It is expected that one of these forms be completed for each student in the class when recording test results. Again, the numbering system at the bottom of each page helps speed up this process. When administering the tests, it is advisable to have an assignment of some form or worksheet available for students to begin as soon as they complete the test, which may only take 30 minutes for an able student.

TOPIC - TO - TOPIC:

A periodic check of the Test Results sheets will assist you in evaluating individual or possible class areas of concern. You can then plan appropriate *Skill Builder* work or advise individual students of concerns (perhaps as a guide to tutoring). It will also give you a valuable indication of the background skills students have before beginning a new topic, allowing you to tailor your lessons appropriately. In fact you are saved from having to pre-test students before each topic. This will result in a considerable saving of class time.

END OF SEMESTER:

Combined, the Worksheet Results sheet, the Test Results sheet and the Worksheet Record sheet become invaluable for writing reports and for preparing for parent / teacher interviews. They give a good indication to parents, not only of the child's skills but also of the consistency of their effort and the degree of responsibility they have assumed for their learning. At the end of the year, particularly when moving into a level where streaming occurs or into senior Mathematics classes, these records allow clear comparisons of students to be made across class groups.

MERIT CERTIFICATES:

Merit Certificates can be used to encourage and reward selected students for consistent work, outstanding results or best of all, for significant improvement. A master Merit Certificate can be found on the Teacher Resource PDF and can be printed and presented to students at the teacher's discretion.



We are confident you will find the Maths Mate Program a valuable asset to your teaching. We thank all those teachers who have provided feedback on this program and we value further comments and suggestions. Please direct all correspondence to:

Joe Wright
The Educational Advantage Pty Ltd
Building 5 / 29 Clarice Road
Box Hill South VIC 3128
AUSTRALIA
Phone: 613 9899 9065
Email: info@mathsmate.net
Website: www.mathsmate.net

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

Dear Parents,

This year, as part of their Mathematics program, all Year 9 students will be given a Maths Mate worksheet on a regular basis. There will be 8 worksheets to be completed each term, generally one per week, the exceptions being short or disrupted weeks.

The Maths Mate worksheets have been designed to allow students to attempt all questions without the aid of a calculator, and this should be encouraged at home.

Don't be too concerned if your child finds the initial worksheet difficult. It is not expected that students will be able to complete every question from week one; in fact Q33 has been included to offer a real challenge to all students. Each worksheet is built around a common framework of questions aimed at covering the current Mathematics Curriculum.

While there is room on the worksheet for the recording of answers, this is only intended as a summary of the student's work. An asterisk ' * ' has been used to indicate those questions where each student has been asked to show his or her working. In these cases the detail normally expected in Mathematics should be included, with all steps in the development of answers clearly shown. This working should be attached to the worksheet and submitted with it.

Corresponding questions on each worksheet cover the same skill area, that is, Q1 always tests long multiplication or division, Q2, addition or subtraction of decimals, and so on, with the questions within each category becoming progressively more difficult from week to week.

Students will be confronted by the same type of question on a regular basis. The diagnostic nature of the worksheets will help students and teachers to identify areas of strength and weakness. This should also help to motivate students to make another attempt at mastering skills that they may have found too difficult in the past. As well, the results sheet, if completed accurately, will allow students to enjoy monitoring their own improvement.

It would be appreciated if you would complete the tear off slip at the bottom of this page so that we can be sure that you are aware of our expectations. We ask also that you sign the completed worksheet each week to acknowledge that your child is working independently and regularly but with your support.

We thank you in anticipation of your involvement and remind you that you are encouraged to call and discuss your child's progress at any time.

Yours sincerely,

Class Teacher

Principal

Maths Mate Program - Return Slip

Student's Name: Class:

As a parent / guardian I have signed this form to indicate that I am aware of the Maths Mate requirements expected of my child.

Parent's Signature: Date:

Dear Parents,

This year, as part of their Mathematics program, all Year 5/6 students will be given a Maths Mate worksheet on a regular basis. There will be 8 worksheets to be completed each term, generally one per week, the exceptions being short or disrupted weeks.

The Maths Mate worksheets have been designed to allow students to attempt all questions without the aid of a calculator, and this should be encouraged at home.

Don't be too concerned if your child finds the initial worksheet difficult. It is not expected that students will be able to complete every question from week one; in fact Q24 has been included to offer a real challenge to all students. Each worksheet is built around a common framework of questions aimed at covering the current Mathematics Curriculum.

While there is room on the worksheet for the recording of answers, this is only intended as a summary of the student's work. An asterisk ' * ' has been used to indicate those questions where each student has been asked to show his or her working. In these cases the detail normally expected in Mathematics should be included, with all steps in the development of answers clearly shown. This working should be attached to the worksheet and submitted with it.

Corresponding questions on each worksheet cover the same skill area; that is, Q1 always tests adding whole numbers to 10, Q2, subtracting whole numbers to 10, and so on with the questions within each category becoming progressively more difficult from week to week.

Students will be confronted by the same type of question on a regular basis. The diagnostic nature of the worksheets will help students and teachers to identify areas of strength and weakness. This should also help to motivate students to make another attempt at mastering skills that they may have found too difficult in the past. As well, the results sheet, if completed accurately, will allow students to enjoy monitoring their own improvement.

If your child is having difficulty with a certain skill, Skill Builders are available to students, teachers and parents from the Maths Mate websites www.mathsmate.net and www.mathsmate.co.nz. The Skill Builders also contain a Glossary of important facts and reference material that will provide students with instant help.

It would be appreciated if you would complete the tear off slip at the bottom of this page so that we can be sure that you are aware of our expectations. We ask also that you sign the completed worksheet each week to acknowledge that your child is working independently and regularly but with your support.

We thank you in anticipation of your involvement and remind you that you are encouraged to call and discuss your child's progress at any time.

Yours sincerely,

Class Teacher

Principal



Maths Mate Program - Return Slip

Student's Name: Class:

As a parent / guardian I have signed this form to indicate that I am aware of the Maths Mate requirements expected of my child.

Parent's Signature: Date:

MATHS MATE



Teacher Resource



Teacher's Guide to the Use of Maths Mate

pages i - viii



Student Pad Answers

pages 3 - 72



Student Pad Short Answers

pages 1 - 8



Problem Solving Hints & Solutions

pages 1 - 16



Test Masters

pages 1 - 32



Test Answers

pages 1 - 32



Record Keeping Sheets

pages 1 - 6



Name:

Due Date: / /

Parent's Signature:

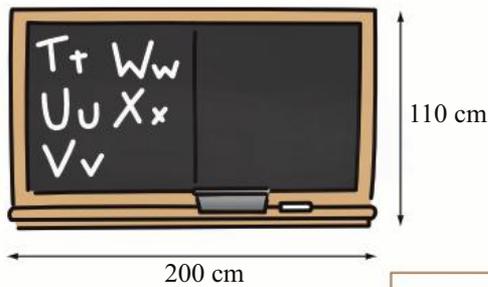
1. [Long \times, \div] *
 $15 \times 35 =$ 525
2. [Decimal $+, -$]
 $6.25 + 9.45 =$ 15.7
3. [Decimal \times, \div]
 $5.7 \times 100 =$ 570
4. [Fraction $+, -$]
 $\frac{1}{9} + \frac{4}{9} =$ $\frac{5}{9}$
5. [Fraction \times, \div]
 $\frac{3}{5} \times \frac{10}{7} =$ $\frac{6}{7}$
6. [Percentages] *
20% of 320 = 64
7. [Integer $+, -$]
 $(-5) - (+7) =$ -12
8. [Integer \times, \div]
 $(-2) \times (+6) =$ -12
9. [Rates / Ratios] *
The fastest aircraft in the world is the X-15 rocket plane, with a climbing rate of 18000 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 $\sqrt{\frac{4}{25}}$ $\frac{2}{5}$
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] *

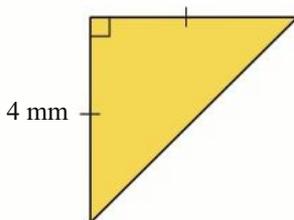
Find the perimeter of the blackboard.



620 cm

24. [Area] *

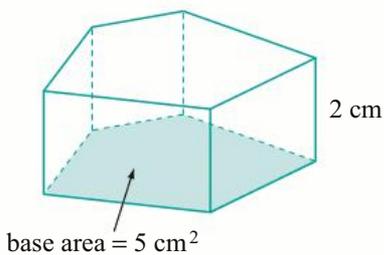
Find the area of the triangle.



8 mm²

25. [Volume] *

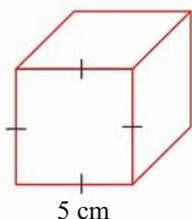
Find the volume of the prism.



10 cm³

26. [Surface Area] *

Find the total surface area of the cube.



150 cm²

27. [Pythagoras / Trigonometry]

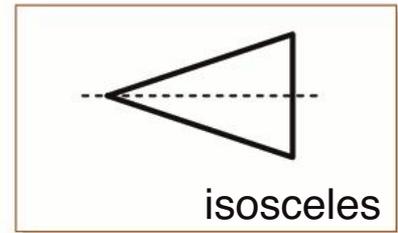
Find the positive solution for x :

$$x^2 = 81$$

9

28. [Shape / Location]

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



isosceles

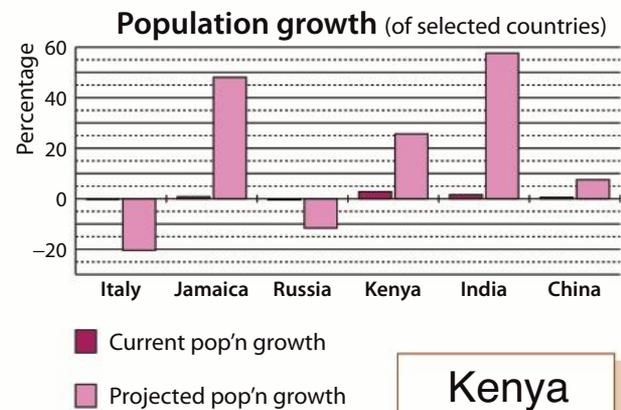
29. [Angles]

What is the supplement of 123°?

57°

30. [Statistics]

Which country has the highest current population growth?



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 $(-2)^{33}$?

$(-3)^{22}$



Name:

Due Date: / /

Parent's Signature:

1. [Long \times, \div]
 $234 \div 9 =$

26

2. [Decimal $+, -$]
 $4.38 + 0.9 =$

5.28

3. [Decimal \times, \div]
 $32 \div 1000 =$

0.032

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

$\frac{2}{3}$

5. [Fraction \times, \div] *
 $\frac{2}{3} \div \frac{4}{5} =$

$\frac{5}{6}$

6. [Percentages] *
 25% of 180 =

45

7. [Integer $+, -$]
 $(+9) - (+1) =$

8

8. [Integer \times, \div]
 $(+8) \times (+2) =$

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.

$\frac{1}{400}$

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

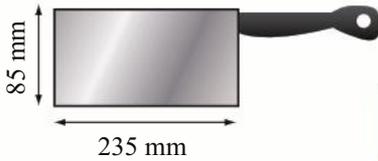
21. [Graphs & Functions]
 Complete the table for the rule $y = -x + 1$

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?

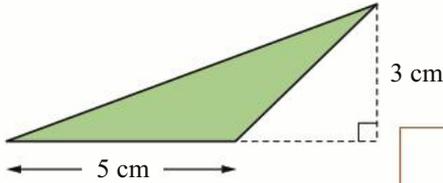
57 months

23. [Perimeter] *
Find the perimeter of the meat cleaver blade.



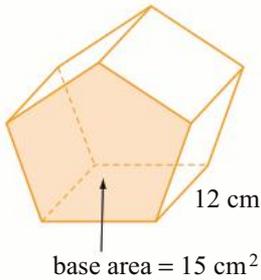
640 mm

24. [Area] *
Find the area of the shaded triangle.



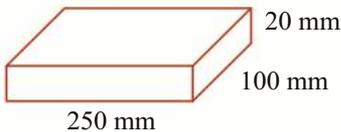
7.5 cm²

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



180 cm³

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

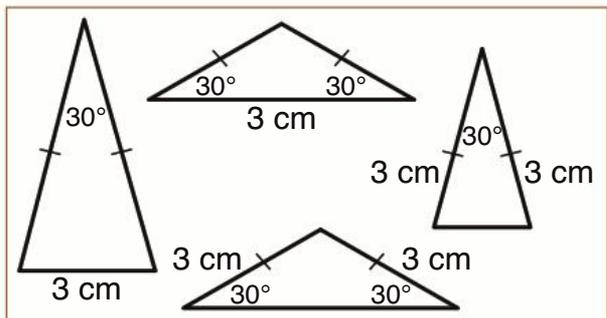


64 000 mm²

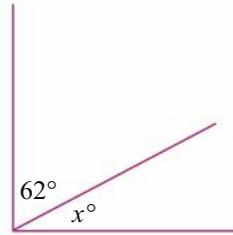
27. [Pythagoras / Trigonometry] *
Find the positive solution for c :
 $c^2 = 0.6^2 + 0.8^2$

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.]

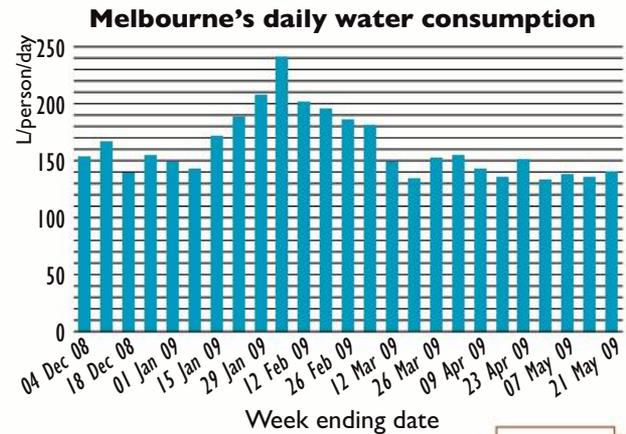


29. [Angles] *
Find the value of x° .



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?



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] *
 $1 \times 3 \times \dots \times 101 > 2 \times 4 \times \dots \times 100$
True or false?

true

33. [Problem Solving 2] *
What is the smallest number which is reversed when 2 is added to its double?

25



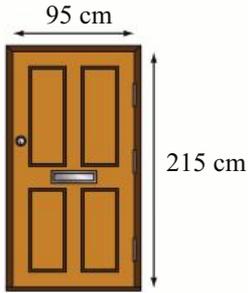
Name:

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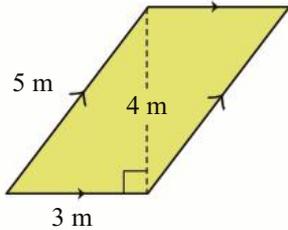
1. [Long \times , \div]
 $438 \div 6 =$ 73
2. [Decimal $+$, $-$]
 $6.7 - 2.8 =$ 3.9
3. [Decimal \times , \div]
 $0.8 \div 100 =$ 0.008
4. [Fraction $+$, $-$] *
 $\frac{3}{4} + \frac{1}{4} =$ 1
5. [Fraction \times , \div]
 $\frac{1}{6} \times \frac{6}{7} =$ $\frac{1}{7}$
6. [Percentages] *
 15% of 480 = 72
7. [Integer $+$, $-$]
 $(-9) + (-3) =$ -12
8. [Integer \times , \div]
 $(-12) \div (-3) =$ 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 $\frac{5^5}{5^2}$ 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.
 $\frac{3}{50}$
14. [Scientific Notation]
 Express 4.005×10^2 as a basic numeral.
400.5
15. [Number Patterns]
 Complete the pattern:
 $\frac{1}{5}, 1, 5, 25,$ 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 :
 $\frac{2x + 1}{3} = 5$ 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

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



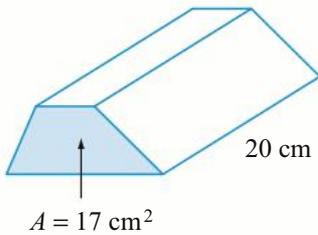
620 cm

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



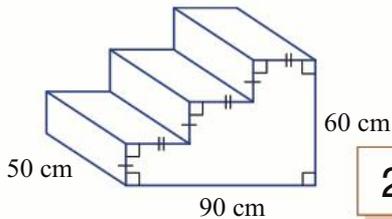
12 m²

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



340 cm³

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

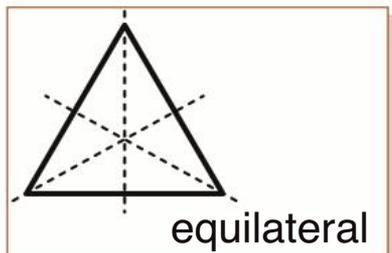


22 200 cm²

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

6

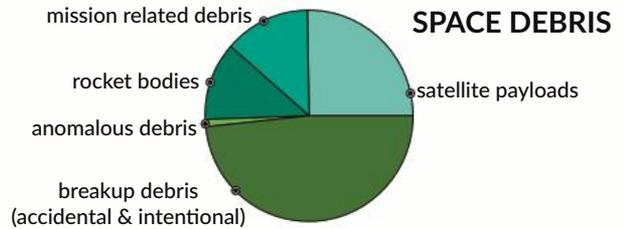
28. [Shape / Location]
Draw a triangle that has three axes of symmetry. What type of triangle have you drawn?



29. [Angles]
State whether the following angles are supplementary (S) or complementary (C):
 $65^\circ, 25^\circ$.

C

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



satellite payloads

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

Pr = $\frac{1}{1000}$ A — 1 once in a blue moon
 Pr = $\frac{1}{2}$ B — 2 in the box seat
 Pr = 0 C — 3 even chance
 Pr = $\frac{3}{4}$ 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



Name:

Due Date: / /

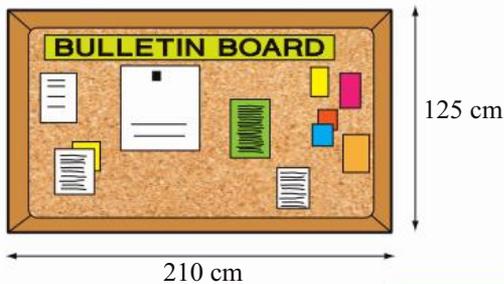
Parent's Signature:

1. [Long \times , \div]
 $170 \div 5 =$ 34
2. [Decimal $+$, $-$]
 $4.2 - 3.9 =$ 0.3
3. [Decimal \times , \div]
 $1000 \times 0.02 =$ 20
4. [Fraction $+$, $-$] *
 $\frac{19}{13} - \frac{6}{13} =$ 1
5. [Fraction \times , \div] *
 $\frac{5}{4} \div \frac{3}{8} =$ $3\frac{1}{3}$
6. [Percentages] *
 5% of \$15.00 = \$ 0.75
7. [Integer $+$, $-$]
 $(-1) - (+9) =$ -10
8. [Integer \times , \div]
 $(-9) \div (+3) =$ -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 $\frac{2^{14}}{2^{10}}$ 16
11. [Square Roots / Surds]
 Evaluate $\sqrt{\frac{64}{25}}$ $1\frac{3}{5}$
12. [Order of Operations] *
 $3 \times 5 - (18 \div 3) =$ 9
13. [Exploring Number]
 Write $\frac{12.5}{10}$ 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 $y = \frac{2x+1}{3}$, 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

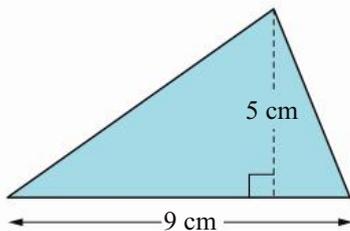
QUOTE OF THE WEEK: Time flies like an arrow; fruit flies like a banana. Groucho Marx

23. [Perimeter] *
Find the perimeter of the bulletin board.



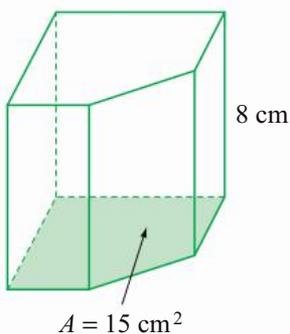
670 cm

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



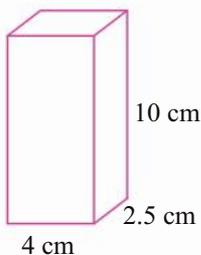
22.5 cm²

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



120 cm³

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

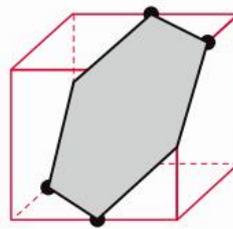


150 cm²

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?

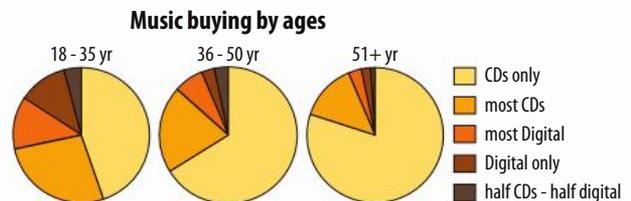


hexagon

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?



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:
 $(-1)^1 \times (-1)^2 \times (-1)^3 \times \dots \times (-1)^{30}$

-1

33. [Problem Solving 2] *
Find the value of the product:
 $(1 + \frac{1}{2})(1 + \frac{1}{3})(1 + \frac{1}{4})(1 + \frac{1}{5})(1 + \frac{1}{6})$

3.5



Name:

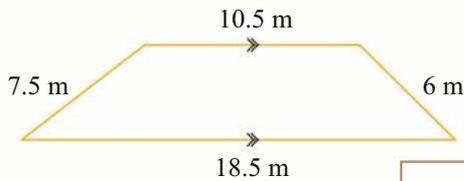
Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $84 \times 13 =$ 1092
2. [Decimal $+, -$]
 $2.0 - 0.5 =$ 1.5
3. [Decimal \times, \div]
 $146 \times 0.01 =$ 1.46
4. [Fraction $+, -$]
 $3\frac{2}{5} - \frac{1}{5} =$ $3\frac{1}{5}$
5. [Fraction \times, \div] *
 $\frac{3}{2} \times \frac{8}{4} =$ 3
6. [Percentages] *
75% of 1 litre = 750 millilitres
7. [Integer $+, -$]
 $(+2) - (+7) =$ -5
8. [Integer \times, \div]
 $(+10) \times (+4) =$ 40
9. [Rates / Ratios] *
A car with a 2 L engine has a consumption of 4.6 litres of diesel per 100 kilometres. How many litres of diesel are needed for a 350 km trip?
16.1 L
10. [Indices]
Simplify $\frac{4s^3}{2s^3}$ 2
11. [Square Roots / Surds] *
Evaluate $\sqrt{1.96}$ 1.4
12. [Order of Operations] *
 $(2 + 2)^2 \times 2 =$ 32
13. [Exploring Number] *
Place in ascending order:
 $\frac{1}{3}, 0.3, 3\%$ $3\%, 0.3, \frac{1}{3}$
14. [Scientific Notation]
Round 100.6 correct to the nearest whole number. 101
15. [Number Patterns]
Complete the pattern:
3, 4, 7, 12, 19, 28, 39
16. [Expressions]
Simplify
 $2z - 5 + z + 8$ $3z + 3$
17. [Substitution] *
If $y = (x + 2)(x + 3)$, find the value of y when $x = 0$ 6
18. [Expansion]
Expand $2k(k + 2)$ $2k^2 + 4k$
19. [Factorisation]
Factorise $6x^2 + 9x + 15xy$
 $3x(2x + 3 + 5y)$
20. [Equations] *
Solve for x :
 $\frac{x}{5} - 1 = 4$ 25
21. [Graphs & Functions]
Complete the table of values for the rule $y = 2x + 5$

x	-3	-2	-1	0	1	2	3
y	-1	1	3	5	7	9	11
22. [Units of Measurement / Time]
Complete the statement:
 $2\frac{1}{2}$ years = 30 months

23. [Perimeter] *
Find the perimeter of the trapezium.

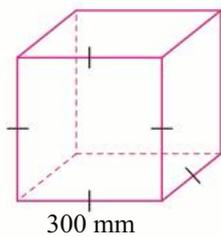


42.5 m

24. [Area] *
What is the area of a square whose perimeter is 20 cm?

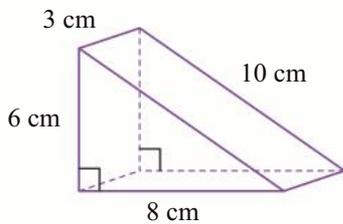
25 cm²

25. [Volume] *
Find, in cm³, the volume of the cube.



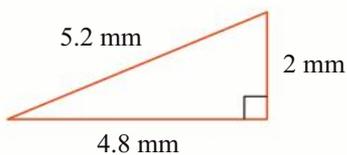
27 000 cm³

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



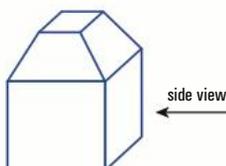
120 cm²

27. [Pythagoras / Trigonometry]
What is the length of the hypotenuse of the triangle?

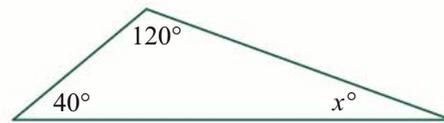


5.2 mm

28. [Shape / Location]
Draw the side view of the solid.



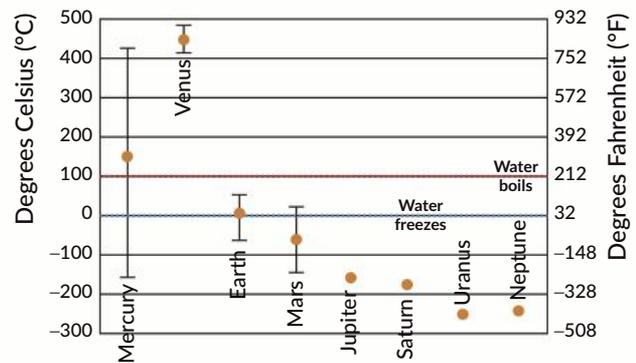
29. [Angles] *
Find the value of x° .



20°

30. [Statistics]
On which planet would it be possible to experience temperatures of 850°F?

Atmospheric temperatures of the planets - range/average



Venus

31. [Probability] *
A 52 card deck of playing cards is shuffled, and one card is dealt from the top of the deck. Determine the probability that it is an ace.



$\frac{1}{13}$

32. [Problem Solving 1] *
If n is a whole number, which of the following must be an odd number?

- A) $n + 1$
- B) $2n$
- C) $2n + 1$
- D) $2(n + 1)$
- E) $3(n + 1)$

C

33. [Problem Solving 2] *
A car's odometer displays 15 951 km. This is a palindromic number - it reads the same backwards and forwards. Two hours later the meter shows the next palindromic number. What was the car's average speed for those two hours?

55 km/h



Name:

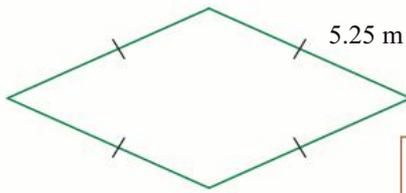
Due Date: / /

Parent's Signature:

1. [Long \times , \div]
 $621 \div 9 =$ 69
2. [Decimal $+$, $-$]
 $7.82 - 3.65 =$ 4.17
3. [Decimal \times , \div]
 $48 \times 0.1 =$ 4.8
4. [Fraction $+$, $-$] *
 $1\frac{1}{8} + 2\frac{3}{8} =$ $3\frac{1}{2}$
5. [Fraction \times , \div] *
 $\frac{6}{5} \div \frac{2}{9} =$ $5\frac{2}{5}$
6. [Percentages] *
 $66\frac{2}{3}\%$ of 1 hour = 40 minutes
7. [Integer $+$, $-$]
 $(-1) - (-5) =$ 4
8. [Integer \times , \div]
 $(-20) \div (-4) =$ 5
9. [Rates / Ratios] *
One of the busiest airports in the world is in Atlanta (Georgia, USA). It has averaged 1.75 million passengers per week. At this rate what is the average number of people using the airport each day?
250 000
10. [Indices]
Simplify $7b \times b^5$ $7b^6$
11. [Square Roots / Surds] *
Evaluate $\sqrt{2\frac{7}{9}}$ $1\frac{2}{3}$
12. [Order of Operations]
 $(3 \times 3)^3 =$ 729
13. [Exploring Number] *
Place in descending order:
 $0.4, \frac{1}{2}, 45\%$ $\frac{1}{2}, 45\%, 0.4$
14. [Scientific Notation]
Express 0.012 correct to 2 decimal places. 0.01
15. [Number Patterns]
Complete the pattern:
24, 22, 19, 15, 10, 4
16. [Expressions]
Simplify
 $8 - 5q + 12 + 4q$ $20 - q$
17. [Substitution] *
If $y = x(x + 3)$, find the value of y when $x = 1$ 4
18. [Expansion]
Expand $3n(4 - 2n)$ $12n - 6n^2$
19. [Factorisation]
Factorise $4x^2y^2 - 20xy$ $4xy(xy - 5)$
20. [Equations] *
Solve for x :
 $\frac{x}{3} - 2 = 3$ 15
21. [Graphs & Functions]
Complete the table of values for the rule $y = -2x - 1$

x	-3	-2	-1	0	1	2	3
y	5	3	1	-1	-3	-5	-7
22. [Units of Measurement / Time]
Convert 18:30 from 24 hour time to 12 hour (am/pm) time. 6:30 pm

23. [Perimeter] *
Find the perimeter of the rhombus.

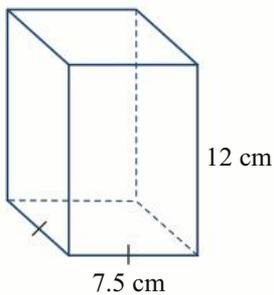


21 m

24. [Area] *
A rectangle has a perimeter of 36 cm. If its length is twice its width, find its area.

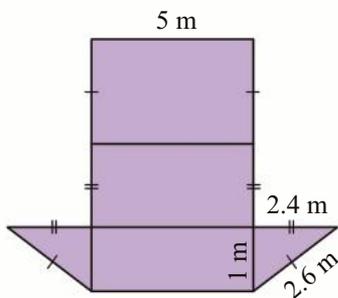
72 cm²

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



675 cm³

26. [Surface Area] *
Find the area of the net.

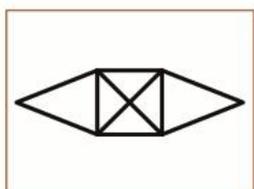
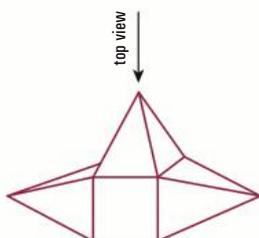


32.4 m²

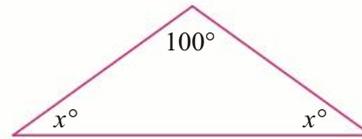
27. [Pythagoras / Trigonometry]
The three sides of a right-angled triangle have lengths of 24 cm, 26 cm and 10 cm. Which one is the length of the hypotenuse?

26 cm

28. [Shape / Location]
Draw the top view of this solid.

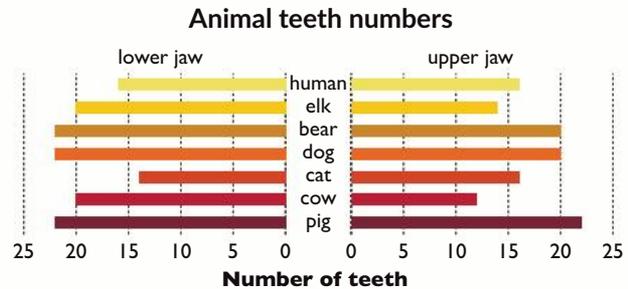


29. [Angles] *
Find the value of x° .



40°

30. [Statistics]
Which animal has a total of 30 teeth?



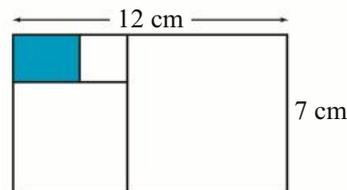
cat

31. [Probability] *
A card is drawn at random from a deck of 52 playing cards. What is the probability that it is a 2 or a 3?



$\frac{2}{13}$

32. [Problem Solving 1] *
A 12 cm by 7 cm rectangle is divided into 3 squares and a rectangle as shown below. Find the area of the shaded rectangle.



6 cm²

33. [Problem Solving 2]
The lines of a multiplication table are shown jumbled below. Which times table is it?

E × B = E
E × C = HD
E × D = BH
E × E = HI
E × F = DB
E × G = JC
E × H = DG
E × I = CF
E × J = FJ

7



Name:

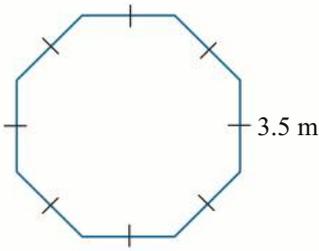
Due Date: / /

Parent's Signature:

1. [Long \times ,+]
 $28 \times 20 =$ 560
2. [Decimal +,-]
 $0.5 + 9.8 =$ 10.3
3. [Decimal \times ,+]
 $2.03 \div 0.01 =$ 203
4. [Fraction +,] *
 $\frac{4}{6} + 2\frac{2}{6} =$ 3
5. [Fraction \times ,+] *
 $\frac{5}{8} \times \frac{4}{9} =$ $\frac{5}{18}$
6. [Percentages] *
20% of 1 metre = 200 millimetres
7. [Integer +,]
 $(+7) - (-1) =$ 8
8. [Integer \times ,+]
 $(+12) \times (-2) =$ -24
9. [Rates / Ratios] *
On average, iron makes up 5% of the Earth's crust. How much iron would you expect to find in 1 tonne of the Earth's crust? 50 kg
10. [Indices]
Simplify $\frac{4m^6}{2m}$ 2m⁵
11. [Square Roots / Surds] *
Evaluate $\sqrt{0.01}$ 0.1
12. [Order of Operations] *
 $(4 + 1 \times 4)^2 =$ 64
13. [Exploring Number]
Place in ascending order:
 $-6^\circ\text{C}, -13^\circ\text{C}, +2^\circ\text{C}, 0^\circ\text{C}$
 $-13^\circ\text{C}, -6^\circ\text{C}, 0^\circ\text{C}, +2^\circ\text{C}$
14. [Scientific Notation]
Express 17.651 correct to 2 decimal places. 17.65
15. [Number Patterns]
Complete the pattern:
1, 10, 18, 25, 31, 36
16. [Expressions]
Simplify $6t - 5 + t + 9$ 7t + 4
17. [Substitution] *
If $y = \frac{x}{4} - 3$, find the value of y when $x = 12$ 0
18. [Expansion]
Expand $5x(1 - x)$ 5x - 5x²
19. [Factorisation]
Factorise $x^2y^2 + 2x^3y$ x²y(y + 2x)
20. [Equations] *
Solve for x :
 $\frac{x}{2} + 1 = 12$ 22
21. [Graphs & Functions]
Complete the table of values for the rule $y = -2x - 5$

x	-3	-2	-1	0	1	2	3
y	1	-1	-3	-5	-7	-9	-11
22. [Units of Measurement / Time] *
Complete the statement:
 $\frac{3}{5}$ of a kilogram = 600 grams

23. [Perimeter] *
Find the perimeter of the octagon.

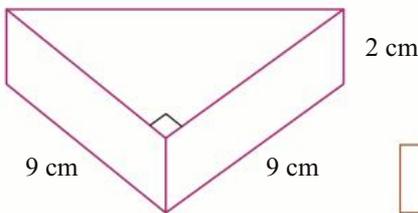


28 m

24. [Area] *
A square paddock has a perimeter of 2 km.
Find its area in hectares (ha).

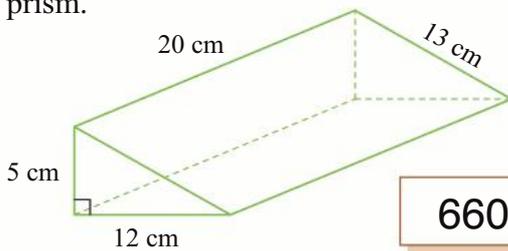
25 ha

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



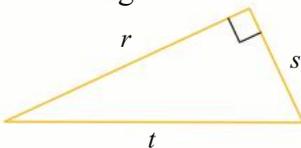
81 cm³

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



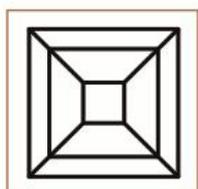
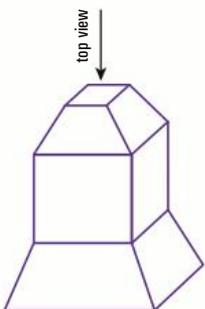
660 cm²

27. [Pythagoras / Trigonometry]
Which letter corresponds to the hypotenuse of this triangle?

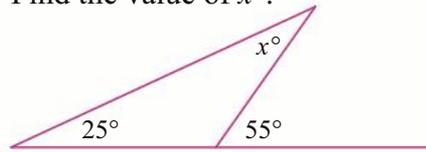


t

28. [Shape / Location]
Draw the top view of the solid.

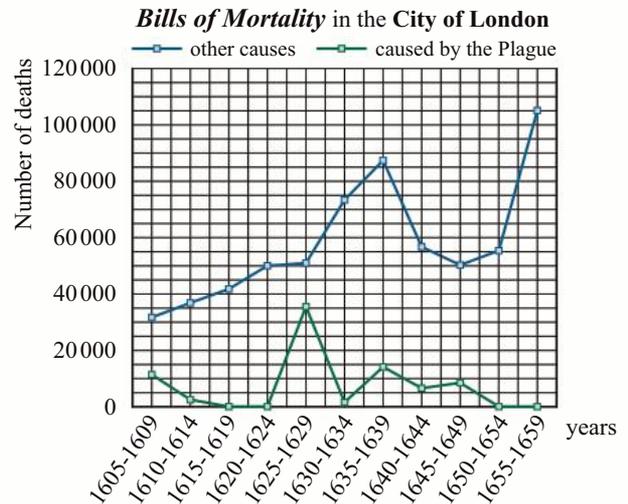


29. [Angles] *
Find the value of x° .



30°

30. [Statistics]
Use the graph below to estimate the number of people who died from the plague in the years 1625 to 1629.



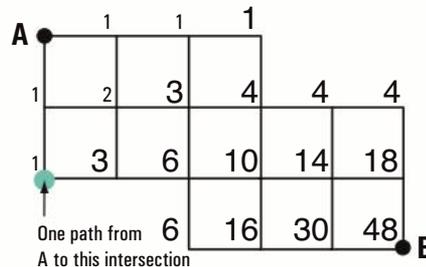
35 000

31. [Probability] *
A 52 card deck of playing cards is shuffled, and two cards are dealt from the top of the deck. Determine the probability of dealing two red cards.



$\frac{25}{102}$

32. [Problem Solving 1]
You are to move from A to B, always moving right or down along the lines. On how many different paths can you go? [The number of paths from A to various intersections has been included.]



48

33. [Problem Solving 2] *
You need to drive 80 kilometres in one hour for an appointment with a judge. If you have taken 40 minutes to drive the first 40 km, what speed must you average for the remainder of your journey so as not to be late?

120 km/h



Name:

Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $23 \times 23 =$

529

2. [Decimal $+, -$]
 $0.9 + 3.3 =$

4.2

3. [Decimal \times, \div]
 $5.4 \div 0.1 =$

54

4. [Fraction $+, -$] *
 $4\frac{7}{9} - 1\frac{4}{9} =$

$3\frac{1}{3}$

5. [Fraction \times, \div] *
 $\frac{8}{5} \div \frac{3}{4} =$

$2\frac{2}{15}$

6. [Percentages] *
22% of 1 tonne = **220 000** grams

7. [Integer $+, -$]
 $(+2) - (-8) =$

10

8. [Integer \times, \div]
 $(+16) \div (-4) =$

-4

9. [Rates / Ratios] *
The lowest level of unemployment in Australia was reached in 2022, at 3.4%. At this rate what was the average number of unemployed people found in a sample of 100 000 people?

3400

10. [Indices]
Simplify $3x \times x^2 \times 5x^3$

$15x^6$

11. [Square Roots / Surds] *
Evaluate $\sqrt{1\frac{21}{100}}$

$1\frac{1}{10}$

12. [Order of Operations] *
 $3 \times (100 \div 5)^2 =$

1200

13. [Exploring Number] *
Place in ascending order:
 $\sqrt{3} - \sqrt{2}$, $\sqrt{4} - \sqrt{3}$, $\sqrt{5} - \sqrt{4}$

$\sqrt{5} - \sqrt{4}$, $\sqrt{4} - \sqrt{3}$, $\sqrt{3} - \sqrt{2}$

14. [Scientific Notation]
Round 4.09 to the nearest whole number.

4

15. [Number Patterns]
Complete the pattern:

1, 3, 7, 15, **31, 63**

16. [Expressions]
Simplify
 $9h - 5h + 12 + h$

$5h + 12$

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

-8

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

$2m - 4m^2$

19. [Factorisation]
Factorise
 $4x^2y - 6xy + 12xy^2$

$2xy(2x - 3 + 6y)$

20. [Equations] *
Solve for x :
 $3 - \frac{x}{2} = 6$

-6

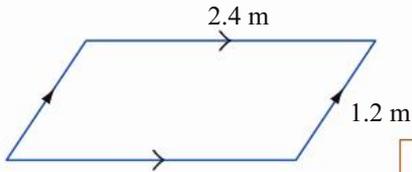
21. [Graphs & Functions]
Complete the table of values for the rule
 $y = -3x + 3$

x	-3	-2	-1	0	1	2	3
y	12	9	6	3	0	-3	-6

22. [Units of Measurement / Time]
Convert 10:21 pm to 24 hour time.

22:21 hours

23. [Perimeter] *
Find the perimeter of the parallelogram.

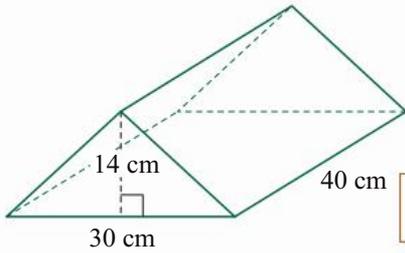


7.2 m

24. [Area] *
What is the area of a rhombus whose perimeter is 16 metres if its opposite sides are 3 metres apart?

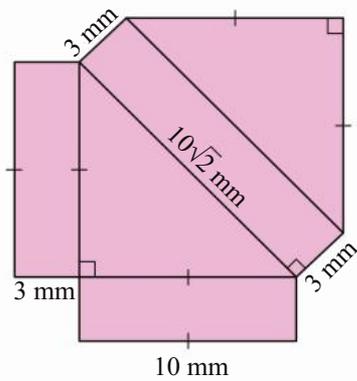
12 m²

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



8400 cm³

26. [Surface Area] *
Find the area of the net. (Use $\sqrt{2} \approx 1.4$)

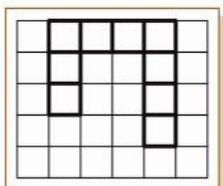
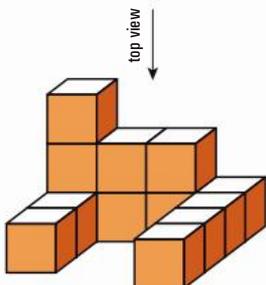


202 mm²

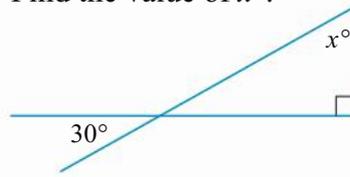
27. [Pythagoras / Trigonometry]
The three sides of a right-angled triangle have lengths of 2.5 mm, 2.4 mm and 0.7 mm. Which one is the length of the hypotenuse?

2.5 mm

28. [Shape / Location]
Draw the top view of this solid.

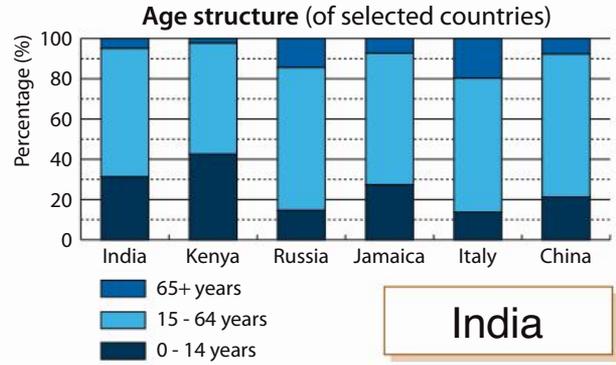


29. [Angles] *
Find the value of x° .



60°

30. [Statistics]
Which country has closest to twice as many people in the 0 to 14 age group as Russia?



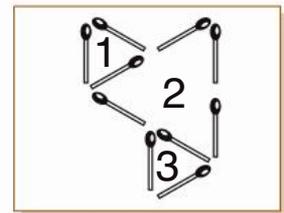
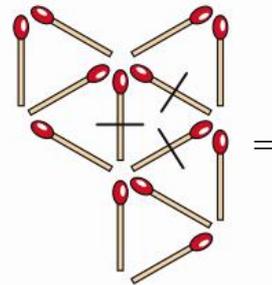
India

31. [Probability] *
A 52 card deck of playing cards is shuffled, and two cards are dealt from the top of the deck. Determine the probability of dealing one black and one red card.



$\frac{13}{51}$

32. [Problem Solving 1]
Remove three matches from this arrangement to leave three triangles.



33. [Problem Solving 2] *
David left Echuca on the Great Victorian Bike Ride riding at 20 km/h. Forty-five minutes later Peter rode out of town at 25 km/h. If these speeds are maintained, how far down the road will David be when Peter catches up to him?

75 km



Name:

Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $17 \times 35 =$ 595
2. [Decimal $+, -$]
 $8 - 3.5 =$ 4.5
3. [Decimal \times, \div] *
 $1.2 \div 0.3 =$ 4
4. [Fraction $+, -$]
 $4 - \frac{1}{5} =$ $3\frac{4}{5}$
5. [Fraction \times, \div] *
 $1\frac{3}{10} \times \frac{15}{13} =$ $1\frac{1}{2}$
6. [Percentages] *
Express 48 out of 60 as a percentage. 80%
7. [Integer $+, -$]
 $(-6) - (+9) =$ -15
8. [Integer \times, \div]
 $(-5) \times (+11) =$ -55
9. [Rates / Ratios] *
Mortar is made from lime, sand and cement.
If 36 kg of mortar contains 27 kg of sand and 6 kg of cement, find the ratio lime : cement : sand. 1 : 2 : 9
10. [Indices]
Evaluate $(-1)^{10}$ 1
11. [Square Roots / Surds]
 $\sqrt{25} - \sqrt{16} = \sqrt{9}$
True or false? false
12. [Order of Operations] *
 $3 + 4 \times 9 \div 3 =$ 15
13. [Exploring Number]
 $-3.04 > -3.4$ True or false? true
14. [Scientific Notation]
Express 6.29×10^5 as a basic numeral. 629 000
15. [Number Patterns]
Complete the pattern:
1, 9, 17, 25, 33, 41
16. [Expressions]
Simplify $4 \times q \times q^2 \div 2$ without using \times and \div signs. $2q^3$
17. [Substitution] *
If $a = 6$ and $b = 9$, find the value of $a + \frac{b}{a}$ 7.5
18. [Expansion] *
Expand and simplify $3(2p + 1) + 3p$ $9p + 3$
19. [Factorisation] *
Factorise, then evaluate $21 \times 2.3 - 21 \times 1.3$ 21
20. [Equations] *
Solve the inequality:
 $2x > 7x + 5$ $x < -1$
21. [Graphs & Functions] *
Complete the missing coordinates given that A, B and C lie on the line defined by the rule $y = -x$
A(-4, 4), B(5, -5), C(6, -6)
22. [Units of Measurement / Time]
How many metres in 0.54 kilometres? 540 m



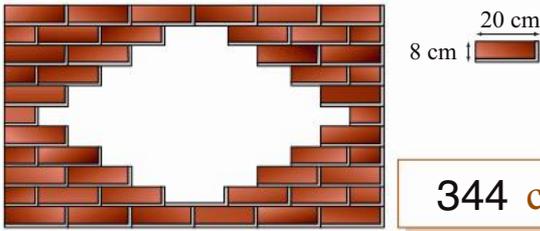
Name:

Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $568 \div 5 =$ 113.6
2. [Decimal $+, -$]
 $7.8 - 4.75 =$ 3.05
3. [Decimal \times, \div] *
 $13 \times 0.07 =$ 0.91
4. [Fraction $+, -$]
 $1 - \frac{5}{9} =$ $\frac{4}{9}$
5. [Fraction \times, \div] *
 $1\frac{2}{3} \div \frac{2}{3} =$ $2\frac{1}{2}$
6. [Percentages] *
Express 27 out of 90 as a percentage. 30%
7. [Integer $+, -$]
 $(+3) - (+8) =$ -5
8. [Integer \times, \div]
 $(+8) \times (+10) =$ 80
9. [Rates / Ratios] *
If 20% of the atoms in methane are carbon, and the rest are hydrogen, what is the methane ratio of carbon atoms to hydrogen atoms? 1 : 4
10. [Indices]
Evaluate $(-10)^3$ -1000
11. [Square Roots / Surds]
 $\sqrt{100} - \sqrt{36} = \sqrt{64}$
True or false? false
12. [Order of Operations] *
 $(1 + 6) \times (4 + 9) =$ 91
13. [Exploring Number] *
 $\frac{5}{6}$ of 18 $<$ $\frac{2}{3}$ of 24 True or false? true
14. [Scientific Notation]
Express 4.72×10^4 as a basic numeral. 47 200
15. [Number Patterns]
Complete the pattern:
57, 48, 39, 30, 21, 12
16. [Expressions]
Simplify $2 \times p \times q^2 \div q$ without using \times and \div signs. 2pq
17. [Substitution] *
If $p = 7$ and $q = 11$, find the value of $q(p + 1)$ 88
18. [Expansion] *
Expand and simplify $b(b + 3) - 2b$ $b^2 + b$
19. [Factorisation] *
Factorise, then evaluate $\frac{3}{8} \times 33 + \frac{3}{8} \times 47$ 30
20. [Equations] *
Solve the inequality:
 $5x \leq x + 16$ $x \leq 4$
21. [Graphs & Functions] *
Complete the missing coordinates given that A, B and C lie on the line defined by the rule $y = 2x$
A(3, 6), B(-2, -4), C(-3, -6)
22. [Units of Measurement / Time]
Change 35 centimetres into metres. 0.35 m

23. [Perimeter] *
Find the perimeter of the hole in the brick wall.

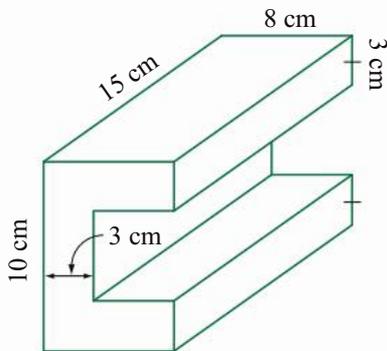


344 cm

24. [Area] *
Find the length of the base of a triangle whose height is 16 cm and area is 80 cm^2 .

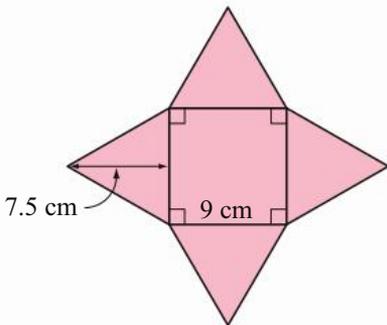
10 cm

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



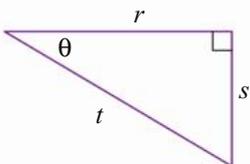
900 cm^3

26. [Surface Area] *
Find the area of the net.



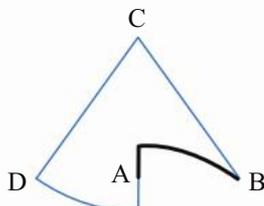
216 cm^2

27. [Pythagoras / Trigonometry]
Which perpendicular side is adjacent to the angle θ in the triangle?

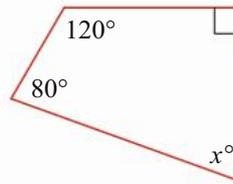


r

28. [Shape / Location]
If $CD = CB$, join A to B in such a way that the completed shape will tessellate.

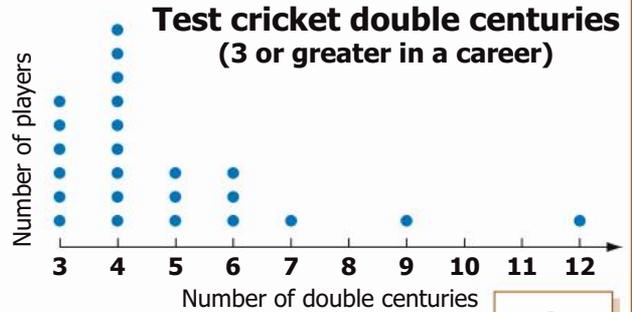


29. [Angles] *
Find the value of x° .



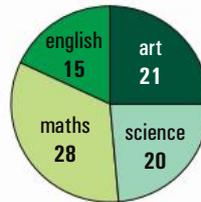
70°

30. [Statistics]
How many more double centuries did the best batsman make over his closest rival?



3

31. [Probability] *
If a student is chosen at random, what is the probability that their favourite subject is Maths?



Students' Favourite Subject

or $0.\dot{3}$ $\frac{1}{3}$

32. [Problem Solving 1] *
Two rockets fly from two different places, 1317 km apart, towards each other. One flies at a speed of 9000 km/h and the other at 21 000 km/h. What is the distance between the rockets 1 minute before the collision?

500 km

33. [Problem Solving 2] *
Last Autumn, while tidying up her sweet peas, Breanna was surprised to find that there were just as many pods on each plant as there were plants. What is more, there were the same number of seeds in each pod as there were pods on each plant. Nonetheless, she divided the seeds into 7 equal piles to give to her friends and the few remaining seeds, she planted in her own garden. How many seeds did she plant?

6



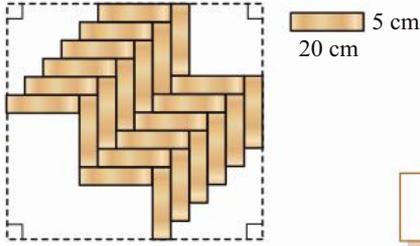
Name:

Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $438 \div 8 =$ 54.75
2. [Decimal $+, -$]
 $5 - 0.8 =$ 4.2
3. [Decimal \times, \div] *
 $4 \div 0.08 =$ 50
4. [Fraction $+, -$]
 $4 - \frac{2}{7} =$ $3\frac{5}{7}$
5. [Fraction \times, \div] *
 $2\frac{1}{2} \times \frac{6}{9} =$ $1\frac{2}{3}$
6. [Percentages] *
 Express 24 out of 80 as a percentage.
30%
7. [Integer $+, -$]
 $(-7) + (-4) =$ -11
8. [Integer \times, \div]
 $(-34) \div (+17) =$ -2
9. [Rates / Ratios] *
 Two-stroke fuel for my chainsaw contains 4% oil, and the rest is petrol. What is the ratio of oil to petrol in the fuel?
1 : 24
10. [Indices]
 Evaluate $\left(\frac{2}{5}\right)^3$ $\frac{8}{125}$
11. [Square Roots / Surds]
 Evaluate $\sqrt{16} + \sqrt{9}$ 7
12. [Order of Operations] *
 $3 \times (8 - 9 \times 2) =$ -30
13. [Exploring Number]
 $-12.5 < -15.2$ True or false?
false
14. [Scientific Notation]
 Express 7×10^{-3} as a basic numeral.
0.007
15. [Number Patterns]
 Complete the pattern:
 2, 13, 24, 35, 46, 57
16. [Expressions]
 Simplify $3 \times t - 4 \div t$ without using \times and \div signs.
 $3t - \frac{4}{t}$
17. [Substitution] *
 If $c = -1$ and $d = 8$, find the value of $\frac{c+d}{c}$
-7
18. [Expansion] *
 Expand and simplify $-x(2x + 3) + 5x$
 $-2x^2 + 2x$
19. [Factorisation] *
 Factorise, then evaluate $\frac{6}{7} \times 16 + \frac{6}{7} \times 19$
30
20. [Equations] *
 Solve the inequality: $4x \geq x + 21$
 $x \geq 7$
21. [Graphs & Functions] *
 Complete the missing coordinates given that A, B and C lie on the line defined by the rule $y = 4x + 3$
 A(1, 7), B(-3, -9), C(-4, -13)
22. [Units of Measurement / Time]
 How many kilograms in 11.2 tonnes?
11 200 kg

23. [Perimeter] *
Calculate the distance around the shaded section of the parkway floor.

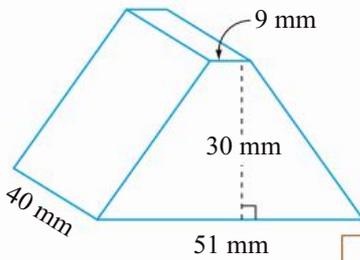


270 cm

24. [Area] *
A square has an area of 2 hectares. What will the area of the square become if you double the length of its sides?

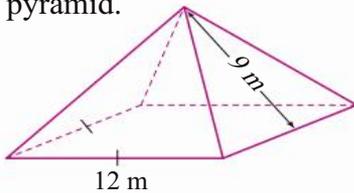
8 ha

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



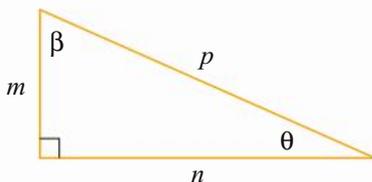
36 000 mm³

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



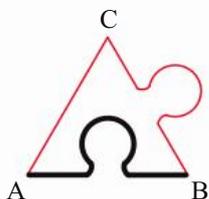
360 m²

27. [Pythagoras / Trigonometry]
Which side is opposite the angle θ in the triangle?

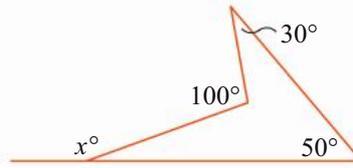


m

28. [Shape / Location]
If A, B and C are the vertices of an equilateral triangle, join A to B in such a way that the completed shape will tessellate.



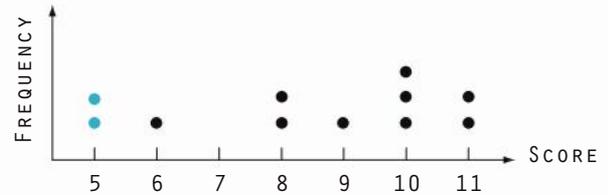
29. [Angles] *
Find the value of x° .



160°

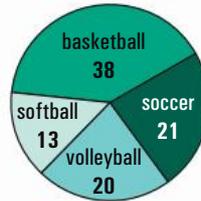
30. [Statistics]
Complete the dot plot and find the median of the following data:

5, 5, 10, 8, 10, 11, 8, 10, 6, 9, 11



9

31. [Probability] *
If a student is chosen at random, what is the probability that they will be playing basketball at the school carnival?



Sports at school carnival

or 0.4 $\frac{2}{5}$

32. [Problem Solving 1] *
The first digit of a six-digit number is 9. If this 9 is moved to the end of the number, the new six-digit number is only a quarter of the original number. Find the original number.

$$\begin{array}{r} \text{A B C D E 9} \\ \times 4 \\ \hline 9 \text{ A B C D E} \end{array}$$

923076

33. [Problem Solving 2] *
Patrick has fewer than 35 marbles. When he puts them in piles of 3, he has no marbles left over. When he puts them in piles of 2, he has one left. When he puts them in piles of 5, he has one left. How many marbles does he have?

21



Name:

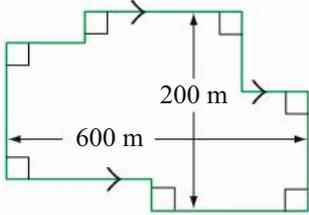
Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $368 \div 3 =$ 122.6
2. [Decimal $+, -$]
 $7 - 5.5 =$ 1.5
3. [Decimal \times, \div] *
 $0.5 \div 0.25 =$ 2
4. [Fraction $+, -$]
 $3 - \frac{1}{3} =$ $2\frac{2}{3}$
5. [Fraction \times, \div] *
 $2\frac{2}{3} \div \frac{1}{3} =$ 8
6. [Percentages] *
What percentage of 75 is 15? 20%
7. [Integer $+, -$]
 $(-6) - (+4) =$ -10
8. [Integer \times, \div]
 $(-36) \div (+4) =$ -9
9. [Rates / Ratios] *
If 100 g of chocolate contains 28 g of fat,
find the ratio of fat to non-fat
ingredients. 7 : 18
10. [Indices]
Evaluate $(-\frac{1}{2})^2$ $\frac{1}{4}$
11. [Square Roots / Surds]
Evaluate $\sqrt{25} + \sqrt{144}$ 17
12. [Order of Operations] *
 $(3 \times 5 - 18) \div 3 =$ -1
13. [Exploring Number]
 $\frac{4}{7} < \frac{1}{2}$ True or false? false
14. [Scientific Notation]
Express 9.1×10^{-2} as
a basic numeral. 0.091
15. [Number Patterns]
Complete the pattern:
4, 4.75, 5.50, 6.25, 7, 7.75
16. [Expressions]
Simplify $3 \times g^0 \times g^1 \times g^2 \div 3$
without using \times and \div signs. g^3
17. [Substitution] *
If $u = 5$ and $w = -3$,
find the value of $(u + w)(u - w)$ 16
18. [Expansion] *
Expand and simplify
 $-3y(2 - y) + 10y$ $3y^2 + 4y$
19. [Factorisation] *
Factorise, then evaluate
 $\frac{5}{6} \times 38 + \frac{5}{6} \times 22$ 50
20. [Equations] *
Solve the inequality:
 $4x < 10x + 48$ $x > -8$
21. [Graphs & Functions] *
Complete the missing coordinates given that
A, B and C lie on the line defined by the rule
 $y = \frac{1}{2}x - 2$
A(8 , 2), B(2, -1), C(-4 , -4)
22. [Units of Measurement / Time]
Change 600 grams into kilograms. 0.6 kg

QUOTE OF THE WEEK: The real art of conversation is not only to say the right thing at the right place, but to leave unsaid the wrong thing at the tempting moment. Dorothy Nevill

23. [Perimeter] *
Find the perimeter of the polygon.

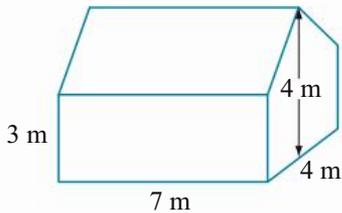


1600 m

24. [Area] *
A rectangle has an area of 15 cm^2 . If you double the width of the rectangle, what is the area of the wider rectangle?

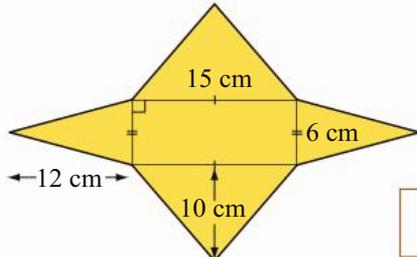
30 cm^2

25. [Volume] *
What is the volume of air inside the shed?



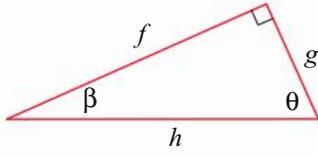
98 m^3

26. [Surface Area] *
Find the area of the net.



312 cm^2

27. [Pythagoras / Trigonometry]
For which angle is f the adjacent side?

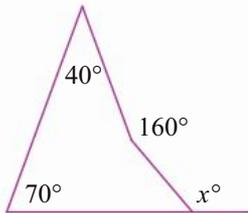


β

28. [Shape / Location]
Euler's formula $E = V + F - 2$ defines the relationship between Edges, Vertices and Faces of any polyhedron. Verify Euler's formula for a pentagonal prism.

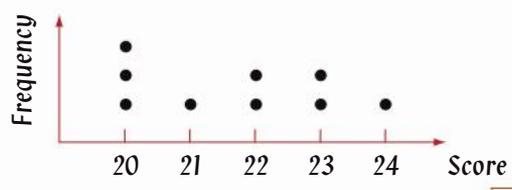
15 = 10 + 7 - 2

29. [Angles] *
Find the value of x° .



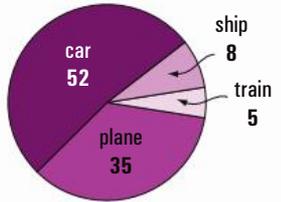
130°

30. [Statistics]
Complete the dot plot and find the median of the following data:
22, 24, 20, 21, 23, 23, 20, 22, 20



22

31. [Probability] *
What is the probability that a scientist, selected at random, travelled to the conference by train?



Global Warming Conference: Transport mode by Scientists

or 0.05 $\frac{1}{20}$

32. [Problem Solving 1]
Here are two views of one die. Which letter is on the face opposite the D?



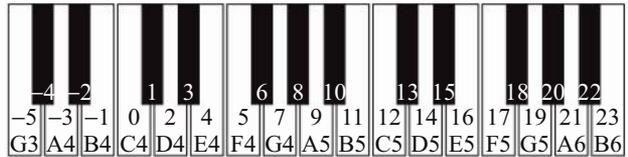
C

33. [Problem Solving 2] *
On a piano the frequency of the note 'middle C' (shown as C4 below) is 440 Hz. If we imagine this key as position 0 on a number line and other keys as 1, 2, 3, to the right and -1, -2, -3 to the left as shown, then the frequency of each key can be found using:

$$F_n = 440 \times 2^{\left(\frac{n}{12}\right)}$$

Use this to find the value of the ratio:

$$\frac{\text{frequency of C4}}{\text{frequency of C5}}$$



Middle C (440 Hz)

$\frac{1}{2}$



Name:

Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $69 \times 12 =$ 828
2. [Decimal $+, -$]
 $5.5 + 0.55 =$ 6.05
3. [Decimal \times, \div] *
 $1.2 \times 0.8 =$ 0.96
4. [Fraction $+, -$]
 $2\frac{2}{7} - \frac{5}{7} =$ $1\frac{4}{7}$
5. [Fraction \times, \div] *
 $1\frac{1}{2} \times 1\frac{4}{5} =$ $2\frac{7}{10}$
6. [Percentages] *
Increase \$40 by 15%.
\$ 46
7. [Integer $+, -$]
 $(+1) - (+5) =$ -4
8. [Integer \times, \div]
 $(+2) \times (+25) \times (+4) =$ 200
9. [Rates / Ratios] *
The golden eagle can fly at a speed of 300 km/h. At this speed, what distance can it fly in 5 minutes?
25 km
10. [Indices]
Simplify $(3x)^4$ $81x^4$
11. [Square Roots / Surds] *
Between which two consecutive whole numbers does $2\sqrt{5}$ lie?
4 and 5
12. [Order of Operations] *
 $(4 - 1)^3 + 1^3 =$ 28
13. [Exploring Number] *
Which quantity is cheaper per millilitre?
A) \$12 for 800 mL
B) \$14 for 1 L
B
14. [Scientific Notation]
Which is larger:
 2.11×10^4 or 2.1×10^4 ?
 2.11×10^4
15. [Number Patterns]
Complete the pattern:
3, 4.2, 5.4, 6.6, 7.8, 9
16. [Expressions]
The expression $4(x + 3)$ can also be written as:
 $4 + (x + 3)$, $4 \times (x + 3)$ or $4 - (x + 3)$
 $4 \times (x + 3)$
17. [Substitution] *
Given $V = IR$, find V when
 $I = 0.24$ and $R = 1000$
240
18. [Expansion]
Expand $-x(x + 2)$
 $-x^2 - 2x$
19. [Factorisation]
Factorise
 $3(x + 1) + x(x + 1)$
 $(x + 1)(3 + x)$
20. [Equations] *
Solve for x :
 $3(x + 2) = 9$
1
21. [Graphs & Functions] *
Find the y -intercept of the graph defined by the linear rule $2x + 3y = 18$
[Let $x = 0$ in the relation.]
(0,6)
22. [Units of Measurement / Time] *
Wednesday 1200 hours in Sydney occurs at 1800 hours Tuesday in San Francisco. What day and time is it in San Francisco if it is 1130 hours on a Friday in Sydney?
1730 hours on Thursday

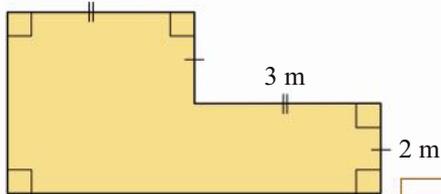
23. [Perimeter] *

The Great Pyramid of Giza is a square pyramid with a base length of 230 metres and a height of 147 metres. What is the perimeter of the pyramid's base?

920 m

24. [Area] *

Find the area of the shape.

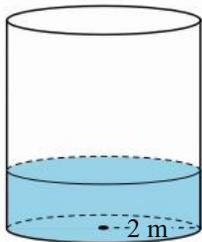


18 m²

25. [Volume] *

In this cylindrical water tank there are 31 400 L of water. Using $\pi \approx 3.14$ find the depth of the water in the tank.

[Hint: 1000 L = 1 m³]



2.5 m

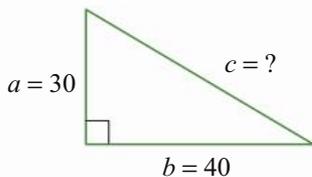
26. [Surface Area] *

Find the total surface area of an ice cube of side 10 mm.

600 mm²

27. [Pythagoras / Trigonometry] *

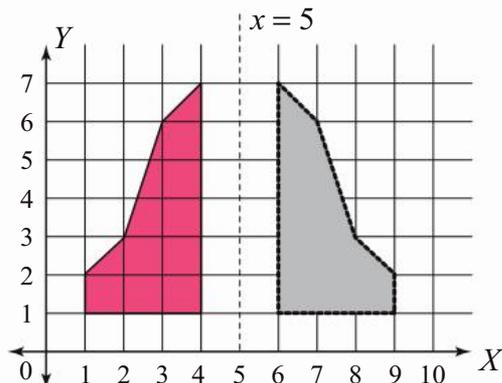
Using Pythagoras' theorem $a^2 + b^2 = c^2$, find the length of the hypotenuse.



50

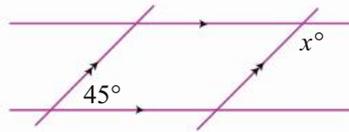
28. [Shape / Location]

Draw the reflection of the shape in the line of equation $x = 5$.



29. [Angles] *

Find the value of x° .



135°

30. [Statistics]

This stem-and-leaf plot shows the points scored by Ravi in a basketball tournament. Calculate his median score for the tournament.

stem	leaves
0	5
1	8 8 9
2	1 5 6 6
3	5
4	0

23

31. [Probability]

What is the probability that a person chosen at random flew with Qantas?

[Complete the two-way table.]

	America	Europe	Total
Qantas	16	21	37
Other airlines	8	5	13
Total	24	26	50

$\frac{37}{50}$

32. [Problem Solving 1] *

A picture was reduced on a photocopier using a scale factor of $66\frac{2}{3}\%$. What scale factor is required to copy the reduced picture so that it returns to its original size?

150%

33. [Problem Solving 2] *

Find the dimensions of all rectangles that have a perimeter equal to their area.

[Note: The dimensions must be integers.]

3 × 6, 4 × 4



Name:

Due Date: / /

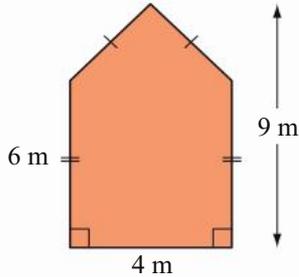
Parent's Signature:

1. [Long \times , \div]
 $693 \div 9 =$ 77
2. [Decimal $+$, $-$]
 $9.6 + 0.535 =$ 10.135
3. [Decimal \times , \div] *
 $30 \times 0.16 =$ 4.8
4. [Fraction $+$, $-$]
 $2\frac{2}{9} - \frac{6}{9} =$ $1\frac{5}{9}$
5. [Fraction \times , \div] *
 $\frac{5}{6} \div 4\frac{1}{2} =$ $\frac{5}{27}$
6. [Percentages] *
Increase \$1000 by 18%. \$ 1180
7. [Integer $+$, $-$]
 $(-3) - (-5) =$ 2
8. [Integer \times , \div]
 $(-3) \times (-2) \times (-8) =$ -48
9. [Rates / Ratios] *
The blue shark can reach a speed of 70 km/h.
At this speed, how much time does it take to cover 700 m? 36 s
10. [Indices]
Simplify $2(a^3)^4$ $2a^{12}$
11. [Square Roots / Surds]
Between which two consecutive whole numbers does $\sqrt{77}$ lie? 8 and 9
12. [Order of Operations] *
 $(2 + 3 \times 5)^2 - 7 =$ 282
13. [Exploring Number] *
Which item is cheaper per gram?
A) \$18 for 1500 g
B) \$12.50 for 1 kg A
14. [Scientific Notation]
Which is larger:
 2.64×10^6 or 6.24×10^4 ? 2.64×10^6
15. [Number Patterns]
Complete the pattern:
9.45, 8.70, 7.95, 7.20, 6.45 , 5.70
16. [Expressions]
The expression $2 \times y \times y \times z \times z$ can also be written as:
 $2yz$, $2yz^2$ or $2y^2z^2$ $2y^2z^2$
17. [Substitution] *
Given $v = \frac{x}{t}$, find v when
 $x = 200$ and $t = 25$ 8
18. [Expansion]
Expand $-3(4 - a)$ $-12 + 3a$
19. [Factorisation]
Factorise
 $6(a + 4) + 2b(a + 4)$ $2(a + 4)(3 + b)$
20. [Equations] *
Solve for x : $3(2 - x) = 9$ -1
21. [Graphs & Functions] *
Find the x -intercept for the straight line defined by the equation $-3x + y = -9$
[Let $y = 0$ in the relation.] (3,0)
22. [Units of Measurement / Time] *
At 1200 hours in Melbourne it is 1000 hours in Beijing. What day and time is it in Beijing if it is 2150 hours on Saturday in Melbourne? 1950 hours on Saturday

23. [Perimeter] *
A soccer field is not allowed to be more than 120 m long or 90 m wide. What is the maximum allowable perimeter of a soccer field?

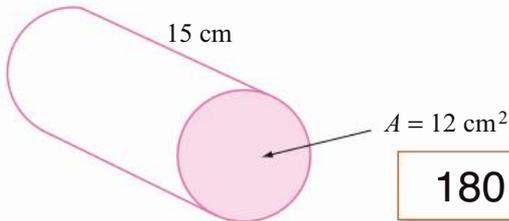
420 m

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



30 m²

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

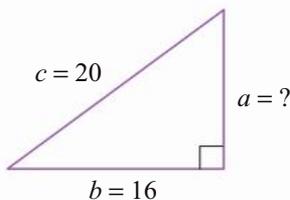


180 cm³

26. [Surface Area] *
Using $TSA = 2\pi r(r + h)$ where $\pi \approx 3.14$, find the total surface area of a cylindrical ice hockey puck with a radius of 2 cm and height 3 cm.

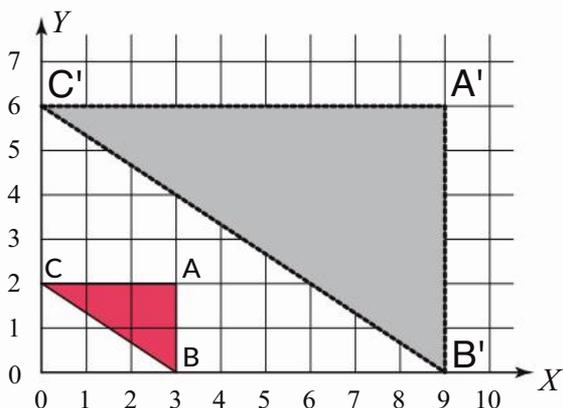
62.8 cm²

27. [Pythagoras / Trigonometry] *
Using Pythagoras' theorem $a^2 + b^2 = c^2$, find the length of the side labelled a .



12

28. [Shape / Location]
Enlarge triangle ABC by a scale factor of 3 about the origin of the axes.



29. [Angles]
Find the value of x° .



64°

30. [Statistics]
This stem-and-leaf plot shows the ages of the teachers in a small primary school. Calculate the median age of the teachers.

STEM	LEAVES
2	3 7 8
3	5 6 9 9
4	1 1 5 8 9
5	2 3 3
6	0

41

31. [Probability]
What is the probability that a person chosen at random from the theatre audience is a girl aged between 10 and 18 years?
[Complete the two-way table.]

	Under 10	Between 10 & 18	Over 18	Total
Boys	20	14	30	64
Girls	12	15	10	37
Total	32	29	40	101

$\frac{15}{101}$

32. [Problem Solving 1] *
Charles has $\frac{3}{5}$ of the amount of money Di has. How much money does Charles have if Di has \$6 more than Charles?

\$ 9

33. [Problem Solving 2] *
Use the digits 1, 2, 3, 4 and 5 (once each) to complete the multiplication below so that the answer is as large as possible.

$$\begin{array}{r}
 \begin{array}{|c|c|c|} \hline 4 & 3 & 1 \\ \hline \end{array} \\
 \times \begin{array}{|c|c|} \hline 5 & 2 \\ \hline \end{array} \\
 \hline
 \begin{array}{r}
 862 \\
 21550 \\
 \hline
 22412
 \end{array}
 \end{array}$$



Name:

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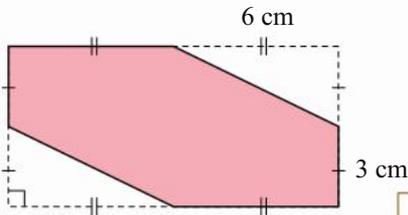
Parent's Signature:

1. [Long \times ,+]
 $44 \times 20 =$ 880
2. [Decimal +,-]
 $30 - 0.4 =$ 29.6
3. [Decimal \times ,+] *
 $0.3 \div 0.03 =$ 10
4. [Fraction +,-] *
 $3\frac{1}{12} - \frac{7}{12} =$ $2\frac{1}{2}$
5. [Fraction \times ,+] *
 $1\frac{1}{4} \times \frac{3}{5} =$ $\frac{3}{4}$
6. [Percentages] *
Increase \$90 by 30%. \$ 117
7. [Integer +,-]
 $(+3) - (-1) =$ 4
8. [Integer \times ,+]
 $(+4) \times (+4) \times (-10) =$ -160
9. [Rates / Ratios] *
The earth's average velocity orbiting the sun is 107 200 km per hour. At this speed, what distance does the earth cover in a day?
2572 800 km
10. [Indices]
Simplify $(5z^2)^3$ $125z^6$
11. [Square Roots / Surds]
Between which two consecutive whole numbers does $\sqrt{37}$ lie?
6 and 7
12. [Order of Operations] *
 $2 \times 9 + 25 \div 5 =$ 23
13. [Exploring Number] *
Which item is cheaper per gram?
A) \$5 for 75 g
B) \$15 for 250 g B
14. [Scientific Notation]
Which is larger:
 6.1×10^{-3} or 2.7×10^{-1} ? 2.7×10^{-1}
15. [Number Patterns]
Complete the pattern:
0.65, 1.3, 2.6, 5.2, 10.4, 20.8
16. [Expressions]
The expression $7 \times t \times t \times k \times k \times k \times j$ can also be written as:
 $7jk^2t$, $7jk^3t^2$ or $7jk^2t^2$ $7jk^3t^2$
17. [Substitution] *
Given $a = \frac{v-u}{t}$, find a when $v = 61$, $u = 19$ and $t = 6$ 7
18. [Expansion]
Expand $-3n(n+4)$ $-3n^2 - 12n$
19. [Factorisation] *
Factorise
 $ab + 3b + 2a + 6$ $(a+3)(b+2)$
20. [Equations] *
Solve for x :
 $2(x-4) = 20$ 14
21. [Graphs & Functions] *
Find the y -intercept of the graph defined by the linear rule $-4x - 3y = 12$ (0,-4)
22. [Units of Measurement / Time] *
At 1200 hours in Brisbane it is 1400 hours in Auckland. What day and time is it in Auckland if it is 0630 hours on Sunday in Brisbane?
0830 hours on Sunday

23. [Perimeter] *
Flower markets are still held in 'The Market Place' in Brussels. Surrounded by 18th century buildings, the rectangular courtyard is 110 m long and 68 m wide. Find its perimeter.

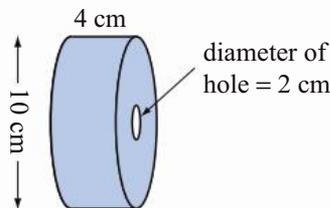
356 m

24. [Area] *
Find the area of the shaded region.



54 cm²

25. [Volume] *
Find the volume of rubber used to make the wheel. (Use $\pi \approx 3.14$)

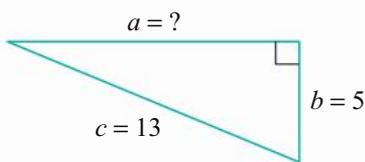


301.44 cm³

26. [Surface Area] *
Find the total surface area of a plank of wood in the shape of a rectangular prism 5 cm by 15 cm by 200 cm.

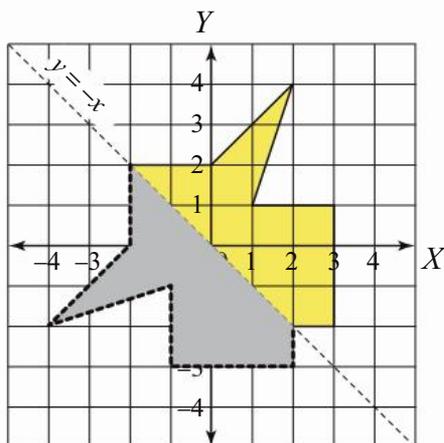
8150 cm²

27. [Pythagoras / Trigonometry] *
Using Pythagoras' theorem $a^2 + b^2 = c^2$, find the length of the side labelled a .



12

28. [Shape / Location]
Draw the other half of this shape, given it has a line of symmetry of equation $y = -x$.



29. [Angles] *
Find the value of x° .



109°

30. [Statistics]
Complete the stem-and-leaf plot using class intervals of 10, then use it to find the median value for the following data:

30, 55, 22, 36, 57, 21, 60, 53, 38, 45, 63, 22, 57, 34

stem	leaves
2	1 2 2
3	0 4 6 8
4	5
5	3 5 7 7
6	0 3

41.5

31. [Probability]
What is the probability that a student chosen at random preferred to go to the library?
[Complete the two-way table.]

	Boys	Girls	Total
Library	50	24	74
Playing	30	54	84
Total	80	78	158

$\frac{37}{79}$

32. [Problem Solving 1] *
Our large pump can fill our dam from the river in 3 hours. It takes 12 hours using the small pump. How long would it take if I use both pumps at the same time?

2 h 24 min

33. [Problem Solving 2] *
If a , b and c represent the side lengths of a triangle and $a^2b^2 + c^4 = b^4 + a^2c^2$, then what type of triangle is it?

isosceles or right-angled triangle



Name:

Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $41 \times 23 =$ 943
2. [Decimal $+, -$]
 $7 - 3.65 =$ 3.35
3. [Decimal \times, \div] *
 $200 \times 0.15 =$ 30
4. [Fraction $+, -$] *
 $1\frac{4}{10} - \frac{9}{10} =$ $\frac{1}{2}$
5. [Fraction \times, \div] *
 $1\frac{2}{5} \div 1\frac{3}{4} =$ $\frac{4}{5}$
6. [Percentages] *
Increase \$60 by 20%. \$ 72
7. [Integer $+, -$]
 $(+8) - (-8) =$ 16
8. [Integer \times, \div]
 $(+4) \times (-4) \times (-4) =$ 64
9. [Rates / Ratios] *
The average speed of a space shuttle in orbit is 29 000 km/h. At this speed, how many kilometres will a shuttle travel in 2.5 hours?
72 500 km
10. [Indices]
Simplify $(2b^2)^5$ 32b¹⁰
11. [Square Roots / Surds]
Between which two consecutive whole numbers does $\sqrt{62}$ lie? 7 and 8
12. [Order of Operations] *
 $(3 + 4)^2 - 9 =$ 40
13. [Exploring Number] *
Which quantity is cheaper per millilitre?
A) \$15 for 500 mL
B) \$40 for 1.25 L A
14. [Scientific Notation]
Which is larger:
 0.5×10^4 or 4.8×10^3 ? 0.5×10^4
15. [Number Patterns]
Complete the pattern:
0.01042, 0.1042, 1.042, 10.42,
104.2, 1042
16. [Expressions]
The expression $5 \times g \times g^2 \times h \times k$ can also be written as:
 g^3hk , $5g^2hk$ or $5g^3hk$ $5g^3hk$
17. [Substitution] *
Given the perimeter of a rectangle is $P = 2(l + w)$, find P when $l = 8$ and $w = 4$ 24
18. [Expansion]
Expand $-4(1 - 2t)$ $-4 + 8t$
19. [Factorisation] *
Factorise $x^2 + 2x + xy + 2y$ $(x + 2)(x + y)$
20. [Equations] *
Solve for x :
 $4(x - 1) = 24$ 7
21. [Graphs & Functions] *
Find the x -intercept for the straight line defined by the equation $y = 2x - 6$ (3,0)
22. [Units of Measurement / Time] *
At 1200 hours in Canberra it is 0400 hours in Athens. What day and time is it in Athens if it is 0620 hours on Monday in Canberra?
2220 hours on Sunday

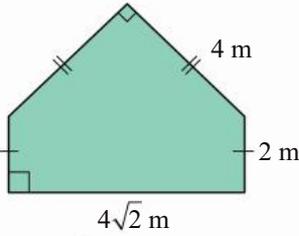
23. [Perimeter] *

French artist Jean-François Millet painted 'The Gleaners' in 1850. Three poor peasant women on the Plain of Chailly have been excluded from the harvest and are only allowed to glean what the harvesters have left behind. The painting is 111 cm wide and 83 cm high. Find the painting's perimeter.

388 cm

24. [Area] *

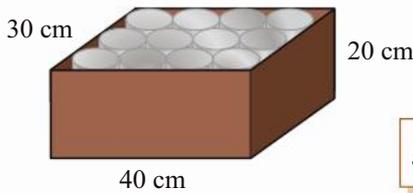
Find the area of the shape. (Use $\sqrt{2} \approx 1.41$)



19.28 m²

25. [Volume] *

There are 12 cylindrical cans with diameter 10 cm and height 20 cm in this box. Find the volume of air left in the box. (Use $\pi \approx 3.14$)



5160 cm³

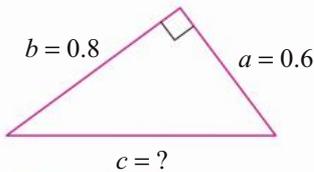
26. [Surface Area] *

Given $TSA = \pi r(r + s)$ where $\pi \approx \frac{22}{7}$, find the total surface area of a cone of radius 14 cm and slant height 36 cm.

2200 cm²

27. [Pythagoras / Trigonometry] *

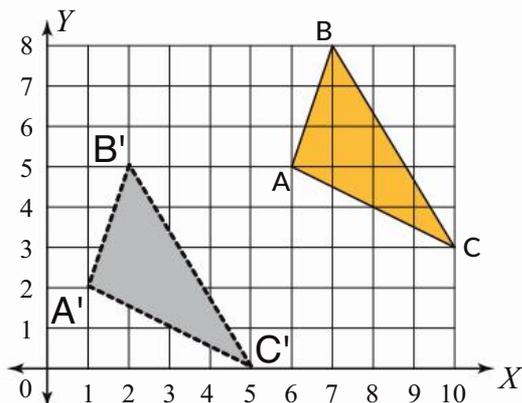
Using Pythagoras' theorem $a^2 + b^2 = c^2$, find the length of the hypotenuse.



1

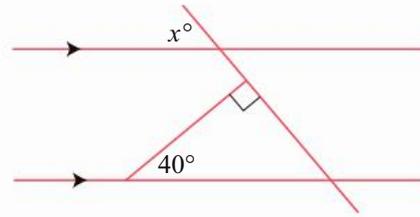
28. [Shape / Location]

Redraw the triangle ABC after translating it -5 units horizontally and -3 units vertically.



29. [Angles] *

Find the value of x° .



50°

30. [Statistics]

The heights in centimetres of twenty year 9 students are shown in the stem-and-leaf plot. Find the median height in the class.

STEM | LEAVES

14	0 2 5
15	1 3 3 4 7
16	3 4 4 5 6 6
17	0 1 8 9
18	0 2

164 cm

31. [Probability]

What is the probability that a person chosen at random flew using economy class?

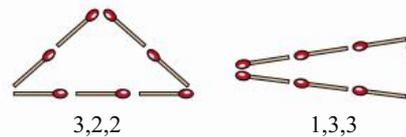
[Complete the two-way table.]

	Economy class	Business class	First class	Total
Leisure	56%	4%	8%	68%
Business	8%	21%	3%	32%
Total	64%	25%	11%	100%

64%

32. [Problem Solving 1] *

Seven matchsticks can be used to form a triangular enclosure in two different ways, $\{3,2,2\}$ and $\{1,3,3\}$. How many different triangles can be formed using 14 matchsticks?



4

33. [Problem Solving 2] *

Calculate:

$$\sqrt{2} \times \sqrt{2 + \sqrt{2}} \times \sqrt{2 + \sqrt{2} + \sqrt{2}} \times \sqrt{2 - \sqrt{2} + \sqrt{2}}$$

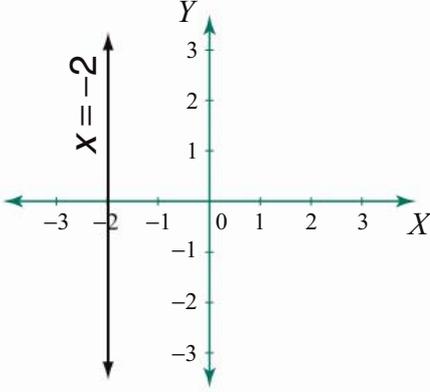
2



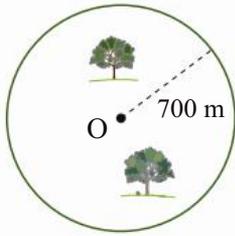
Name:

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Parent's Signature:

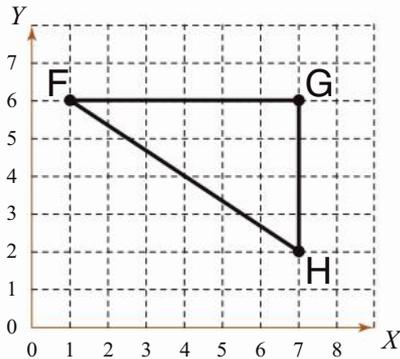
1. [Long \times, \div]
 $1463 \div 7 =$ 209
2. [Decimal $+, -$]
 $5.12 - 0.04 =$ 5.08
3. [Decimal \times, \div] *
 $2.4 \times 0.4 =$ 0.96
4. [Fraction $+, -$] *
 $\frac{1}{3} + \frac{1}{6} =$ $\frac{1}{2}$
5. [Fraction \times, \div] *
 $7 \times \frac{4}{3} =$ $9\frac{1}{3}$
6. [Percentages] *
 Of the 40 students in our class, 75% went camping. How many students went camping? 30
7. [Integer $+, -$]
 $(-2) - (-9) - (+10) =$ -3
8. [Integer \times, \div]
 $(-5) \times (-4) \times (+10) =$ 200
9. [Rates / Ratios] *
 Joanna's computer uses a internet connection with a download speed of 50 MB per second. At this rate, how many seconds will it take to download a 30 GB file?
 [Hint: 1 GB = 1000 MB.] 600 s
10. [Indices]
 Evaluate 3^{-1} $\frac{1}{3}$
11. [Square Roots / Surds] *
 Evaluate $2\sqrt{100} + 3\sqrt{100}$ 50
12. [Order of Operations] *
 $[(2 + 1)^2 + 1]^2 =$ 100
13. [Exploring Number]
 Fill in with the appropriate symbol ($<$, $>$, $=$)
 $2340 \div 0.9$ $>$ 2340
14. [Scientific Notation]
 Round 0.027 correct to 2 decimal places. 0.03
15. [Number Patterns]
 Complete the pattern:
 $\frac{3}{1000}, \frac{3}{100}, \frac{3}{10},$ $\frac{3}{1}, \frac{30}{1}$
16. [Expressions]
 Write the following as an algebraic expression:
 5 more than p $p + 5$
17. [Substitution] *
 If $e = -5$ and $f = -4$, find the value of $5ef$ 100
18. [Expansion] *
 Expand and simplify
 $(3a - 1) + 2(a + 2)$ $5a + 3$
19. [Factorisation]
 Factorise $x^2 - 1$ $(x - 1)(x + 1)$
20. [Equations] *
 Solve the inequality:
 $\frac{2x + 1}{3} \geq 5$ $x \geq 7$
21. [Graphs & Functions]
 Sketch the line of equation $x = -2$

22. [Units of Measurement / Time]
 How many litres in 0.8 megalitres (ML)? 800 000 L

23. [Perimeter] *
Using $C = 2\pi r$ and $\pi \approx \frac{22}{7}$, find the circumference of the circular park.



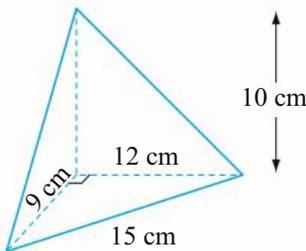
4400 m

24. [Area] *
Plot the points F(1,6), G(7,6) and H(7,2) and use them to find the area of the triangle FGH.



12

25. [Volume] *
Using $V = \frac{1}{3} \times \text{base area} \times \text{height}$, find the volume of the triangular pyramid.

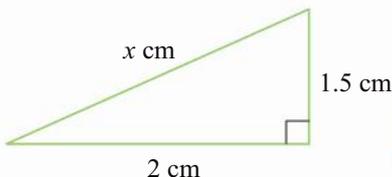


180 cm³

26. [Surface Area] *
Using $TSA = 2\pi r(r + h)$ and $\pi \approx \frac{22}{7}$, find the total surface area of a cylinder of radius 4 cm and height 3 cm.

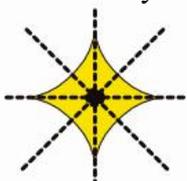
176 cm²

27. [Pythagoras / Trigonometry] *
Find the value of x .

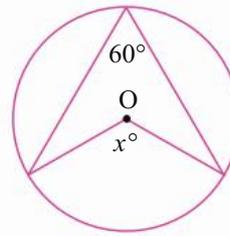


2.5 cm

28. [Shape / Location]
Draw all axes of symmetry and show the centre of symmetry for the shape.



29. [Angles] *
Find the value of x° .



120°

30. [Statistics]
How is the variable 'language spoken' best defined?

- A) Ordinal (ranked opinion e.g. favourite song)
B) Nominal (described e.g. car colour)
C) Continuous (measured e.g. weight)
D) Discrete (counted e.g. crowd size)

B

31. [Probability]
Two dice are thrown one after the other. What is the probability of getting a 2 on the first throw?



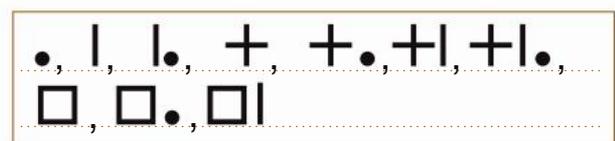
or 0.16̇ $\frac{1}{6}$

32. [Problem Solving 1] *
An ancient civilization used the following number system:

$$\bullet = 1, \quad | = 2, \quad + = 4,$$

$$\square = 8 \quad \text{and} \quad \boxplus = 16.$$

Using as few symbols as possible, complete the numbers 1 to 10.



33. [Problem Solving 2] *
Four students on an excursion came across an old weighing machine and decided to weigh themselves.

"Sorry," said the owner, "that machine is only accurate for weights over 100 kg."

"That's OK," replied one student, "we will hop on two at a time."

The results of the pairings in kilograms were: 103, 105, 106, 106, 107 and 109. What was the weight of the lightest student?

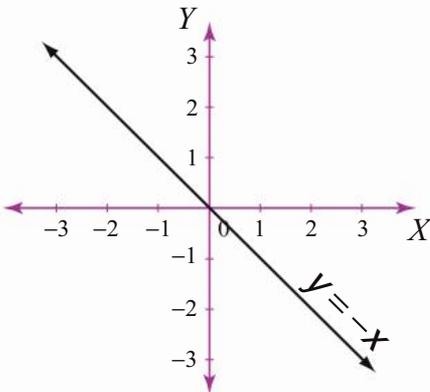
51 kg



Name:

Due Date: / /

Parent's Signature:

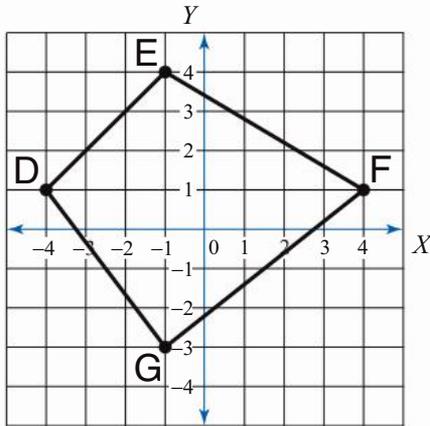
1. [Long \times, \div] *
 $534 \div 12 =$ 44.5
2. [Decimal $+, -$] *
 $1 - 0.09 =$ 0.91
3. [Decimal \times, \div] *
 $0.6 \div 0.25 =$ 2.4
4. [Fraction $+, -$] *
 $\frac{1}{4} - \frac{1}{12} =$ $\frac{1}{6}$
5. [Fraction \times, \div] *
 $6 \div \frac{3}{7} =$ 14
6. [Percentages]
 Of the 10 games, Leon won 6. What percentage of the games did he win? 60%
7. [Integer $+, -$]
 $(+5) - (+10) - (+9) =$ -14
8. [Integer \times, \div]
 $(-6) \times (+5) \div (+10) =$ -3
9. [Rates / Ratios] *
 The average speed of a river current is 5 km/h. How long would it take a person floating on an air bed to drift with the current for 12 km?
2 hours 24 min
10. [Indices] *
 Evaluate $(-0.5)^{-2}$ 4
11. [Square Roots / Surds] *
 Evaluate $2\sqrt{7} + 3\sqrt{7}$ $5\sqrt{7}$
12. [Order of Operations] *
 $[3 \times (6 - 2) + 4] \div 2 =$ 8
13. [Exploring Number]
 Fill in with the appropriate symbol ($<$, $>$, $=$)
 4.03 $<$ $4 + \frac{3}{10}$
14. [Scientific Notation]
 Express 5.0218 correct to 3 decimal places. 5.022
15. [Number Patterns]
 Complete the pattern:
 $\frac{7}{27}, \frac{7}{9}, \frac{7}{3}, 7,$ 21, 63
16. [Expressions]
 Write the following as an algebraic expression:
 A number that is equal to fifteen less than y
 $y - 15$
17. [Substitution] *
 If $x = -3$, find the value of $2x^2 + x$ 15
18. [Expansion] *
 Expand and simplify
 $(m + 1)(m + 4)$ $m^2 + 5m + 4$
19. [Factorisation]
 Factorise $16 - x^2$ $(4 - x)(4 + x)$
20. [Equations] *
 Solve the inequality:
 $\frac{3 - 2x}{3} > 7$ $x < -9$
21. [Graphs & Functions]
 Sketch the line of equation $y = -x$ using the set of coordinate axes below.

22. [Units of Measurement / Time]
 Change 2500 mL into litres. 2.5 L

QUOTE OF THE WEEK: There's a fine line between fishing and just standing on the shore looking like an idiot. Steven Wright

23. [Perimeter] *
Using $\pi \approx 3.14$ find the circumference of a bicycle wheel with a radius of 25 cm.

157 cm

24. [Area] *
Plot the points D(-4,1), E(-1,4), F(4,1) and G(-1,-3) and use them to find the area of the quadrilateral DEFG.

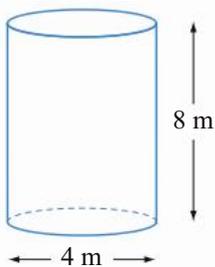


28

25. [Volume] *
A square pyramid has a base 4 cm by 4 cm and a height of 3 cm. What is its volume?

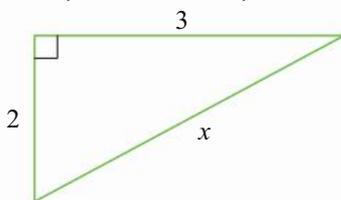
16 cm³

26. [Surface Area] *
Using $\pi \approx 3.14$ find the total surface area of the cylinder.



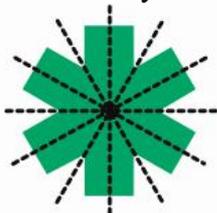
125.6 m²

27. [Pythagoras / Trigonometry] *
Find, in surd form, the value of x .

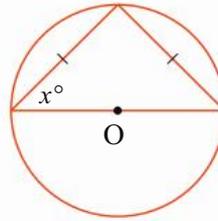


$\sqrt{13}$

28. [Shape / Location]
Draw all axes of symmetry and mark the centre of symmetry for the shape.



29. [Angles] *
Find the value of x° .



45°

30. [Statistics]
How is the variable 'games won this season' best defined?

- A) Ordinal (ranked opinion e.g. favourite song)
B) Nominal (described e.g. car colour)
C) Continuous (measured e.g. weight)
D) Discrete (counted e.g. crowd size)

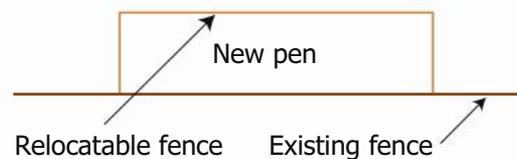
D

31. [Probability]
Two dice are thrown one after the other. What is the probability of getting a 4 on the second throw?



or 0.16 $\frac{1}{6}$

32. [Problem Solving 1] *
A farmer wishes to make a rectangular pen using an existing section of straight fence and 100 m of relocatable fencing materials. What is the largest possible area of the pen?



1250 m²

33. [Problem Solving 2] *
For a scheduled test match, the ground staff at Lords were asked to move the rope, used to mark the circular boundary, out a further 5 metres all the way around the ground. How much more rope should the curator purchase to fill the gap created by enlarging the circle? (Use $\pi \approx 3.14$)

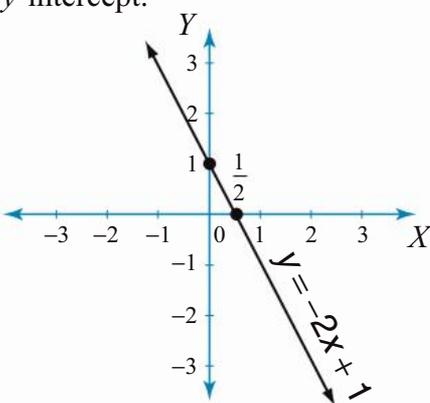
31.4 m



Name:

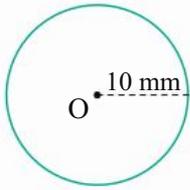
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1. [Long \times, \div] *
 $56 \times 38 =$ 2128
2. [Decimal $+, -$]
 $4.27 + 1.93 =$ 6.2
3. [Decimal \times, \div] *
 $3.2 \div 0.08 =$ 40
4. [Fraction $+, -$] *
 $\frac{2}{3} + \frac{1}{9} =$ $\frac{7}{9}$
5. [Fraction \times, \div] *
 $2 \times \frac{7}{8} =$ $1\frac{3}{4}$
6. [Percentages] *
Of the 400 sausages bought for a school fete, only 35% were sold. How many sausages were sold? 140
7. [Integer $+, -$] *
 $(-1) - (-10) + (-7) =$ 2
8. [Integer \times, \div]
 $(-40) \times (-10) \div (+20) =$ 20
9. [Rates / Ratios] *
A police officer drives from Canberra to Wagga Wagga, a distance of 240 km, at an average speed of 80 km/h, and returns in an emergency averaging 120 km/h. What is the officer's average speed for the two way trip? 96 km/h
10. [Indices] *
Evaluate $\frac{1}{10^{-2}}$ 100
11. [Square Roots / Surds] *
Evaluate $4\sqrt{25} - 3\sqrt{25}$ 5
12. [Order of Operations] *
 $[3 + (7 - 6)] \times 3 =$ 12
13. [Exploring Number]
Fill in with the appropriate symbol ($<$, $>$, $=$)
 5.20 = $5 + \frac{2}{10}$
14. [Scientific Notation]
Express 60.499 correct to the nearest whole number. 60
15. [Number Patterns]
Complete the pattern:
 $\frac{1}{32}, \frac{1}{4}, 2, 16,$ 128, 1024
16. [Expressions]
Write the following as an algebraic expression:
A quarter of x $\frac{x}{4}$
17. [Substitution] *
If $a = -1$, $b = 3$ and $c = 4$, find the value of $b^2 - \frac{c}{a}$ 13
18. [Expansion] *
Expand and simplify $x(x + 2) - 2(x + 1)$ $x^2 - 2$
19. [Factorisation]
Factorise $y^2 - 36$ $(y - 6)(y + 6)$
20. [Equations] *
Solve the inequality:
 $\frac{3x + 1}{5} < 5$ $x < 8$
21. [Graphs & Functions] *
Sketch the graph of the linear rule $y = -2x + 1$ by first finding the x -intercept and the y -intercept.

22. [Units of Measurement / Time]
How many millimetres in 125 centimetres? 1250 mm

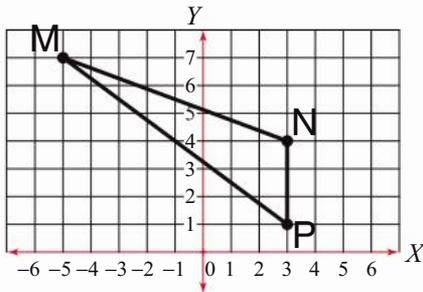
QUOTE OF THE WEEK: We give thanks for the invention of the handle, without it there would be many things we couldn't get a hold on. Leunig

23. [Perimeter] *
Using $\pi \approx 3.14$ find the circumference of the circle.



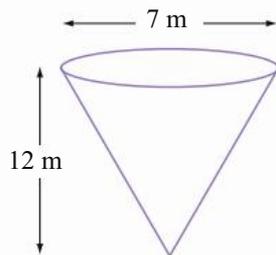
62.8 mm

24. [Area] *
Plot the points M(-5,7), N(3,4) and P(3,1) and use them to find the area of the triangle MNP.



12

25. [Volume] *
Using $V = \frac{\pi r^2 h}{3}$ and $\pi \approx \frac{22}{7}$, find the volume of the cone.

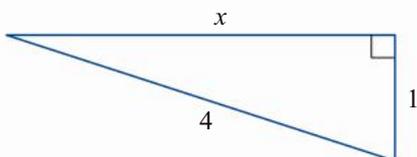


154 m³

26. [Surface Area] *
Using $\pi \approx \frac{22}{7}$ find the total surface area of a cylindrical can of radius 3.5 cm and height 1.5 cm.

110 cm²

27. [Pythagoras / Trigonometry] *
Find, in surd form, the value of x .

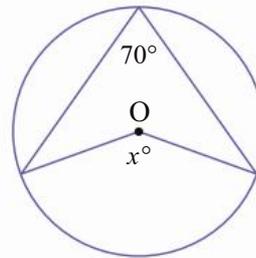


$\sqrt{15}$

28. [Shape / Location]
Draw all axes of symmetry and mark the centre of symmetry for the shape.



29. [Angles] *
Find the value of x° .



140°

30. [Statistics]
How is the variable 'restaurant quality' best defined?

- A) Ordinal (ranked opinion e.g. favourite song)
- B) Nominal (described e.g. car colour)
- C) Continuous (measured e.g. weight)
- D) Discrete (counted e.g. crowd size)

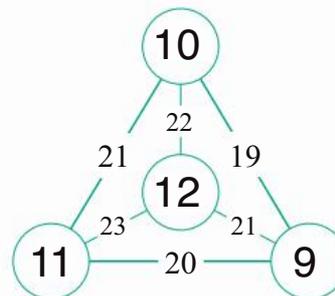
A

31. [Probability]
Two dice are thrown one after the other. What is the probability of getting the same score on the second die as the first?



or 0.16 $\frac{1}{6}$

32. [Problem Solving 1] *
Enter numbers in the circles so that the numbers on each line equal the sum of the numbers at each end.



33. [Problem Solving 2] *
Farmer Brown claims his rectangular farm is the same as Old MacDonald's, admittedly 20% shorter, but to make up for this it is 20% wider. In reality he owns 10 hectares less than Old MacDonald. How many hectares does Old MacDonald own?

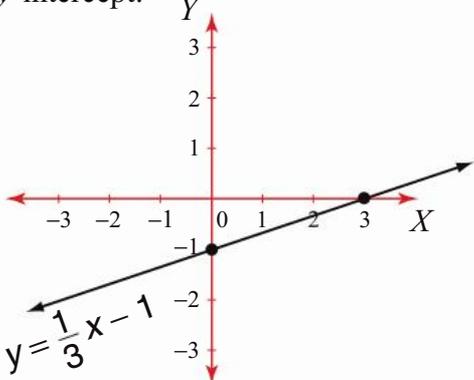
250 ha



Name:

Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $649 \div 11 =$ 59
2. [Decimal $+, -$]
 $8.09 + 0.91 =$ 9
3. [Decimal \times, \div] *
 $0.5 \times 0.3 =$ 0.15
4. [Fraction $+, -$] *
 $\frac{5}{18} - \frac{1}{9} =$ $\frac{1}{6}$
5. [Fraction \times, \div] *
 $\frac{5}{9} \div 6 =$ $\frac{5}{54}$
6. [Percentages] *
In the mathematics test, Mabel scored 32 out of a possible 40 marks. What percentage is this? 80%
7. [Integer $+, -$]
 $(+10) + (-7) + (-4) =$ -1
8. [Integer \times, \div]
 $(+5) \times (-40) \div (+2) =$ -100
9. [Rates / Ratios] *
Joshua averaged 164 heart beats per minute for the first 10 minutes of his half an hour fitness session, and 122 beats per minute for the rest of the session. What was his average heart rate for the whole session? 136 beats/min
10. [Indices] *
Evaluate $\left(\frac{1}{2}\right)^{-4}$ 16
11. [Square Roots / Surds] *
Evaluate $4\sqrt{3} \times 2\sqrt{3}$ 24
12. [Order of Operations] *
 $[12 + (24 - 16)] \div 4 =$ 5
13. [Exploring Number]
Fill in with the appropriate symbol ($<$, $>$, $=$)
 4245×0.9 $<$ 4245
14. [Scientific Notation]
Express 0.08529 correct to 3 decimal places. 0.085
15. [Number Patterns]
Complete the pattern:
 $\frac{1}{18}, \frac{1}{3}, 2, 12,$ 72, 432
16. [Expressions]
Write the following as an algebraic expression:
Four lots of b 4b
17. [Substitution] *
If $p = 2, r = -1$ and $s = 4,$
find the value of $\frac{r}{p} + \frac{r}{s}$ $-\frac{3}{4}$
18. [Expansion] *
Expand and simplify
 $(y + 1)(y - 1)$ $y^2 - 1$
19. [Factorisation]
Factorise $9x^2 - 4$ $(3x - 2)(3x + 2)$
20. [Equations] *
Solve the inequality:
 $\frac{5x + 2}{11} \leq 2$ $x \leq 4$
21. [Graphs & Functions] *
Sketch the graph of the linear rule $y = \frac{1}{3}x - 1$
by first finding the x -intercept and the y -intercept.

22. [Units of Measurement / Time]
Change 1650 mm into metres. 1.65 m

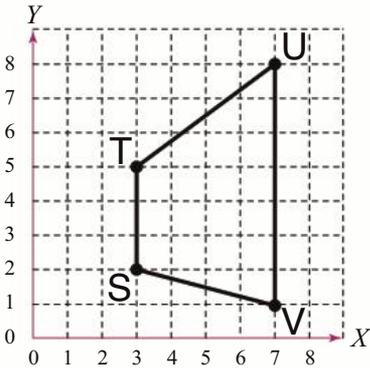
23. [Perimeter] *
Using $\pi \approx \frac{22}{7}$ find the circumference of a bicycle wheel with radius 21 cm.



wheel diameter = 42 cm

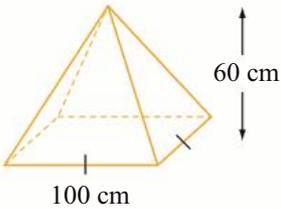
132 cm

24. [Area] *
Plot the points S(3,2), T(3,5), U(7,8) and V(7,1) and use them to find the area of the quadrilateral STUV.



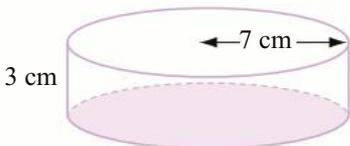
20

25. [Volume] *
Find the volume, in m^3 , of the square pyramid.



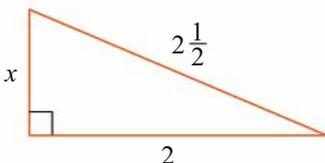
0.2 m^3

26. [Surface Area] *
Using $\pi \approx \frac{22}{7}$ find the total surface area of the cylinder.



440 cm^2

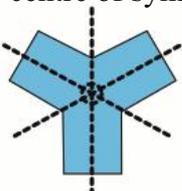
27. [Pythagoras / Trigonometry] *
Find the value of x .



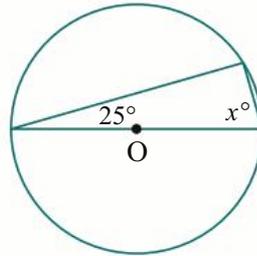
or 1.5

1 $\frac{1}{2}$

28. [Shape / Location]
Draw all axes of symmetry and mark the centre of symmetry for the shape.



29. [Angles] *
Find the value of x° .



65°

30. [Statistics]
How is the variable 'patient's temperature' best defined?

- A) Ordinal (ranked opinion e.g. favourite song)
B) Nominal (described e.g. car colour)
C) Continuous (measured e.g. weight)
D) Discrete (counted e.g. crowd size)

C

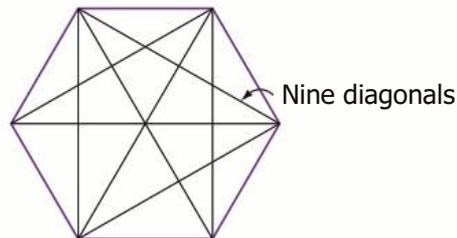
31. [Probability] *
A coin and a die are tossed. What is the probability of throwing a tail and an even number?



or 0.25

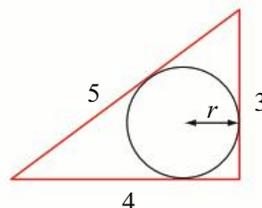
$\frac{1}{4}$

32. [Problem Solving 1] *
If each corner of a square is joined to each other corner of the square, two diagonals will have been drawn. To do the same for a hexagon, nine diagonals would have to be drawn. How many diagonals would have to be drawn on a regular polygon with 15 sides?



90

33. [Problem Solving 2] *
Find the radius of the inscribed circle in a 3, 4, 5 triangle.



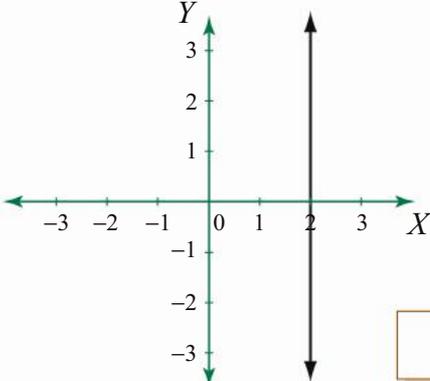
1



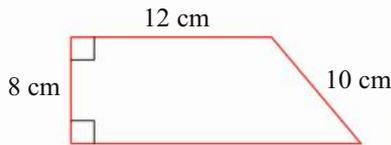
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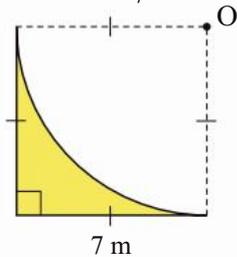
1. [Long \times, \div] *
 $12.5 \times 12 =$ 150
2. [Decimal $+, -$] *
 $20 - 0.08 =$ 19.92
3. [Decimal \times, \div] *
 $2 \div 0.08 =$ 25
4. [Fraction $+, -$] *
 $1\frac{3}{8} - \frac{1}{4} =$ $1\frac{1}{8}$
5. [Fraction \times, \div] *
 $\frac{3}{5} \times 10 =$ 6
6. [Percentages] *
 Reduce \$130 by 20%. \$ 104
7. [Integer $+, -$] *
 $(+5) - (+2) + (-9) =$ -6
8. [Integer \times, \div] *
 $\frac{(-6)}{(-2)} =$ 3
9. [Rates / Ratios] *
 Divide \$21 in the ratio 2 : 5 \$6 : \$15
10. [Indices] *
 Simplify $\frac{x^4 y^6}{x^3}$ xy^6
11. [Square Roots / Surds] *
 $\sqrt{27} = 3\sqrt{3}$
 True or false? true
12. [Order of Operations] *
 $\sqrt{9+16} =$ 5
13. [Exploring Number] *
 Write $\frac{2}{3}$ as a recurring decimal. $0.\dot{6}$
14. [Scientific Notation] *
 Express 0.0175 in scientific notation. 1.75×10^{-2}
15. [Number Patterns] *
 Complete the pattern:
 2, 2, 4, 6, 10, 16, 26
16. [Expressions] *
 Write the following as an algebraic expression:
 A number that is five more than
 a half of z $5 + \frac{z}{2}$
17. [Substitution] *
 If $y = 3x + 7$, what value of x
 will make $y = 7$? 0
18. [Expansion] *
 Expand and simplify
 $2(p + 2) - (p - 3)$ $p + 7$
19. [Factorisation] *
 Factorise and simplify $\frac{6x - 3}{10x - 5}$ $\frac{3}{5}$
20. [Equations] *
 Solve for x :
 $\frac{3(x + 2)}{5} = 6$ 8
21. [Graphs & Functions] *
 Find the equation of the straight line.
 $x = 2$
22. [Units of Measurement / Time] *
 Convert 10 km^2 to m^2 . $10\,000\,000 \text{ m}^2$

23. [Perimeter] *
Find the perimeter of the trapezium.
[Hint: Pythagoras' theorem will help.]



48 cm

24. [Area] *
Find the area of the shaded region.
(Use $\pi \approx \frac{22}{7}$)



10.5 m²

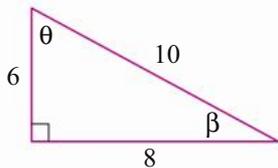
25. [Volume] *
Find the volume of milk (in litres) in a carton
8 cm by 8 cm by $15\frac{5}{8}$ cm.

1 L

26. [Surface Area] *
A cargo container 3 m by 4 m by 2.5 m is to be given a coat of paint on all surfaces, inside and out. If 1 litre of paint covers 10 m², how many 4 litre tins of paint are required?

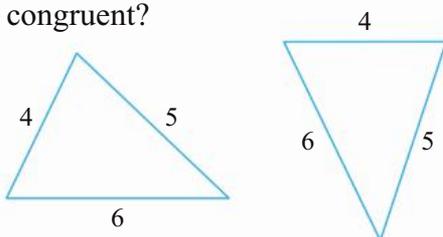
3

27. [Pythagoras / Trigonometry] *
For which angle is the sine ratio 0.6?



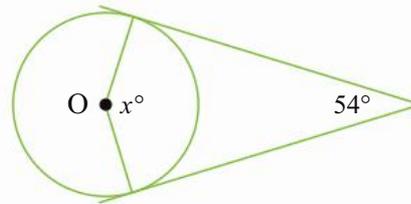
β

28. [Shape / Location]
Which test (SSS, SAS, ASA, RHS) could be used to show the following triangles are congruent?



SSS

29. [Angles] *
Find the value of x° .



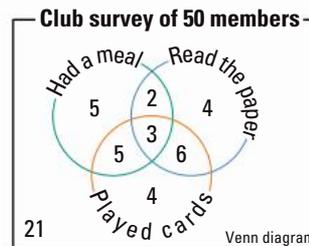
126°

30. [Statistics]
Find the median and mode for the following distribution:

Score	11	12	13	14	15	16
Frequency	3	5	1	2	4	1

median = 12.5 mode = 12

31. [Probability] *
Find the probability that a club member selected at random had a meal and played cards, but didn't read the paper.

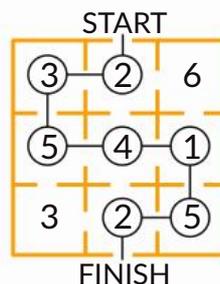


or 0.1
 $\frac{1}{10}$

32. [Problem Solving 1] *
Martha, Tamara and Virginia each prepared a list of history's most influential people. The lists were compared and any names that appeared on at least two lists were shortlisted. Of the names on the shortlist, 45 had been included on Martha's list, 34 on Tamara's list, and 28 on Virginia's list. What is the maximum number of names that might have reached the shortlist?

53

33. [Problem Solving 2] *
Find a path from START to FINISH so that the product of the numbers of the rooms through which you pass is 1200.





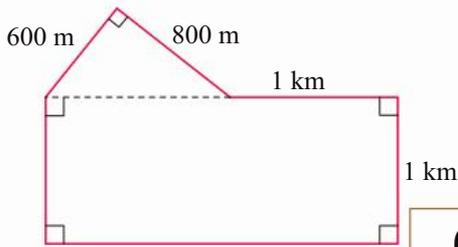
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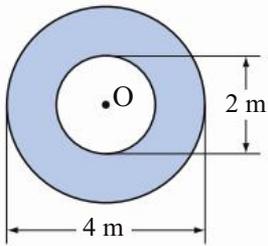
1. [Long \times, \div]
 $531 \div 9 =$ 59
2. [Decimal $+, -$]
 $1.19 + 0.91 =$ 2.1
3. [Decimal \times, \div]*
 $1.5 \times 0.6 =$ 0.9
4. [Fraction $+, -$]*
 $3\frac{1}{6} + \frac{1}{2} =$ $3\frac{2}{3}$
5. [Fraction \times, \div]*
 $8 \div \frac{4}{3} =$ 6
6. [Percentages]*
 Reduce \$96 by 25%. \$ 72
7. [Integer $+, -$]
 $(-3) - (+2) + (-6) =$ -11
8. [Integer \times, \div]
 $\frac{18}{(-3)} =$ -6
9. [Rates / Ratios]*
 Share 45 oranges in the ratio 6 : 3 30 : 15
10. [Indices]
 Simplify $\frac{5a^{10}b^4}{a^6}$ $5a^4b^4$
11. [Square Roots / Surds]*
 Simplify $\sqrt{48}$ $4\sqrt{3}$
12. [Order of Operations]*
 $\sqrt{5^2 - 3^2} =$ 4
13. [Exploring Number]*
 Express the recurring decimal $0.\dot{1}\dot{5}$ as a fraction in its simplest form. $\frac{5}{33}$
14. [Scientific Notation]
 Express $2\,500\,000\text{ km}^2$, the area of the Mediterranean Sea, in scientific notation. $2.5 \times 10^6\text{ km}^2$
15. [Number Patterns]
 Complete the pattern:
 $\frac{1}{1}, \frac{1}{4}, \frac{1}{9}, \frac{1}{16},$ $\frac{1}{25}, \frac{1}{36}$
16. [Expressions]
 Write the following as an algebraic expression:
 A number that is ten less than a third of n $\frac{n}{3} - 10$
17. [Substitution]*
 If we substitute $x = 0$ and $y = 4$ into $\frac{x}{y} + 4$ the result is 4. True or false? true
18. [Expansion]*
 Expand and simplify $4(z - 1) - 2(z - 2)$ 2z
19. [Factorisation]*
 Factorise and simplify $\frac{4x^2 - 8x}{3x - 6}$ $\frac{4x}{3}$
20. [Equations]*
 Solve for x :
 $\frac{2(x - 3)}{3} = 9$ 16.5
21. [Graphs & Functions]*
 Find the equation of the straight line.
 $y = x - 2$
22. [Units of Measurement / Time]
 How many cm^2 are there in an area of 400 mm^2 ? 4 cm^2

23. [Perimeter] *
Find the perimeter of the polygon.
[Hint: Pythagoras' theorem will help.]



6.4 km

24. [Area] *
Find the area of the shaded annulus.
(Use $\pi \approx 3.14$)



9.42 m²

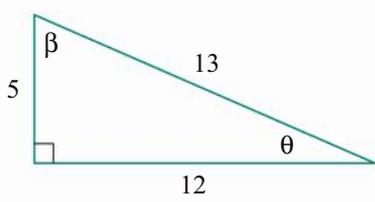
25. [Volume] *
A rectangular fish tank 120 cm long and 50 cm wide is filled with 240 litres of water. What is the average depth of the water in the fish tank?

40 cm

26. [Surface Area] *
The side length of a cube is tripled. By what factor will the surface area increase?

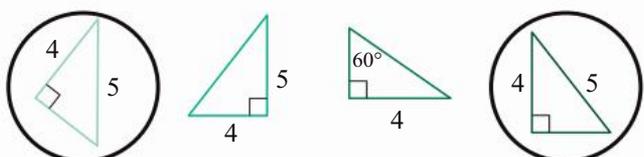
9

27. [Pythagoras / Trigonometry] *
For which angle is the tangent ratio 2.4?



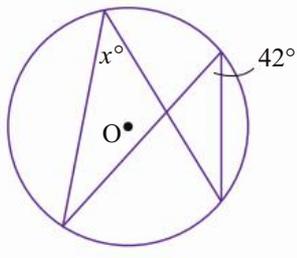
beta

28. [Shape / Location]
Circle the two congruent triangles and give your reason: SSS, SAS, ASA or RHS



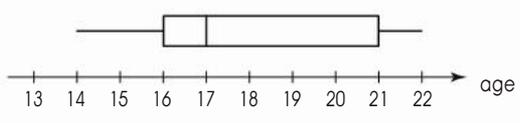
RHS

29. [Angles] *
Find the value of x° .



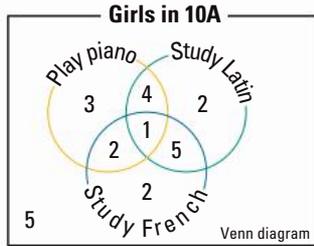
42°

30. [Statistics]
Find the median and range for the ages sampled in this box-and-whisker plot.



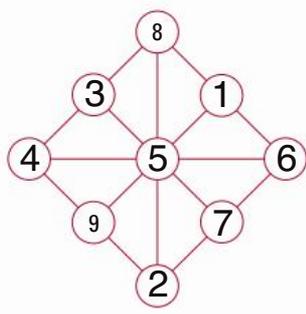
median = 17 range = 8

31. [Probability] *
If a girl from the class is chosen at random, what is the probability that she plays piano?



5/12

32. [Problem Solving 1] *
Fill in the numbers 1 to 7 so that the sum of the numbers along each straight line is 15.



33. [Problem Solving 2] *
Two women and two children wish to cross a river in a canoe that will hold only one woman or both children. They can all row on their own, but no one can swim. If a one way trip in the canoe takes 10 minutes, what is the minimum time in which all four people can cross the river?

90 min



Name:

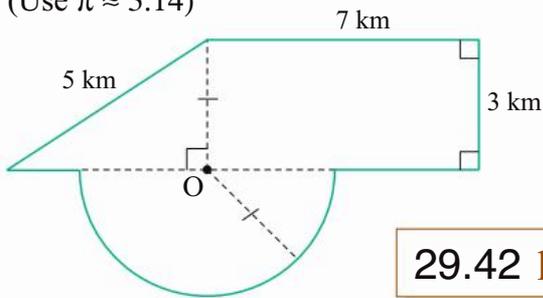
Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $23.8 \times 14 =$ 333.2
2. [Decimal $+, -$] *
 $4 - 0.04 =$ 3.96
3. [Decimal \times, \div] *
 $0.12 \div 0.006 =$ 20
4. [Fraction $+, -$] *
 $\frac{3}{4} - \frac{3}{20} =$ $\frac{3}{5}$
5. [Fraction \times, \div] *
 $4 \times \frac{9}{2} =$ 18
6. [Percentages] *
 Reduce \$12 by 5%. \$ 11.40
7. [Integer $+, -$] *
 $(+15) + (-12) + (-1) =$ 2
8. [Integer \times, \div] *
 $\frac{(-24)}{6} =$ -4
9. [Rates / Ratios] *
 Divide 60 kg in the ratio 4 : 2
40 kg : 20 kg
10. [Indices] *
 Simplify $\frac{9a^3 b}{3a}$ 3a²b
11. [Square Roots / Surds] *
 Simplify $\sqrt{72}$ 6 $\sqrt{2}$
12. [Order of Operations] *
 $\sqrt[3]{(5+3)^2} =$ 4
13. [Exploring Number] *
 Express the recurring decimal $0.\dot{8}$ as a fraction. $\frac{8}{9}$
14. [Scientific Notation] *
 Express 100 000 000 000, the number of stars in the Milky Way, in scientific notation. 1×10^{11}
15. [Number Patterns] *
 Complete the pattern:
 0, 2, 6, 14, 30, 62, 126
16. [Expressions] *
 Write the following as an algebraic expression:
 A number that is three times more than a half of m $\frac{3m}{2}$
17. [Substitution] *
 If $y = \frac{x}{4} - 3$, find the value of y when $x = 12$ 0
18. [Expansion] *
 Expand and simplify $(x - 2)(x + 3)$ $x^2 + x - 6$
19. [Factorisation] *
 Factorise and simplify $\frac{5x^2 + 10x}{2x + 4}$ $\frac{5x}{2}$
20. [Equations] *
 Solve for x :
 $\frac{4(x - 1)}{3} = 8$ 7
21. [Graphs & Functions] *
 Find the equation of the straight line.
y = 1
22. [Units of Measurement / Time] *
 How many cm^3 are there in 1 cubic metre? 1 000 000 cm^3

23. [Perimeter] *

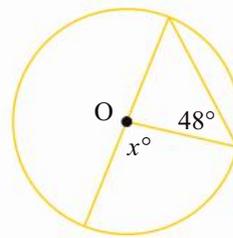
Find the perimeter of the shape.
(Use $\pi \approx 3.14$)



29.42 km

29. [Angles] *

Find the value of x° .

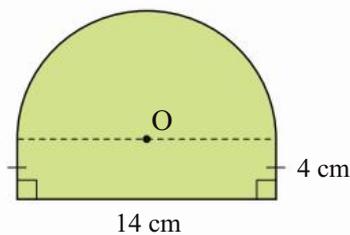


96°

24. [Area] *

Find the area of the shaded region.

(Use $\pi \approx \frac{22}{7}$)



133 cm²

30. [Statistics]

Find the median and mode for the following distribution:

Score	1	2	3	4	5	6
Frequency	2	1	3	1	2	6

median = 5

mode = 6

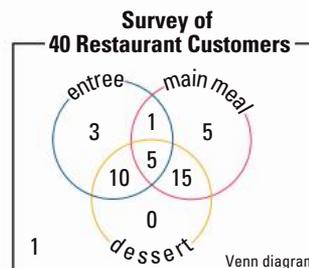
25. [Volume] *

A water-wise person places a brick 12 cm by 10 cm by 25 cm inside the toilet cistern. How many litres of water will the family save each week if the toilet is used 13 times per day?

273 L

31. [Probability] *

Find the probability that a customer selected at random had a main meal and dessert but no entree.



or 0.375

$\frac{3}{8}$

26. [Surface Area] *

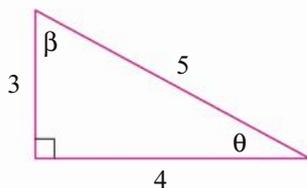
In which sphere is the ratio $\frac{\text{surface area}}{\text{volume}}$ greater?

- A) a smaller sphere
B) a larger sphere

A

27. [Pythagoras / Trigonometry] *

Calculate the value of $\cos \theta$.



or 0.8

$\frac{4}{5}$

32. [Problem Solving 1] *

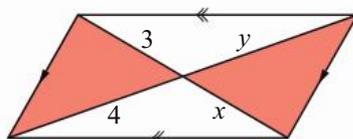
If $0 < x < 1$, which of the following is the largest?

- A) $\frac{1}{x^2}$ B) $\frac{1}{x}$ C) x D) x^2 E) x^3

A

33. [Problem Solving 2] *

A pattern of triangles is made from matches, as shown below. To make the first triangle required three matches, the second figure required 9 matches. How many matches are required for the tenth figure in this pattern?



$x = 3$ $y = 4$

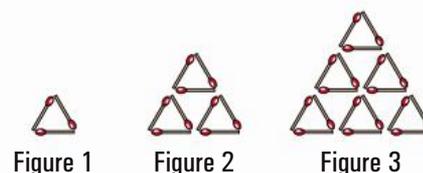


Figure 1

Figure 2

Figure 3

165



Name:

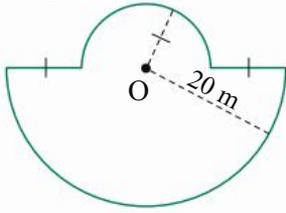
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Parent's Signature:

1. [Long \times, \div] *
 $37.5 \times 8 =$ 300
2. [Decimal $+, -$]
 $2.88 + 0.88 =$ 3.76
3. [Decimal \times, \div] *
 $1.3 \times 0.11 =$ 0.143
4. [Fraction $+, -$] *
 $1\frac{1}{14} - \frac{3}{7} =$ $\frac{9}{14}$
5. [Fraction \times, \div] *
 $3 \div \frac{3}{7} =$ 7
6. [Percentages] *
Reduce \$6.50 by 40%. \$ 3.90
7. [Integer $+, -$]
 $(+6) - (-7) + (+13) =$ 26
8. [Integer \times, \div]
 $(4 - 6) \times (3 - 5) =$ 4
9. [Rates / Ratios] *
Share 24 apples in the ratio 5 : 3 15 : 9
10. [Indices]
Simplify $\frac{6m^4n^2}{2m^2n^2}$ 3m²
11. [Square Roots / Surds] *
Simplify $\sqrt{80}$ 4 $\sqrt{5}$
12. [Order of Operations] *
 $(\sqrt{9} + \sqrt{4})^2 =$ 25
13. [Exploring Number]
Write $\frac{2}{11}$ as a recurring decimal. 0.1 $\dot{8}$
14. [Scientific Notation]
Express 149 000 000 km, the distance from the Earth to the Sun, in scientific notation. 1.49 $\times 10^8$ km
15. [Number Patterns]
Complete the pattern:
32, 31, 29, 26, 22, 17
16. [Expressions]
Write the following as an algebraic expression:
A number that is the average of m and n $\frac{m+n}{2}$
17. [Substitution] *
If $y = 4x - 5$, what value of x will make $y = -1$? 1
18. [Expansion] *
Expand and simplify $(a + 5)(a - 5)$ a² - 25
19. [Factorisation] *
Factorise and simplify $\frac{12xy - 4y}{6x - 2}$ 2y
20. [Equations] *
Solve for x :
 $\frac{3(x+4)}{4} = 6$ 4
21. [Graphs & Functions]
Find the equation of the straight line.

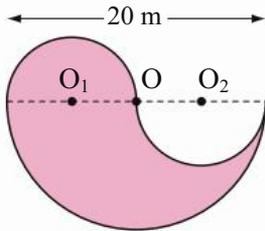
y = -1
22. [Units of Measurement / Time]
Change 0.25 hectares into square metres. 2500 m²

23. [Perimeter] *
Using $\pi \approx 3.14$ calculate the perimeter of the shape.



114.2 m

24. [Area] *
Find the area of the shape. (Use $\pi \approx 3.14$)



157 m²

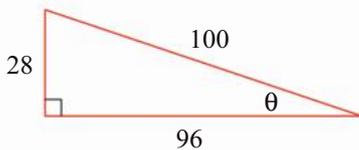
25. [Volume] *
How many cubic metres of sand are needed to fill a rectangular long jump pit 5 m long, 1.8 m wide and 40 cm deep?

3.6 m³

26. [Surface Area] *
The surface area of a cube is 54 cm². What is its side length?

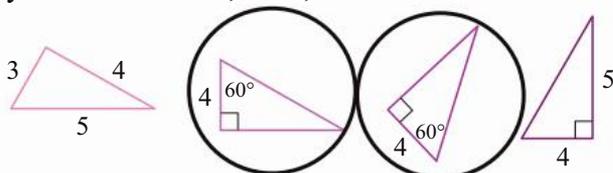
3 cm

27. [Pythagoras / Trigonometry] *
Calculate the value of $\sin \theta$.



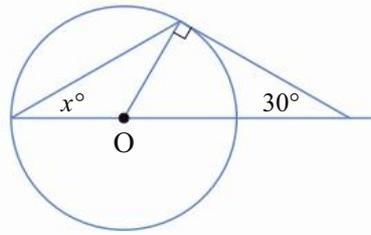
or 0.28
 $\frac{7}{25}$

28. [Shape / Location]
Circle the two congruent triangles and give your reason: SSS, SAS, ASA or RHS



ASA

29. [Angles] *
Find the value of x° .



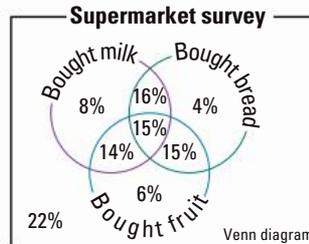
30°

30. [Statistics]
Find the median and mode for the following distribution:

Score	1	2	3	4	5	6
Frequency	3	2	4	7	8	6

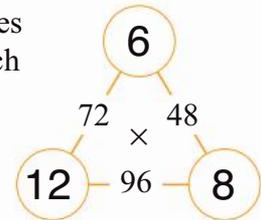
median = 4 mode = 5

31. [Probability] *
Find the probability that a customer chosen at random did not buy fruit.



50%

32. [Problem Solving 1] *
Enter numbers in the circles so that the numbers on each line equal the product of the numbers at each end.



33. [Problem Solving 2]
This table shows the team standings after 2 rounds of the 2006 F.I.F.A. World Cup. Who did Japan play in its third round robin game?
[Each team plays every other team in the group once, and 3 points are awarded for a win, 1 for a draw and none for a lost game.]

Group F

Team	MP	W	D	L	GF	GA	Pts
	matches played	wins	draws	losses	goals for	goals against	points
Brazil	2	2	0	0	3	0	6
Australia	2	1	0	1	3	3	3
Croatia	2	0	1	1	0	1	1
Japan	2	0	1	1	1	3	1

Japan: Brazil (1:4)



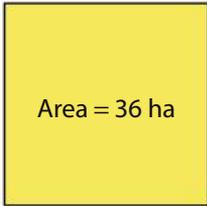
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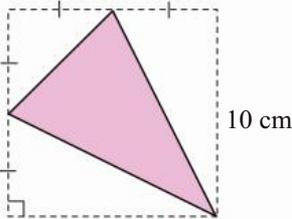
1. [Long \times, \div] *
 $5.2 \div 8 =$ 0.65
2. [Decimal $+, -$]
 $19.6 + 0.1 - 0.4 =$ 19.3
3. [Decimal \times, \div] *
 $0.8 \times 0.6 =$ 0.48
4. [Fraction $+, -$] *
 $\frac{1}{2} + \frac{1}{5} =$ $\frac{7}{10}$
5. [Fraction \times, \div] *
 $\frac{3}{5} \times 2\frac{1}{4} =$ $1\frac{7}{20}$
6. [Percentages] *
Find 100%, given that 10% is \$30. \$ 300
7. [Integer $+, -$]
 $-6 - (2 - 5) =$ -3
8. [Integer \times, \div]
 $(-4m) \times (-2) =$ 8m
9. [Rates / Ratios] *
Concrete contains cement, sand and gravel in the ratio 2 : 3 : 5. How much gravel is there in 200 kg of concrete? 100 kg
10. [Indices] *
Simplify $\frac{4s^2}{8s^{-3}}$ $\frac{s^5}{2}$
11. [Square Roots / Surds] *
Evaluate $\frac{6\sqrt{45}}{3\sqrt{5}}$ 6
12. [Order of Operations] *
 $(9 - 8)^{2011} \times (2 - 2)^{2012} =$ 0
13. [Exploring Number] *
Find $\frac{4}{5}$ of \$6 \$ 4.80
14. [Scientific Notation]
How many significant figures are there in 14 500? 3
15. [Number Patterns] *
Write the first four terms of the sequence $t_n = 2n$ where $n \geq 1$ 2, 4, 6, 8
16. [Expressions]
Simplify:
 $(x^2 + 2x + 3) + (x^2 + 3x - 2)$ $2x^2 + 5x + 1$
17. [Substitution] *
If $a = 5$ and $b = 2$, write true or false for the statement:
 $ab = 0$ false
18. [Expansion] *
Expand $(a + 2)^2$ $a^2 + 4a + 4$
19. [Factorisation] *
Factorise $x^2 + 5x + 6$ $(x + 2)(x + 3)$
20. [Equations] *
Solve for x :
 $(x + 1)(x - 3) = 0$ -1, 3
21. [Graphs & Functions] *
Use the rule $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line joining the points M(1,1) and N(3,7) 3
22. [Units of Measurement / Time] *
A penguin can swim at a speed of 10 m/s. What is this speed in km per hour? 36 km/h

23. [Perimeter] *
Find the perimeter of the square.



2400 m

24. [Area] *
Find the area of the shaded region.

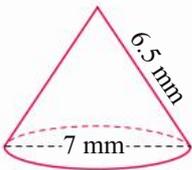


37.5 cm²

25. [Volume] *
A square pyramid of base 3 cm by 3 cm is made from 18 cm³ of clay. What is the height of the pyramid?

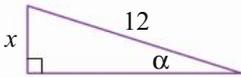
6 cm

26. [Surface Area] *
Use $TSA = \pi r(r + s)$ and $\pi \approx \frac{22}{7}$ to find the total surface area of the cone.



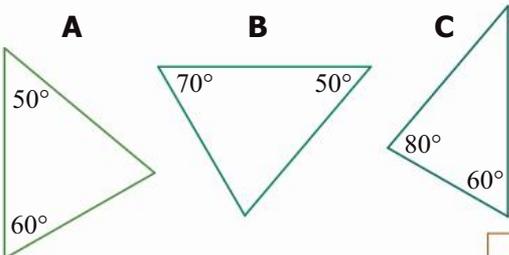
110 mm²

27. [Pythagoras / Trigonometry] *
Find the value of x , given $\sin \alpha = 0.3$



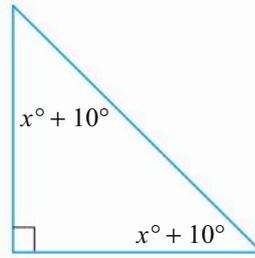
3.6

28. [Shape / Location]
Two of these triangles are similar. Which is the odd one out?



C

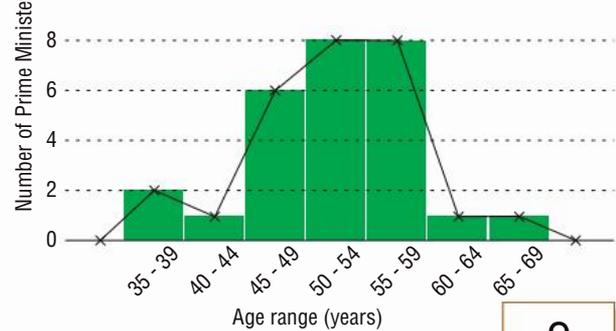
29. [Angles] *
Find the value of x° .



35°

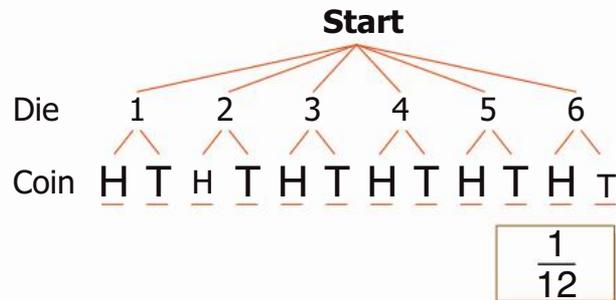
30. [Statistics]
How many prime ministers began their term in office before the age of 50?

Age of Australian Prime Ministers beginning their term (1st Oct 2010)



9

31. [Probability]
A die is rolled, and then a coin tossed. What is the probability of throwing a tail and a five?
[Complete the tree diagram to help solve the problem.]



32. [Problem Solving 1] *
Fill in the magic square.
[Every row, column and diagonal has the same sum.]

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

33. [Problem Solving 2] *
I have square paving tiles in two different colours. I want you to design for me a paved area that is made up of a rectangle in one colour surrounded by a border in the other colour. I want however to use exactly the same number of pavers of each colour and I want the total paved area to be as large as possible. How many pavers do I need?

60



Name:

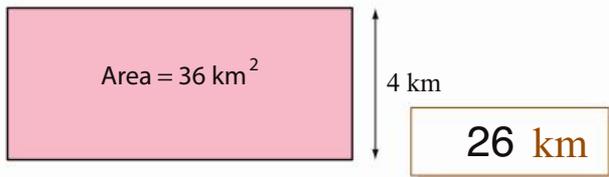
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Parent's Signature:

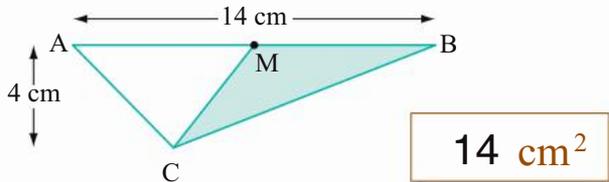
1. [Long \times, \div] *
 $18.7 \times 8 =$ 149.6
2. [Decimal $+, -$]
 $0.7 + 3.5 - 0.5 =$ 3.7
3. [Decimal \times, \div] *
 $0.4 \div 5 =$ 0.08
4. [Fraction $+, -$] *
 $\frac{1}{2} - \frac{1}{3} =$ $\frac{1}{6}$
5. [Fraction \times, \div] *
 $1\frac{1}{9} \times 1\frac{7}{2} =$ 5
6. [Percentages] *
Find 100%, given that 50% is \$28. \$ 56
7. [Integer $+, -$]
 $7 + (3 - 9) =$ 1
8. [Integer \times, \div]
 $(+5) \times (-3q) =$ -15q
9. [Rates / Ratios] *
Renee built a Lego house using white, blue and red bricks in the ratio 2 : 8 : 5. Of the 150 bricks used, how many were blue? 80
10. [Indices] *
Simplify $\frac{3(t^2)^{-2}}{t^{-5}}$ 3t
11. [Square Roots / Surds] *
Evaluate $\frac{5\sqrt{80}}{\sqrt{5}}$ 20
12. [Order of Operations] *
 $15 \times 36 \times (2 - 2) + 9 =$ 9
13. [Exploring Number] *
Find $\frac{2}{9}$ of \$3.60 \$ 0.80
14. [Scientific Notation]
How many significant figures are there in 200 000? 1
15. [Number Patterns] *
Write the first four terms of the sequence $t_n = 2n + 3$ where $n \geq 1$ 5, 7, 9, 11
16. [Expressions]
Simplify:
 $(2x^2 + 3x + 5) + (x^2 - 2x - 3)$ $3x^2 + x + 2$
17. [Substitution] *
If $a = 5$, $b = 3$ and $c = 1$, write true or false for the statement:
 $b + c < a$ true
18. [Expansion] *
Expand $(x - 2)^2$ $x^2 - 4x + 4$
19. [Factorisation] *
Factorise $x^2 + 8x + 12$ $(x + 2)(x + 6)$
20. [Equations] *
Solve for x :
 $(x - 8)(x + 3) = 0$ -3, 8
21. [Graphs & Functions] *
Use the rule $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line joining the points P(3,2) and Q(1,5) $-\frac{3}{2}$
22. [Units of Measurement / Time] *
The normal landing speed of a jet aircraft is approximately 270 km/h. How many m/s is this equivalent to? 75 m/s

QUOTE OF THE WEEK: Constant dripping hollows out a stone. Lucretius

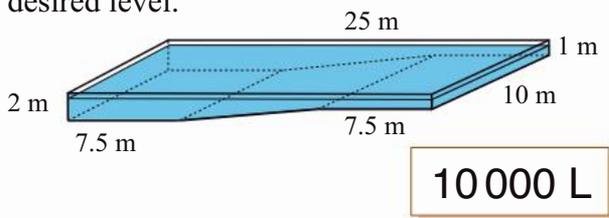
23. [Perimeter] *
Find the perimeter of the rectangle.



24. [Area] *
Find the area of the shaded triangle, given that M is the midpoint of AB.



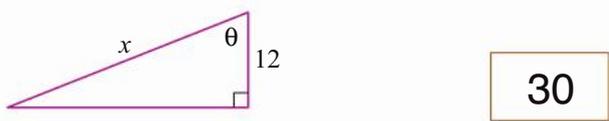
25. [Volume] *
The water level in a public swimming pool has fallen 4 cm due to evaporation. Use the pool dimensions to find how many litres of water must be added to the pool to reach the desired level.



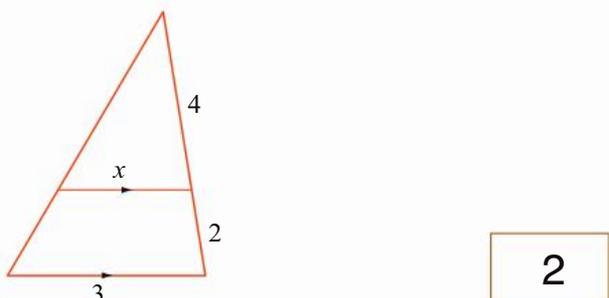
26. [Surface Area] *
Using $TSA = 4\pi r^2$ and $\pi \approx \frac{22}{7}$, find the surface area of the sphere.



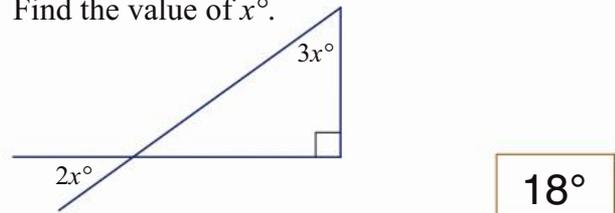
27. [Pythagoras / Trigonometry] *
Find the value of x , given $\cos \theta = 0.4$



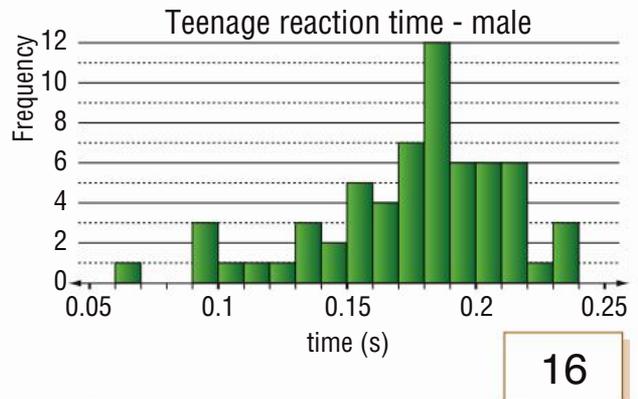
28. [Shape / Location]
Find the value of x . [All measurements are in cm.]



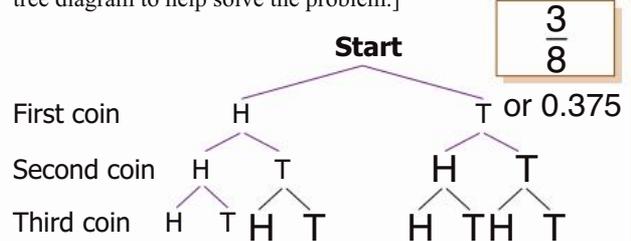
29. [Angles] *
Find the value of x° .



30. [Statistics]
How many teenage males had a reaction time of 0.15 to 0.18 seconds?



31. [Probability]
Three coins are tossed. What is the probability of having two heads and one tail? [Complete the tree diagram to help solve the problem.]



32. [Problem Solving 1] *
Chuquet posed the following problem in the year 1484:
“A builder made a deal with a man to build a house in 30 days. For every day of work the builder was to be paid 5 coins but for every day of rest he would pay back 6 coins. When the house was finished the builder had gained 18 coins. Find the number of days the builder worked.”

33. [Problem Solving 2] *
A bricklayer knows from experience that no more than 6% of any load of bricks is broken on delivery. Since it is often not possible to purchase exactly matching bricks at a later date, it is important that the original order include sufficient bricks for the job. If bricks can only be ordered in lots of 100, and 8000 bricks are required to finish the job, how many bricks should the bricklayer order?



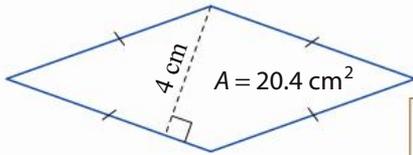
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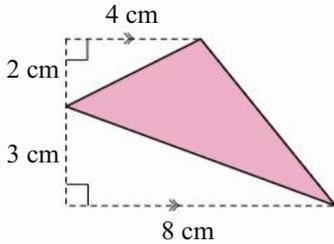
1. [Long \times, \div] *
 $6.03 \div 9 =$ 0.67
2. [Decimal $+, -$] *
 $4 + 0.2 - 2.3 =$ 1.9
3. [Decimal \times, \div] *
 $0.75 \times 0.04 =$ 0.03
4. [Fraction $+, -$] *
 $\frac{2}{5} - \frac{1}{3} =$ $\frac{1}{15}$
5. [Fraction \times, \div] *
 $2 \times 2\frac{4}{5} =$ $5\frac{3}{5}$
6. [Percentages] *
Find 100%, given that 2% is \$4. \$ 200
7. [Integer $+, -$] *
 $(6 - 11) - 2 =$ -7
8. [Integer \times, \div] *
 $(-7) \times (-2t) =$ 14t
9. [Rates / Ratios] *
The ratio of the pages Heath has read to those he hasn't read from a book of 360 pages is 5 : 4. How many pages has Heath read? 200
10. [Indices] *
Simplify $\frac{4s}{s^{-4}}$ 4s⁵
11. [Square Roots / Surds] *
Evaluate $6\sqrt{24} \div 2\sqrt{6}$ 6
12. [Order of Operations] *
 $(3 - 3)^9 + (1999 \times 3)^0 =$ 1
13. [Exploring Number] *
Find $\frac{7}{8}$ of 1 tonne in kilograms. 875 kg
14. [Scientific Notation]
How many significant figures are there in 0.0407? 3
15. [Number Patterns] *
Write the first four terms of the sequence $t_n = 5n$ where $n \geq 1$ 5, 10, 15, 20
16. [Expressions]
Simplify:
 $(3x + 5y + 1) + (2x - 3y + 4)$ 5x + 2y + 5
17. [Substitution] *
If $a = 3$ and $b = 4$, write true or false for the statement:
 $(a + b)^2 = a^2 + 2ab + b^2$ true
18. [Expansion] *
Expand and simplify
 $(x - 1)(2x + 3)$ 2x² + x - 3
19. [Factorisation] *
Factorise
 $x^2 - 11x + 30$ (x - 6)(x - 5)
20. [Equations] *
Solve for x:
 $(x + 2)(x - 5) = 0$ -2, 5
21. [Graphs & Functions] *
Use the rule $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line joining the points A(-1,1) and B(0,2) 1
22. [Units of Measurement / Time] *
A lion can run at 80 km/h. How many m/s is this equivalent to? [Round to the nearest whole number.] 22 m/s

23. [Perimeter] *
Find the perimeter of the rhombus.



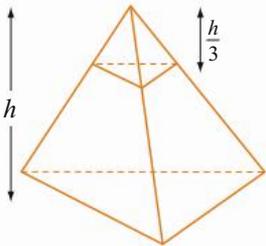
20.4 cm

24. [Area] *
Find the area of the shaded triangle.



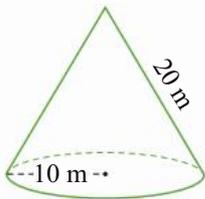
14 cm²

25. [Volume] *
For the pyramids shown, find the ratio:
Volume of pyramid with height h
Volume of pyramid with height $\frac{h}{3}$



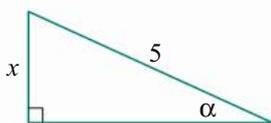
27 : 1

26. [Surface Area] *
Find the total surface area of the cone.
(Use $\pi \approx 3.14$)



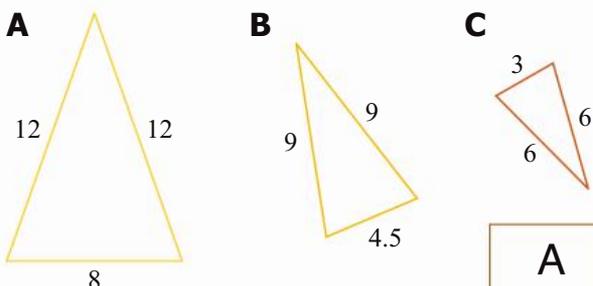
942 m²

27. [Pythagoras / Trigonometry] *
Find the value of x , given $\sin \alpha = 0.42$



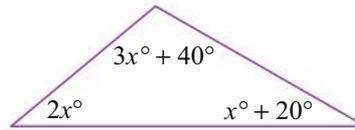
2.1

28. [Shape / Location]
Two of these triangles are similar. Which is the odd one out?



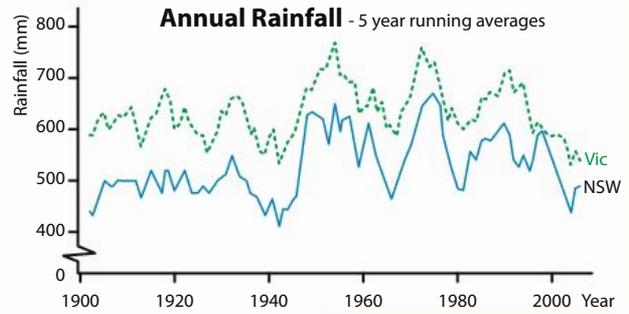
A

29. [Angles] *
Find the value of the biggest angle in the triangle. [Triangle not drawn to scale.]



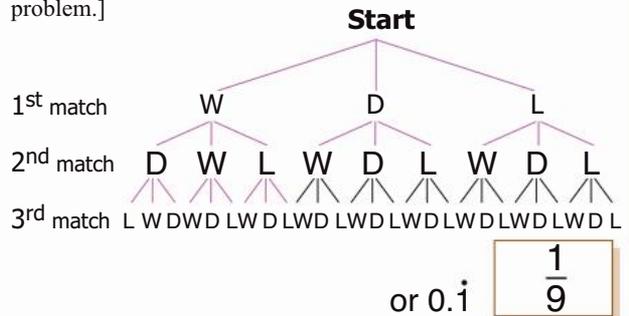
100°

30. [Statistics]
During which 20-year period did both NSW and Victoria have the largest increase in rainfall?



1940 - 1960

31. [Probability]
A soccer team plays three matches which it can either win (W), lose (L) or draw (D). What is the probability of having 2 wins and 1 draw? [Complete the tree diagram to help solve the problem.]



or 0.1 $\frac{1}{9}$

32. [Problem Solving 1] *
 $\frac{0.6 \times 0.125}{0.25 \times 0.1} =$

$3\frac{1}{3}$

33. [Problem Solving 2] *
A gambler begins with \$1024. He bets half of all he has on the toss of a coin. So pleased is he with the win that he bets, in exactly the same fashion, another 9 times. "Happily," he says, "I won as often as I lost. So I presume I've come out even." Just how much money will he have after the 10 bets? [Example: If he bets \$100 he will either lose the \$100 or win \$100.]

\$ 243



Name:

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1. [Long \times, \div] *
 $4.56 \div 5 =$ 0.912
2. [Decimal $+, -$]
 $0.25 + 0.22 - 0.27 =$ 0.2
3. [Decimal \times, \div] *
 $45 \div 1.5 =$ 30
4. [Fraction $+, -$] *
 $\frac{1}{3} + \frac{1}{4} =$ $\frac{7}{12}$
5. [Fraction \times, \div] *
 $\frac{5}{9} \div 2\frac{6}{5} =$ $\frac{25}{144}$
6. [Percentages] *
 Find 100%, given that 5% is \$6. \$120
7. [Integer $+, -$]
 $(6 - 3) - 9 =$ -6
8. [Integer \times, \div]
 $(+20k) \div (-4) =$ -5k
9. [Rates / Ratios] *
 The ratio of the soda water to lemon juice in lemonade is 9 : 1. How much lemon juice is there in 2 L of lemonade? 200 mL
10. [Indices] *
 Simplify $\frac{6p^2}{3p^{-2}}$ 2p⁴
11. [Square Roots / Surds] *
 Evaluate $9\sqrt{2} \div 6\sqrt{18}$ 0.5
12. [Order of Operations] *
 $(4 - 4)^8 \div 1998 =$ 0
13. [Exploring Number] *
 Find $1\frac{1}{2}$ of \$84 \$126
14. [Scientific Notation]
 How many significant figures are there in 5050? 3
15. [Number Patterns] *
 Write the first four terms of the sequence $t_n = n^2$ where $n \geq 1$ 1, 4, 9, 16
16. [Expressions]
 Simplify:
 $(2x + y + 5) + (x + 2y - 3)$ 3x + 3y + 2
17. [Substitution] *
 If $a = 5$, $b = 3$ and $c = 1$, write true or false for the statement:
 $12 - b = a + c + 4$ false
18. [Expansion] *
 Expand and simplify
 $(x + 4)^2 - 10$ $x^2 + 8x + 6$
19. [Factorisation]
 Factorise
 $x^2 + 3x - 10$ $(x - 2)(x + 5)$
20. [Equations] *
 Solve for x :
 $(x - 4)(x + 9) = 0$ -9, 4
21. [Graphs & Functions] *
 Use the rule $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line joining the points A(2,-2) and B(-3,1) $-\frac{3}{5}$
22. [Units of Measurement / Time] *
 A dolphin can swim at up to 18 m/s. What is this speed in km per hour? [Round to the nearest whole number.] 65 km/h

QUOTE OF THE WEEK: One of the advantages of being young is that you don't let common sense get in the way of doing things everybody else knows are impossible.

23. [Perimeter] *
Find the perimeter of the parallelogram.

30 m

24. [Area] *
Find the area of the shaded triangle, given that M, N and P are midpoints of the sides of the triangle ABC.

90 m²

25. [Volume] *
A brick 12 cm by 8 cm by 25 cm is dropped into a deep rectangular tank which is half full of water. If the base of the tank is 15 cm wide and 40 cm long, by how much will the water level in the tank rise?

4 cm

26. [Surface Area] *
Using $\pi \approx 3.14$ find the surface area of the sphere.

78.5 mm²

27. [Pythagoras / Trigonometry] *
Find the value of x , given $\cos \theta = 0.69$

6.9

28. [Shape / Location]
Find the value of x . [All measurements are in cm.]

0.6

29. [Angles] *
Find the value of the smallest angle in the triangle. [Triangle not drawn to scale.]

10 degrees

30. [Statistics]
At what age can female graduates with a 'bachelor or higher degree' boast that they have earned US\$1 000 000 in total?

Estimated cumulative earnings in the USA

49 years

31. [Probability]
A drawer contains three ties, identical except in colour. One is green (G), one black (B) and one navy (N). Two ties are selected at random from the drawer. Find the probability that one of the chosen ties is black.

[Complete the tree diagram to help solve the problem.]

or 0.666... (2/3)

32. [Problem Solving 1] *
Find positive integers a, b, c and d if:
 $a + a = b$,
 $b + b = c$,
 $c + c = d$, and
 $a + b + c + d = 360$

$a = 24 \quad b = 48 \quad c = 96 \quad d = 192$

33. [Problem Solving 2] *
The sum of x consecutive numbers is $12x + 4$. Find the maximum possible value of x .

8



Name:

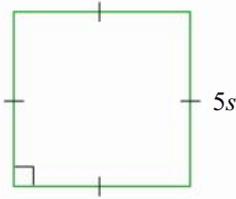
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1. [Long \times, \div] *
 $18.9 \times 47 =$ 888.3
2. [Decimal $+, -$]
 $10 + 4.2 - 0.01 =$ 14.19
3. [Decimal \times, \div] *
 $1 \div 0.008 =$ 125
4. [Fraction $+, -$] *
 $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} =$ $\frac{47}{60}$
5. [Fraction \times, \div] *
 $\frac{3}{4} \times 1\frac{4}{5} =$ $1\frac{7}{20}$
6. [Percentages] *
If the 10% GST on a pair of shoes is \$10, what is the total price of the shoes? \$ 110
7. [Integer $+, -$] *
 $(4 - 5) - (3 - 6) =$ 2
8. [Integer \times, \div] *
 $(10 - 3) \times (3 - 10) =$ -49
9. [Rates / Ratios] *
Find the missing term in the proportion:
 $\frac{3}{5} = \frac{k}{35}$ $k = 21$
10. [Indices] *
If $2^x = 0.125$, then $x =$ -3
11. [Square Roots / Surds] *
Simplify $2\sqrt{8} + 2\sqrt{2}$ $6\sqrt{2}$
12. [Order of Operations] *
 $(25 - 5^2) \div 2004 + 1998 =$ 1998
13. [Exploring Number] *
A pair of socks cost \$3.80. How many pairs can you buy with \$25? 6
14. [Scientific Notation] *
Evaluate $(2.5 \times 10^4) \times (4 \times 10^{-6})$ 0.1
15. [Number Patterns] *
Write the first four terms of the sequence $t_n = 11 - n$ where $n \geq 1$ 10, 9, 8, 7
16. [Expressions]
Using algebraic notation, write three consecutive whole numbers starting with n .
 $n, n + 1, n + 2$
17. [Substitution] *
If $v = u + at$ find the speed v , in m/s, if $u = 2$ m/s, $a = 3$ m/s² and $t = 5$ s. 17 m/s
18. [Expansion] *
Expand $(b - 3)^2$ $b^2 - 6b + 9$
19. [Factorisation] *
Factorise and simplify
 $\frac{x^2 - x - 12}{x + 3}$ $x - 4$
20. [Equations] *
Solve for x :
 $\frac{x}{2} + \frac{x}{3} = 5$ 6
21. [Graphs & Functions] *
Complete the table:

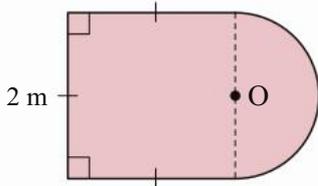
rule	gradient (m)	x -intercept	y -intercept (c)
$y = x + 6$	1	$(-6, 0)$	$(0, 6)$
$y = 2x + 6$	2	$(-3, 0)$	$(0, 6)$
22. [Units of Measurement / Time]
How many litres are there in v millilitres?
 $\frac{v}{1000}$ L

23. [Perimeter] *
Write a formula for the perimeter P of the square.



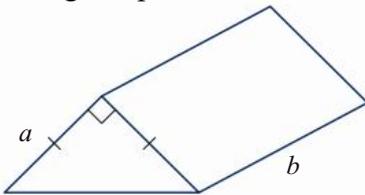
$$P = 20s$$

24. [Area] *
Find the area of the shape. (Use $\pi \approx 3.14$)



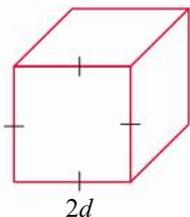
$$5.57 \text{ m}^2$$

25. [Volume] *
Write a formula for the volume V of the triangular prism.



$$V = \frac{a^2b}{2}$$

26. [Surface Area] *
Write a formula for the total surface area (TSA) of the cube.

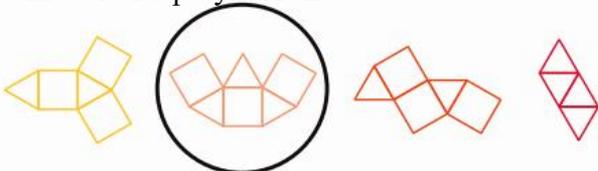


$$TSA = 24d^2$$

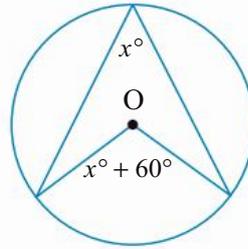
27. [Pythagoras / Trigonometry] *
A triangle has sides of lengths 5 m, 23 m and 24 m. Is it a right-angled triangle?

no

28. [Shape / Location] *
Circle the net that **can not** be folded to form a model of a polyhedron.



29. [Angles] *
Find the value of x° .



$$60^\circ$$

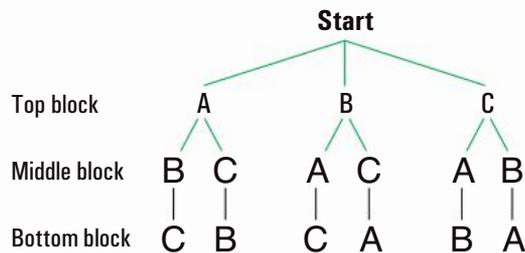
30. [Statistics] *
Calculate the mean and range for the data displayed in the frequency table.

Score	2	3	4	5	6
Frequency	5	4	7	6	4

$$\text{mean} = 4$$

$$\text{range} = 4$$

31. [Probability] *
In how many different ways can three blocks, A, B and C, be stacked in a pile?
[Complete the tree diagram to help solve the problem.]



6

32. [Problem Solving 1] *
Pierre de Fermat, a 17th century French lawyer, stated that any whole number can be written as the sum of four, or fewer, square numbers.
For example: $15 = 3^2 + 2^2 + 1^2 + 1^2$
Write 56 as the sum of four, or fewer, square numbers.

$$6^2 + 4^2 + 2^2$$

33. [Problem Solving 2] *
At the end of a set of tennis, Gabby had won exactly 50% of the points played but lost the set! What is the least number of games that Gabby must have won in the set?

3



Name:

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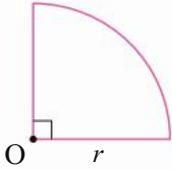
1. [Long \times, \div] *
 $15.6 \times 35 =$ 546
2. [Decimal $+, -$]
 $3.142 - 0.14 - 0.002 =$ 3
3. [Decimal \times, \div] *
 $25 \times 0.04 =$ 1
4. [Fraction $+, -$] *
 $\frac{2}{3} - \frac{2}{5} + \frac{1}{15} =$ $\frac{1}{3}$
5. [Fraction \times, \div] *
 $3\frac{1}{2} \div \frac{7}{3} =$ $1\frac{1}{2}$
6. [Percentages] *
If the 10% GST on the price of a telescope is \$30, what is the total price of the telescope? \$ 330
7. [Integer $+, -$] *
 $(6 + 3) + (2 - 4) =$ 7
8. [Integer \times, \div] *
 $(4 - 6) \times (3 - 8) =$ 10
9. [Rates / Ratios] *
Find the missing term in the proportion:
 $\frac{y}{8} = \frac{15}{40}$ $y = 3$
10. [Indices] *
If $3^x = \frac{1}{81}$, find the value of x . -4
11. [Square Roots / Surds] *
Simplify $4\sqrt{7} - 3\sqrt{63}$ $-5\sqrt{7}$
12. [Order of Operations] *
 $(6 \times 4 - 23)^9 - 2^3 =$ -7
13. [Exploring Number] *
Can you drive 475 km at an average speed of 80 km/h in under 6 hours? yes
14. [Scientific Notation] *
Evaluate $(2 \times 10^{-1}) \times (5 \times 10^2)$ 100
15. [Number Patterns] *
Write the first four terms of the sequence $t_n = 5(n - 1)$ where $n \geq 1$ 0, 5, 10, 15
16. [Expressions]
Using algebraic notation, write two consecutive whole numbers starting with $2n$. $2n, 2n + 1$
17. [Substitution] *
If $x = vt$ find the distance x , in km, when $v = 25$ km/h and $t = 120$ min. 50 km
18. [Expansion] *
Expand and simplify $(t + 3)^2 - 4t$ $t^2 + 2t + 9$
19. [Factorisation] *
Factorise and simplify $\frac{x^2 + 4x + 3}{x + 1}$ $x + 3$
20. [Equations] *
Solve for x :
 $\frac{x}{2} + \frac{x}{4} = 3$ 4
21. [Graphs & Functions] *
Complete the table:

rule	gradient (m)	x -intercept	y -intercept (c)
$y = -x + 1$	-1	(1,0)	(0,1)
$y = x - 1$	1	(1,0)	(0,-1)
22. [Units of Measurement / Time]
How many grams are there in w kilograms? 1000w grams

QUOTE OF THE WEEK: Just a glance at this generation makes us realise we are living in hair raising times.

23. [Perimeter] *

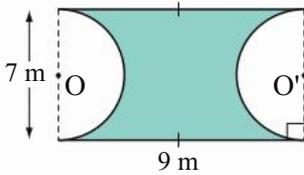
Write a formula for the perimeter P of the shape. [Leave your answer as a multiple of π .]



$$P = 2r + \frac{\pi r}{2}$$

24. [Area] *

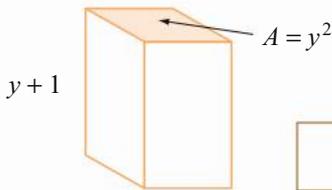
Find the area of the shaded region. (Use $\pi \approx \frac{22}{7}$)



$$24.5 \text{ m}^2$$

25. [Volume] *

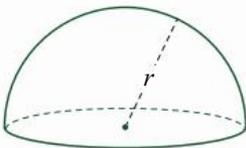
Write a formula for the volume V of the rectangular prism.



$$V = y^2(y + 1)$$

26. [Surface Area] *

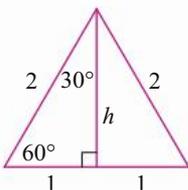
The surface area of a sphere is $4\pi r^2$. Write a formula for the total surface area (TSA) of the solid hemisphere. [Leave your answer as a multiple of π .]



$$TSA = 3\pi r^2$$

27. [Pythagoras / Trigonometry] *

Find the height of the equilateral triangle. [Express your answer in surd form.]



$$\sqrt{3}$$

28. [Shape / Location]

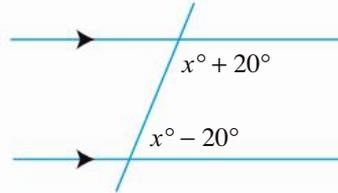
I have three squares and two triangles, all of which have side lengths of 4 cm. I attempt to form a net for a polyhedron by taping the shapes together along their edges. If this can be done, into what shape will the net fold?



triangular prism

29. [Angles] *

Find the value of x° .



$$90^\circ$$

30. [Statistics] *

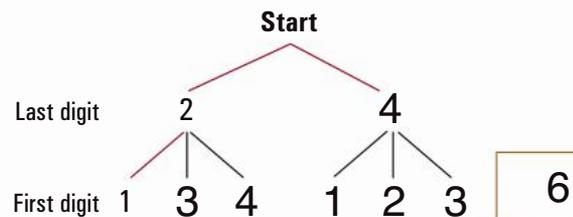
Calculate the mean and range for the data displayed in the frequency table.

Score	20	21	22	23	24	25
Frequency	2	3	5	6	3	1

$$\text{mean} = 22.4 \quad \text{range} = 5$$

31. [Probability]

How many different two-digit even numbers can be made using the digits 1, 2, 3 and 4 if the digits can not be repeated? [Complete the tree diagram to help solve the problem.]



32. [Problem Solving 1] *

If each letter represents a different digit, none of which is zero, find the value of the number 'DANGER'. [Clue: SOS = 323]

$$\begin{array}{r} \text{CROSS} \\ + \text{ROADS} \\ \hline \text{DANGER} \end{array} \quad 158746$$

33. [Problem Solving 2] *

What are the last two digits in the expansion of 6^{2012} ?

$$36$$



Name:

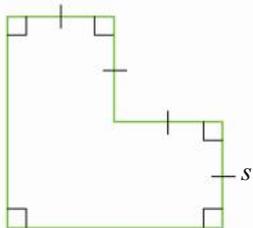
Due Date: / /

Parent's Signature:

1. [Long \times, \div] *
 $612 \div 18 =$ 34
2. [Decimal $+, -$] *
 $1.1 + 0.49 + 0.01 =$ 1.6
3. [Decimal \times, \div] *
 $2.25 \div 0.9 =$ 2.5
4. [Fraction $+, -$] *
 $\frac{2}{3} + \frac{3}{4} - \frac{5}{12} =$ 1
5. [Fraction \times, \div] *
 $1\frac{1}{9} \times 1\frac{3}{6} =$ $1\frac{2}{3}$
6. [Percentages] *
If the 10% GST on admission to the game is \$2, what is the total price of admission? \$ 22
7. [Integer $+, -$] *
 $(7 - 11) - (1 - 8) =$ 3
8. [Integer \times, \div] *
 $\frac{6 - 9}{9 - 6} =$ -1
9. [Rates / Ratios] *
Find the missing term in the proportion:
 $\frac{36}{40} = \frac{9}{x}$ $x = 10$
10. [Indices] *
If $3 \times 2^y = 12$, then $y =$ 2
11. [Square Roots / Surds] *
Simplify $3\sqrt{8} + 2\sqrt{18}$ $12\sqrt{2}$
12. [Order of Operations] *
 $(1001 - 10^3) \times 2012 =$ 2012
13. [Exploring Number] *
Can you drive 642 km at an average speed of 90 km/h in under 7 hours? no
14. [Scientific Notation] *
Evaluate $(1.6 \times 10^2) \times (3 \times 10^5)$ 48 000 000
15. [Number Patterns] *
Write the first four terms of the sequence $t_n = 2(n + 1)$ where $n \geq 1$ 4, 6, 8, 10
16. [Expressions] *
Using algebraic notation, write three consecutive whole numbers starting with $n - 2$. $n - 2, n - 1, n$
17. [Substitution] *
Given $a = \frac{v}{t}$ find the acceleration a , in m/s^2 , when $v = 300 \text{ m/s}$ and $t = 60 \text{ s}$. 5 m/s^2
18. [Expansion] *
Expand and simplify $(2m + 3)(m - 1)$ $2m^2 + m - 3$
19. [Factorisation] *
Factorise and simplify $\frac{x^2 + 11x + 10}{x + 1}$ $x + 10$
20. [Equations] *
Solve for x :
 $\frac{x}{3} + \frac{x}{4} = 7$ 12
21. [Graphs & Functions] *
Complete the table:

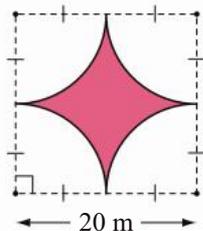
rule	gradient (m)	x -intercept	y -intercept (c)
$y = x$	1	(0,0)	(0,0)
$y = x - 1$	1	(1,0)	(0,-1)
22. [Units of Measurement / Time] *
How many years are there in t decades? $10t$ years

23. [Perimeter] *
Write a formula for the perimeter P of the polygon.



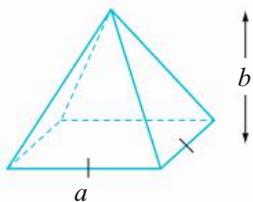
$$P = 8s$$

24. [Area] *
Find the area of the shaded region.
(Use $\pi \approx 3.14$)



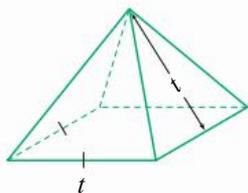
$$86 \text{ m}^2$$

25. [Volume] *
Write a formula for the volume V of the square pyramid.



$$V = \frac{a^2 b}{3}$$

26. [Surface Area] *
Write a formula for the total surface area (TSA) of the square pyramid.



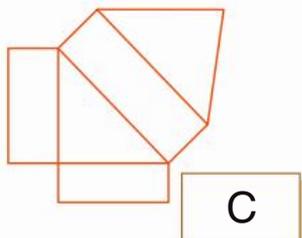
$$TSA = 3t^2$$

27. [Pythagoras / Trigonometry] *
Find the distance between the points A(1,5) and B(4,1).

$$5$$

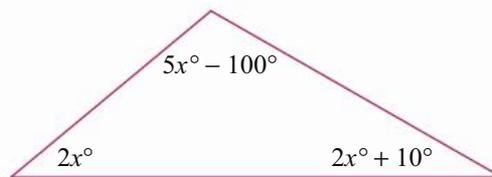
28. [Shape / Location]
Which shape can this net be used to make?

- A) cube
- B) square pyramid
- C) triangular prism
- D) rectangular prism
- E) tetrahedron



$$C$$

29. [Angles] *
Find the value of the biggest angle in the triangle below. [Triangle not drawn to scale.]



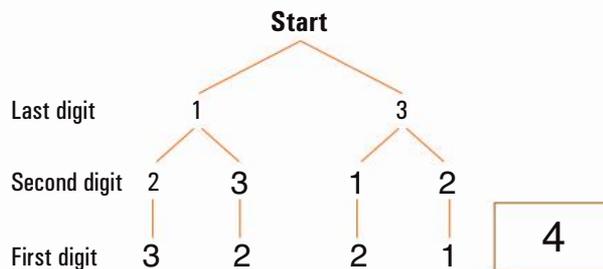
$$70^\circ$$

30. [Statistics] *
Calculate the mean and range for the data displayed in the frequency table.

Score	5	6	7	8	9
Frequency	5	2	9	6	3

$$\text{mean} = 7 \quad \text{range} = 4$$

31. [Probability]
How many odd, three-digit numbers can be made using the digits 1, 2 and 3 once each?
[Complete the tree diagram to help solve the problem.]



32. [Problem Solving 1] *
Fill in the missing digits in the multiplication.

$$\begin{array}{r}
 228 \\
 \times 24 \\
 \hline
 912 \\
 4560 \\
 \hline
 5472
 \end{array}$$

33. [Problem Solving 2] *
How many squares are there on a chess board? [Hint: Remember that apart from the 64 smallest squares there are other squares of a larger size 2×2 , 3×3 , etc.]

$$204$$



Name:

Due Date: / /

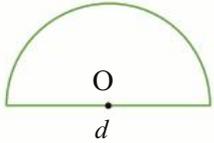
Parent's Signature:

1. [Long \times, \div] *
 $31.6 \times 25 =$ 790
2. [Decimal $+, -$]
 $32 - 0.5 + 1.64 =$ 33.14
3. [Decimal \times, \div] *
 $0.04 \div 8 =$ 0.005
4. [Fraction $+, -$] *
 $\frac{1}{2} + \frac{2}{3} - \frac{4}{5} =$ $\frac{11}{30}$
5. [Fraction \times, \div] *
 $3\frac{1}{7} \div \frac{11}{7} =$ 2
6. [Percentages] *
 If the 10% GST on the price of a ticket is \$1.50, what is the total price of the ticket? \$ 16.50
7. [Integer $+, -$] *
 $(8 - 4) - (4 - 8) =$ 8
8. [Integer \times, \div] *
 $(4 - 9) \times (6 - 3) =$ -15
9. [Rates / Ratios] *
 Find the missing term in the proportion:
 $\frac{10}{z} = \frac{25}{45}$ $z = 18$
10. [Indices] *
 Given $\frac{1}{5^m} = 0.04$, find the value of m . 2
11. [Square Roots / Surds] *
 Simplify $2 + 3\sqrt{2} + 5 - \sqrt{72}$ $7 - 3\sqrt{2}$
12. [Order of Operations] *
 $(267 \div 6)^0 + 10 =$ 11
13. [Exploring Number] *
 If kitchen chairs cost \$48 each, how many can you buy with \$200? 4
14. [Scientific Notation] *
 Evaluate $(8 \times 10^{-3}) \div (2 \times 10^{-2})$ 0.4
15. [Number Patterns] *
 Write the first four terms of the sequence $t_n = n(n + 1)$ where $n \geq 1$ 2, 6, 12, 20
16. [Expressions]
 Using algebraic notation, write two consecutive whole numbers starting with $2n - 1$. $2n - 1, 2n$
17. [Substitution] *
 Given $I = \frac{V}{R}$ find the current I , in Amps, when $V = 240$ Volts and $R = 1200$ Ohms. 0.2 Amps
18. [Expansion] *
 Expand $(2r - 1)^2$ $4r^2 - 4r + 1$
19. [Factorisation] *
 Factorise and simplify $\frac{x^2 - 7x + 12}{x - 3}$ $x - 4$
20. [Equations] *
 Solve for x :
 $\frac{x}{4} - \frac{x}{2} = 6$ -24
21. [Graphs & Functions]
 Complete the table:

rule	gradient (m)	x -intercept	y -intercept (c)
$y = 3x$	3	(0,0)	(0,0)
$y = 3x - 3$	3	(1,0)	(0,-3)
22. [Units of Measurement / Time]
 How many centimetres are there in d metres? 100d cm

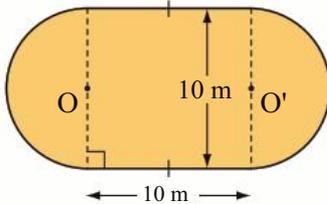
QUOTE OF THE WEEK: Almost every man wastes part of his life in attempts to display qualities which he does not possess, and to gain applause which he cannot keep. Samuel Johnson

23. [Perimeter] *
Write a formula for the perimeter P of the shape. [Leave your answer as a multiple of π .]



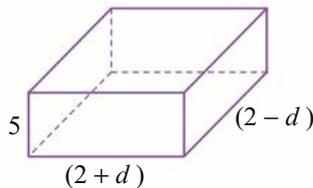
$$P = d + \frac{\pi d}{2}$$

24. [Area] *
Find the area of the shaded region. (Use $\pi \approx 3.14$)



$$178.5 \text{ m}^2$$

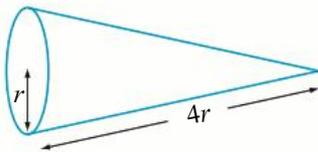
25. [Volume] *
Write a formula for the volume V of the rectangular prism.



$$V = 20 - 5d^2$$

or $5(4 - d^2)$

26. [Surface Area] *
Write a simple formula for the total surface area of the cone in terms of the symbols given. [Leave your answer as a multiple of π .]

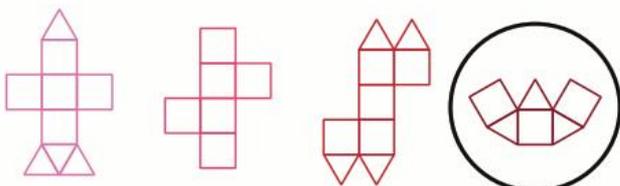


$$TSA = 5\pi r^2$$

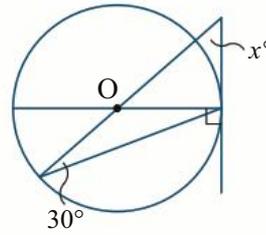
27. [Pythagoras / Trigonometry]
A radio mast is 16 metres high. If support wires are to be attached three quarters of the way up the mast and anchored 9 metres from its base, how long must the support wires be?

$$15 \text{ m}$$

28. [Shape / Location]
Circle the net that **can not** be folded to form a model of a polyhedron.



29. [Angles] *
Find the value of x° .



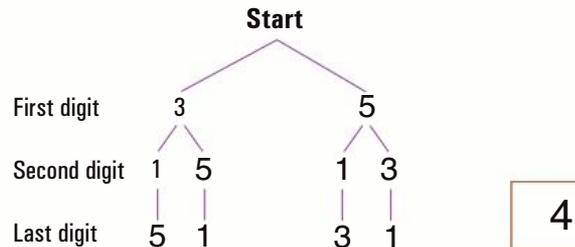
$$30^\circ$$

30. [Statistics] *
Calculate the mean and range for the data displayed in the frequency table.

Score	20	21	22	23	24
Frequency	1	3	4	1	2

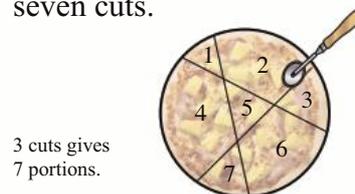
$$\text{mean} = 22 \quad \text{range} = 4$$

31. [Probability]
How many different three-digit numbers greater than 200 can be made using the digits 1, 3 and 5 once each? [Complete the tree diagram to help solve the problem.]



$$4$$

32. [Problem Solving 1] *
A circular pizza can be cut into seven portions using just three straight cuts. Find the maximum number of portions obtainable using seven cuts.



$$29$$

33. [Problem Solving 2] *
If you calculated the following sum
 $9 + 99 + 999 + 9999 + 99999 + \dots$
where the last number to be added consists of 99 digits of 9, how many times would the digit 1 appear in your answer?

$$99$$

MATHS MATE



Teacher Resource



Teacher's Guide to the Use of Maths Mate

pages i - viii



Student Pad Answers

pages 3 - 72



Student Pad Short Answers

pages 1 - 8



Problem Solving Hints & Solutions

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Test Masters

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Test Answers

pages 1 - 32



Record Keeping Sheets

pages 1 - 10

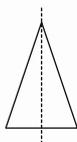


1.1

1. 525
2. 15.7
3. 570
4. $\frac{5}{9}$
5. $\frac{6}{7}$
6. 64
7. -12
8. -12
9. 3000 m
10. 0.008
11. $\frac{2}{5}$
12. 12
13. 105%
14. 51 000
15. 16, 18
16. $z^2, 5z^2$
17. 5
18. $14s - 7$
19. $7c(2d - 1)$
20. 4

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

22. 32 hours
23. 620 cm
24. 8 mm²
25. 10 cm³
26. 150 cm²
27. 9
28. isosceles



29. 57°
30. Kenya
31. $\frac{1}{9}$
32. -5, 1, 3, 9
33. $(-3)^{22}$

1.2

1. 26
2. 5.28
3. 0.032
4. $\frac{2}{3}$
5. $\frac{5}{6}$
6. 45
7. 8
8. 16
9. 80 km
10. 243
11. 81
12. 84
13. $\frac{1}{400}$
14. 0.0086
15. 23, 27
16. 4q, 8q
17. 30
18. $y^2 + 2y$
19. $8f(2ef - g + 3)$
20. 6

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. 57 months
23. 640 mm
24. 7.5 cm²
25. 180 cm³
26. 64 000 mm²
27. 1
- 28.

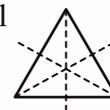
29. 28°
30. 16
31. 0.45
32. true
33. 25

1.3

1. 73
2. 3.9
3. 0.008
4. 1
5. $\frac{1}{7}$
6. 72
7. -12
8. 4
9. 540 km/h
10. 125
11. 1
12. 12
13. $\frac{3}{50}$
14. 400.5
15. 125, 625
16. $2x^2, x^2$
17. 0
18. $12 - 6t$
19. $2b(2a + 3c + 4d)$
20. 7

x	y = 2x - 3	(x, y)
0	y = 2 × 0 - 3	(0, -3)
1	y = 2 × 1 - 3	(1, -1)
2	y = 2 × 2 - 3	(2, 1)
3	y = 2 × 3 - 3	(3, 3)
4	y = 2 × 4 - 3	(4, 5)

22. 17 h 50 min
23. 620 cm
24. 12 m²
25. 340 cm³
26. 22 200 cm²
27. 6
28. equilateral



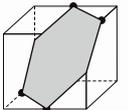
29. C
30. satellite payloads
31. A1, B3, C4, D2
32. 4 min
33. 791

1.4

1. 34
2. 0.3
3. 20
4. 1
5. $3\frac{1}{3}$
6. \$0.75
7. -10
8. -3
9. 108 km/h
10. 16
11. $1\frac{3}{5}$
12. 9
13. 125%
14. 1.175×10^{-1}
15. 9, 5
16. 10, 4
17. 5
18. $x^2 - x$
19. $4x(x - 9)$
20. 4

x	y = -2x + 1	(x, y)
0	y = -2 × 0 + 1	(0, 1)
1	y = -2 × 1 + 1	(1, -1)
2	y = -2 × 2 + 1	(2, -3)
3	y = -2 × 3 + 1	(3, -5)
4	y = -2 × 4 + 1	(4, -7)

22. 13 h 50 min
23. 670 cm
24. 22.5 cm²
25. 120 cm³
26. 150 cm²
27. 20
28. hexagon



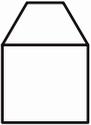
29. 56°
30. 18 - 35 years
31. A3, B4, C2, D1
32. -1
33. 3.5

1.5

1. 1092
2. 1.5
3. 1.46
4. $3\frac{1}{5}$
5. 3
6. 750
7. -5
8. 40
9. 16.1 L
10. 2
11. 1.4
12. 32
13. 3%, 0.3, $\frac{1}{3}$
14. 101
15. 28, 39
16. $3z + 3$
17. 6
18. $2k^2 + 4k$
19. $3x(2x + 3 + 5y)$
20. 25

21.

x	-3	-2	-1	0	1	2	3
y	-1	1	3	5	7	9	11

22. 30
23. 42.5 m
24. 25 cm^2
25. $27\,000 \text{ cm}^3$
26. 120 cm^2
27. 5.2 mm
28. 
29. 20°
30. Venus
31. $\frac{1}{13}$
32. C
33. 55 km/h

1.6

1. 69
2. 4.17
3. 4.8
4. $3\frac{1}{2}$
5. $5\frac{2}{5}$
6. 40
7. 4
8. 5
9. 250 000
10. $7b^6$
11. $1\frac{2}{3}$
12. 729
13. $\frac{1}{2}$, 45%, 0.4
14. 0.01
15. 10, 4
16. $20 - q$
17. 4
18. $12n - 6n^2$
19. $4xy(xy - 5)$
20. 15

21.

x	-3	-2	-1	0	1	2	3
y	5	3	1	-1	-3	-5	-7

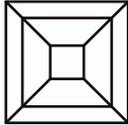
22. 6:30 pm
23. 21 m
24. 72 cm^2
25. 675 cm^3
26. 32.4 m^2
27. 26 cm
28. 
29. 40°
30. cat
31. $\frac{2}{13}$
32. 6 cm^2
33. 7

1.7

1. 560
2. 10.3
3. 203
4. 3
5. $\frac{5}{18}$
6. 200
7. 8
8. -24
9. 50 kg
10. $2m^5$
11. 0.1
12. 64
13. -13°C , -6°C , 0°C , $+2^\circ\text{C}$
14. 17.65
15. 31, 36
16. $7t + 4$
17. 0
18. $5x - 5x^2$
19. $x^2y(y + 2x)$
20. 22

21.

x	-3	-2	-1	0	1	2	3
y	1	-1	-3	-5	-7	-9	-11

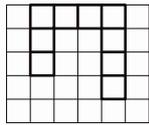
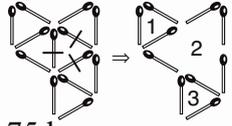
22. 600
23. 28 m
24. 25 ha
25. 81 cm^3
26. 660 cm^2
27. t
28. 
29. 30°
30. 35 000
31. $\frac{25}{102}$
32. 48
33. 120 km/h

1.8

1. 529
2. 4.2
3. 54
4. $3\frac{1}{3}$
5. $2\frac{2}{15}$
6. 220 000
7. 10
8. -4
9. 3400
10. $15x^6$
11. $1\frac{1}{10}$
12. 1200
13. $\sqrt{5} - \sqrt{4}$, $\sqrt{4} - \sqrt{3}$, $\sqrt{3} - \sqrt{2}$
14. 4
15. 31, 63
16. $5h + 12$
17. -8
18. $2m - 4m^2$
19. $2xy(2x - 3 + 6y)$
20. -6

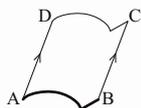
21.

x	-3	-2	-1	0	1	2	3
y	12	9	6	3	0	-3	-6

22. 2221 hours
23. 7.2 m
24. 12 m^2
25. 8400 cm^3
26. 202 mm^2
27. 2.5 mm
28. 
29. 60°
30. India
31. $\frac{13}{51}$
32. 
33. 75 km

2.1

1. 595
2. 4.5
3. 4
4. $3\frac{4}{5}$
5. $1\frac{1}{2}$
6. 80%
7. -15
8. -55
9. 1 : 2 : 9
10. 1
11. false
12. 15
13. true
14. 629 000
15. 33, 41
16. $2q^3$
17. 7.5
18. $9p + 3$
19. 21
20. $x < -1$
21. A(-4,4), B(5,-5), C(6,-6)



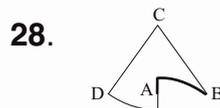
22. 540 m
23. 70 cm
24. 100 m^2
25. 1040 cm^3
26. 56 cm^2
27. a
28. 47°
30. 17
31. $\frac{1}{5}$ or 0.2
32.

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

33. $(8) \times (4) - (2) = 30$
 $(3) \times (7) + (9) = 30$
 $(6) \times (5) + (1) = 30$

2.2

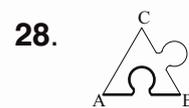
1. 113.6
2. 3.05
3. 0.91
4. $\frac{4}{9}$
5. $2\frac{1}{2}$
6. 30%
7. -5
8. 80
9. 1 : 4
10. -1000
11. false
12. 91
13. true
14. 47 200
15. 21, 12
16. $2pq$
17. 88
18. $b^2 + b$
19. 30
20. $x \leq 4$
21. A(3,6), B(-2,-4), C(-3,-6)



22. 0.35 m
23. 344 cm
24. 10 cm
25. 900 cm^3
26. 216 cm^2
27. r
28. 70°
30. 3
31. $\frac{1}{3}$ or $0.\dot{3}$
32. 500 km
33. 6

2.3

1. 54.75
2. 4.2
3. 50
4. $3\frac{5}{7}$
5. $1\frac{2}{3}$
6. 30%
7. -11
8. -2
9. 1 : 24
10. $\frac{8}{125}$
11. 7
12. -30
13. false
14. 0.007
15. 46, 57
16. $3t - \frac{4}{t}$
17. -7
18. $-2x^2 + 2x$
19. 30
20. $x \geq 7$
21. A(1,7), B(-3,-9), C(-4,-13)



22. 11 200 kg
23. 270 cm
24. 8 ha
25. $36\ 000 \text{ mm}^3$
26. 360 m^2
27. m
28. 160°
30. 9
31. $\frac{19}{46}$
32. 923 076
33. 21

2.4

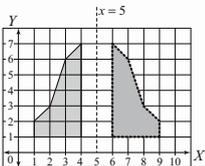
1. $122.\dot{6}$
2. 1.5
3. 2
4. $2\frac{2}{3}$
5. 8
6. 20%
7. -10
8. -9
9. 7 : 18
10. $\frac{1}{4}$
11. 17
12. -1
13. false
14. 0.091
15. 7, 7.75
16. g^3
17. 16
18. $3y^2 + 4y$
19. 50
20. $x > -8$
21. A(8,2), B(2,-1), C(-4,-4)

22. 0.6 kg
23. 1600 m
24. 30 cm^2
25. 98 m^3
26. 312 cm^2
27. β
28. $15 = 10 + 7 - 2$
29. 130°
30. 22
31. $\frac{1}{20}$ or 0.05
32. C
33. $\frac{1}{2}$



2.5

- 828
- 6.05
- 0.96
- $1\frac{4}{7}$
- $2\frac{7}{10}$
- \$46
- 4
- 200
- 25 km
- $81x^4$
- 4 and 5
- 28
- B
- 2.11×10^4
- 7.8, 9
- $4 \times (x + 3)$
- 240
- $-x^2 - 2x$
- $(x + 1)(3 + x)$
- 1
- (0,6)
- 1730 hours on Thursday
- 920 m
- 18 m^2
- 2.5 m
- 600 mm^2
- 50



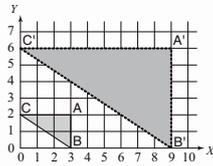
29.	135°
30.	23
31.	$\frac{37}{50}$

	America	Europe	Total
Qantas	16	21	37
Other airlines	8	5	13
Total	24	26	50

- 150%
- $3 \times 6, 4 \times 4$

2.6

- 77
- 10.135
- 4.8
- $1\frac{5}{9}$
- $\frac{5}{27}$
- \$1180
- 2
- 48
- 36 s
- $2a^{12}$
- 8 and 9
- 282
- A
- 2.64×10^6
- 6.45, 5.70
- $2y^2z^2$
- 8
- $-12 + 3a$
- $2(a + 4)(3 + b)$
- 1
- (3,0)
- 1950 hours on Saturday
- 420 m
- 30 m^2
- 180 cm^3
- 62.8 cm^2
- 12



29.	64°
30.	41
31.	$\frac{15}{101}$

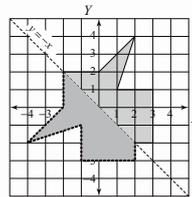
	Under 10	Between 10 & 18	Over 18	Total
Boys	20	14	30	64
Girls	12	15	10	37
Total	32	29	40	101

$$\begin{array}{r}
 431 \\
 \times 52 \\
 \hline
 862 \\
 2150 \\
 \hline
 22412
 \end{array}$$

- \$9
- 2 h 24 min
- isosceles or right-angled triangle

2.7

- 880
- 29.6
- 10
- $2\frac{1}{2}$
- $\frac{3}{4}$
- \$117
- 4
- 160
- 2572 800 km
- $125z^6$
- 6 and 7
- 23
- B
- 2.7×10^{-1}
- 10.4, 20.8
- $7jk^3t^2$
- 7
- $-3n^2 - 12n$
- $(a + 3)(b + 2)$
- 14
- (0,-4)
- 0830 hours on Sunday
- 356 m
- 54 cm^2
- 301.44 cm^3
- 8150 cm^2
- 12



29.	109°
30.	41.5
31.	$\frac{37}{79}$

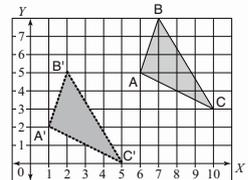
stem	leaves
2	1 2 2
3	0 4 6 8
4	5
5	3 5 7 7
6	0 3

	Boys	Girls	Total
Library	50	24	74
Playing	30	54	84
Total	80	78	158

- 2 h 24 min
- isosceles or right-angled triangle

2.8

- 943
- 3.35
- 30
- $\frac{1}{2}$
- $\frac{4}{5}$
- \$72
- 16
- 64
- 72 500 km
- $32b^{10}$
- 7 and 8
- 40
- A
- 0.5×10^4
- 104.2, 1042
- $5g^3hk$
- 24
- $-4 + 8t$
- $(x + 2)(x + y)$
- 7
- (3,0)
- 2220 hours on Sunday
- 388 cm
- 19.28 m^2
- 5160 cm^3
- 2200 cm^2
- 1



29.	50°
30.	164 cm
31.	64%

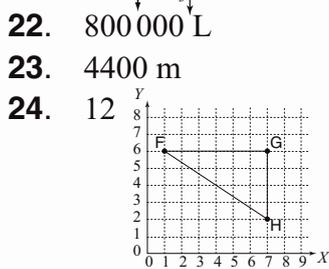
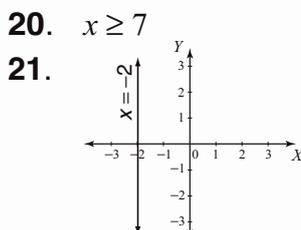
	Economy class	Business class	First class	Total
Leisure	56%	4%	8%	68%
Business	8%	21%	3%	32%
Total	64%	25%	11%	100%

- 4
- 2



3.1

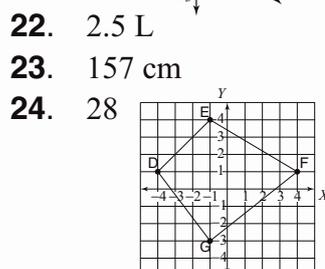
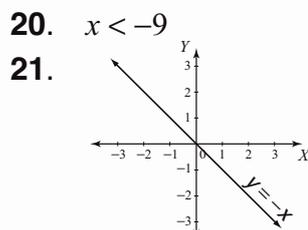
1. 209
2. 5.08
3. 0.96
4. $\frac{1}{2}$
5. $9\frac{1}{3}$
6. 30
7. -3
8. 200
9. 600 s
10. $\frac{1}{3}$
11. 50
12. 100
13. >
14. 0.03
15. 3, 30
16. $p + 5$
17. 100
18. $5a + 3$
19. $(x - 1)(x + 1)$



25. 180 cm^3
26. 176 cm^2
27. 2.5 cm
- 28.
29. 120°
30. B
31. $\frac{1}{6}$ or 0.16
32. •, l, l., +, +., +l, +l., □, □., □
33. 51 kg

3.2

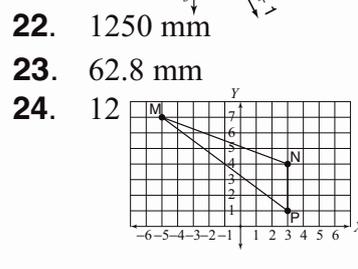
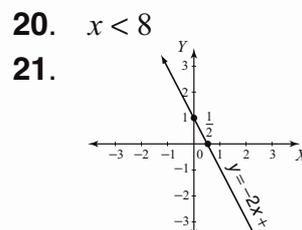
1. 44.5
2. 0.91
3. 2.4
4. $\frac{1}{6}$
5. 14
6. 60%
7. -14
8. -3
9. 2 hours 24 min
10. 4
11. $5\sqrt{7}$
12. 8
13. <
14. 5.022
15. 21, 63
16. $y - 15$
17. 15
18. $m^2 + 5m + 4$
19. $(4 - x)(4 + x)$



25. 16 cm^3
26. 125.6 m^2
27. $\sqrt{13}$
- 28.
29. 45°
30. D
31. $\frac{1}{6}$ or 0.16
32. 1250 m^2
33. 31.4 m

3.3

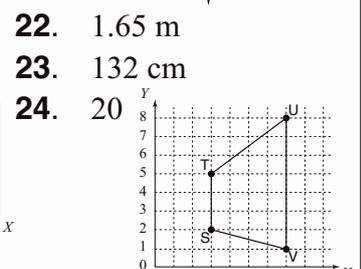
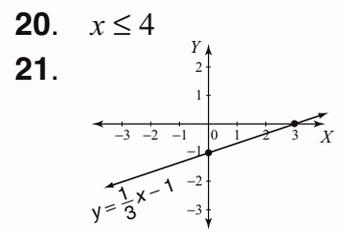
1. 2128
2. 6.2
3. 40
4. $\frac{7}{9}$
5. $1\frac{3}{4}$
6. 140
7. 2
8. 20
9. 96 kmh^{-1}
10. 100
11. 5
12. 12
13. =
14. 60
15. 128, 1024
16. $\frac{x}{4}$
17. 13
18. $x^2 - 2$
19. $(y - 6)(y + 6)$



25. 154 m^3
26. 110 cm^2
27. $\sqrt{15}$
- 28.
29. 140°
30. A
31. $\frac{1}{6}$ or 0.16
- 32.
33. 250 ha

3.4

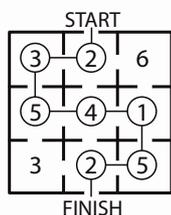
1. 59
2. 9
3. 0.15
4. $\frac{1}{6}$
5. $\frac{5}{54}$
6. 80%
7. -1
8. -100
9. 136 beats/min
10. 16
11. 24
12. 5
13. <
14. 0.085
15. 72, 432
16. $4b$
17. $-\frac{3}{4}$
18. $y^2 - 1$
19. $(3x - 2)(3x + 2)$



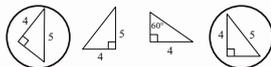
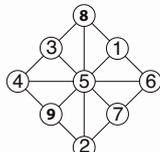
25. 0.2 m^3
26. 440 cm^2
27. $1\frac{1}{2}$ or 1.5
- 28.
29. 65°
30. C
31. $\frac{1}{4}$ or 0.25
32. 90
33. 1

3.5

1. 150
2. 19.92
3. 25
4. $1\frac{1}{8}$
5. 6
6. \$104
7. -6
8. 3
9. \$6 : \$15
10. xy^6
11. true
12. 5
13. $0.\dot{6}$
14. 1.75×10^{-2}
15. 16, 26
16. $5 + \frac{z}{2}$
17. 0
18. $p + 7$
19. $\frac{3}{5}$
20. 8
21. $x = 2$
22. 10 000 000 m²
23. 48 cm
24. 10.5 m²
25. 1 L
26. 3
27. β
28. SSS
29. 126°
30. median = 12.5
mode = 12
31. $\frac{1}{10}$ or 0.1
32. 53



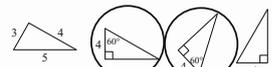
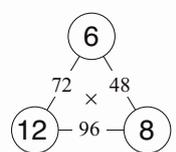
3.6

1. 59
2. 2.1
3. 0.9
4. $3\frac{2}{3}$
5. 6
6. \$72
7. -11
8. -6
9. 30 : 15
10. $5a^4b^4$
11. $4\sqrt{3}$
12. 4
13. $\frac{5}{33}$
14. 2.5×10^6 km²
15. $\frac{1}{25}, \frac{1}{36}$
16. $\frac{n}{3} - 10$
17. true
18. 2z
19. $\frac{4x}{3}$
20. 16.5
21. $y = x - 2$
22. 4 cm²
23. 6.4 km
24. 9.42 m²
25. 40 cm
26. 9
27. β
28. RHS
29.  42°
30. median = 17
range = 8
31. $\frac{5}{12}$
32. 
33. 90 min

3.7

1. 333.2
2. 3.96
3. 20
4. $\frac{3}{5}$
5. 18
6. \$11.40
7. 2
8. -4
9. 40 kg : 20 kg
10. $3a^2b$
11. $6\sqrt{2}$
12. 4
13. $\frac{8}{9}$
14. 1×10^{11}
15. 62, 126
16. $\frac{3m}{2}$
17. 0
18. $x^2 + x - 6$
19. $\frac{5x}{2}$
20. 7
21. $y = 1$
22. 1 000 000 cm³
23. 29.42 km
24. 133 cm²
25. 273 L
26. A
27. $\frac{4}{5}$ or 0.8
28. $x = 3, y = 4$
29. 96°
30. median = 5
mode = 6
31. $\frac{3}{8}$ or 0.375
32. A
33. 165

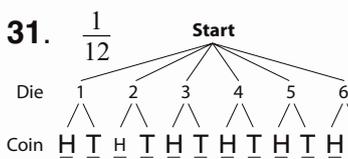
3.8

1. 300
2. 3.76
3. 0.143
4. $\frac{9}{14}$
5. 7
6. \$3.90
7. 26
8. 4
9. 15 : 9
10. $3m^2$
11. $4\sqrt{5}$
12. 25
13. $0.\dot{1}\dot{8}$
14. 1.49×10^8 km
15. 22, 17
16. $\frac{m+n}{2}$
17. 1
18. $a^2 - 25$
19. 2y
20. 4
21. $y = -1$
22. 2500 m²
23. 114.2 m
24. 157 m²
25. 3.6 m³
26. 3 cm
27. $\frac{7}{25}$ or 0.28
28. ASA
29.  30°
30. median = 4
mode = 5
31. 50%
32. 
33. Brazil (1:4)



4.1

1. 0.65
2. 19.3
3. 0.48
4. $\frac{7}{10}$
5. $1\frac{7}{20}$
6. \$300
7. -3
8. 8m
9. 100 kg
10. $\frac{s^5}{2}$
11. 6
12. 0
13. \$4.80
14. 3
15. 2, 4, 6, 8
16. $2x^2 + 5x + 1$
17. false
18. $a^2 + 4a + 4$
19. $(x + 2)(x + 3)$
20. -1, 3
21. 3
22. 36 km/h
23. 2400 m
24. 37.5 cm^2
25. 6 cm
26. 110 mm^2
27. 3.6
28. C
29. 35°
30. 9



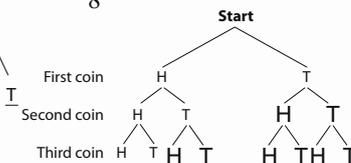
32.

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

33. 60

4.2

1. 149.6
2. 3.7
3. 0.08
4. $\frac{1}{6}$
5. 5
6. \$56
7. 1
8. -15q
9. 80
10. 3t
11. 20
12. 9
13. \$0.80
14. 1
15. 5, 7, 9, 11
16. $3x^2 + x + 2$
17. true
18. $x^2 - 4x + 4$
19. $(x + 2)(x + 6)$
20. -3, 8
21. $-\frac{3}{2}$
22. 75 m/s
23. 26 km
24. 14 cm^2
25. 10 000 L
26. 154 cm^2
27. 30
28. 2
29. 18°
30. 16
31. $\frac{3}{8}$ or 0.375

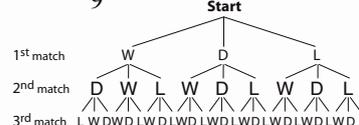


32. 18

33. 8600

4.3

1. 0.67
2. 1.9
3. 0.03
4. $\frac{1}{15}$
5. $5\frac{3}{5}$
6. \$200
7. -7
8. 14t
9. 200
10. $4s^5$
11. 6
12. 1
13. 875 kg
14. 3
15. 5, 10, 15, 20
16. $5x + 2y + 5$
17. true
18. $2x^2 + x - 3$
19. $(x - 6)(x - 5)$
20. -2, 5
21. 1
22. 22 m/s
23. 20.4 cm
24. 14 cm^2
25. 27 : 1
26. 942 m^2
27. 2.1
28. A
29. 100°
30. 1940 - 1960
31. $\frac{1}{9}$ or 0.1

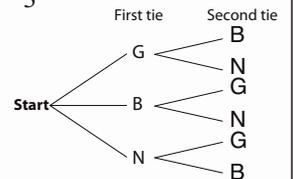


32. $3\frac{1}{3}$

33. \$243

4.4

1. 0.912
2. 0.2
3. 30
4. $\frac{7}{12}$
5. $\frac{25}{144}$
6. \$120
7. -6
8. -5k
9. 200 mL
10. $2p^4$
11. 0.5
12. 0
13. \$126
14. 3
15. 1, 4, 9, 16
16. $3x + 3y + 2$
17. false
18. $x^2 + 8x + 6$
19. $(x - 2)(x + 5)$
20. -9, 4
21. $-\frac{3}{5}$
22. 65 km/h
23. 30 m
24. 90 m^2
25. 4 cm
26. 78.5 mm^2
27. 6.9
28. 0.6
29. 10°
30. 49 years
31. $\frac{2}{3}$ or $0.\dot{6}$



32. $a = 24, b = 48, c = 96, d = 192$

33. 8

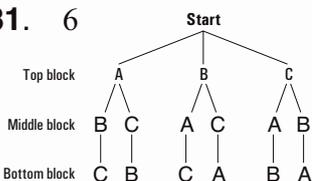


4.5

- 888.3
- 14.19
- 125
- $\frac{47}{60}$
- $1\frac{7}{20}$
- \$110
- 2
- 49
- $k = 21$
- 3
- $6\sqrt{2}$
- 1998
- 6
- 0.1
- 10, 9, 8, 7
- $n, n + 1, n + 2$
- 17 m/s
- $b^2 - 6b + 9$
- $x - 4$
- 6

function	gradient (m)	x-intercept	y-intercept (c)
$y = x + 6$	1	(-6, 0)	(0, 6)
$y = 2x + 6$	2	(-3, 0)	(0, 6)

- $\frac{v}{1000}$ L
- $P = 20s$
- 5.57 m^2
- $V = \frac{a^2b}{2}$
- $TSA = 24d^2$
- no
-
- 60°
- mean = 4
range = 4
- 6



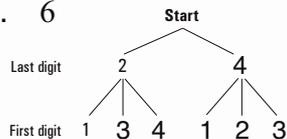
- $6^2 + 4^2 + 2^2$
- 3

4.6

- 546
- 3
- 1
- $\frac{1}{3}$
- $1\frac{1}{2}$
- \$330
- 7
- 10
- $y = 3$
- 4
- $-5\sqrt{7}$
- 7
- yes
- 100
- 0, 5, 10, 15
- $2n, 2n + 1$
- 50 km
- $t^2 + 2t + 9$
- $x + 3$
- 4

function	gradient (m)	x-intercept	y-intercept (c)
$y = -x + 1$	-1	(1, 0)	(0, 1)
$y = x - 1$	1	(1, 0)	(0, -1)

- 1000w grams
- $P = 2r + \frac{\pi r}{2}$
- 24.5 m^2
- $V = y^2(y + 1)$
- $TSA = 3\pi r^2$
- $\sqrt{3}$
- triangular prism
- 90°
- mean = 22.4
range = 5
- 6



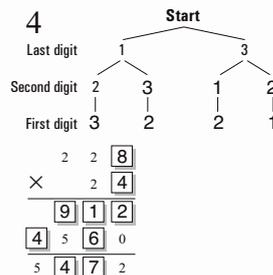
- 158 746
- 36

4.7

- 34
- 1.6
- 2.5
- 1
- $1\frac{2}{3}$
- \$22
- 3
- 1
- $x = 10$
- 2
- $12\sqrt{2}$
- 2012
- no
- 48 000 000
- 4, 6, 8, 10
- $n - 2, n - 1, n$
- 5 m/s^2
- $2m^2 + m - 3$
- $x + 10$
- 12

function	gradient (m)	x-intercept	y-intercept (c)
$y = x$	1	(0, 0)	(0, 0)
$y = x - 1$	1	(1, 0)	(0, -1)

- $10t$ years
- $P = 8s$
- 86 m^2
- $V = \frac{a^2b}{3}$
- $TSA = 3t^2$
- 5
- C
- 70°
- mean = 7
range = 4
- 4



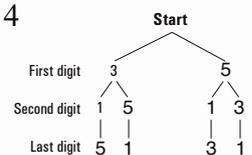
- 29
- 99
- 204

4.8

- 790
- 33.14
- 0.005
- $\frac{11}{30}$
- 2
- \$16.50
- 8
- 15
- $z = 18$
- 2
- $7 - 3\sqrt{2}$
- 11
- 4
- 0.4
- 2, 6, 12, 20
- $2n - 1, 2n$
- 0.2 Amps
- $4r^2 - 4r + 1$
- $x - 4$
- 24

function	gradient (m)	x-intercept	y-intercept (c)
$y = 3x$	3	(0, 0)	(0, 0)
$y = 3x - 3$	3	(1, 0)	(0, -3)

- $100d$ cm
- $P = d + \frac{\pi d}{2}$
- 178.5 m^2
- $V = 20 - 5d^2$
- $TSA = 5\pi r^2$
- 15 m
-
- 30°
- mean = 22
range = 4
- 4



- 29
- 99

MATHS MATE



Teacher Resource



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Test Answers

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A Teacher's Guide to approaching
PROBLEM SOLVING

Dear Educator

The following Problem Solving Hints & Solutions have been designed to support users of the Maths Mate Program.

The Maths Mate problem solving questions at each level have proved challenging for many.

Within these Hints & Solutions only one or two alternative strategies have been presented to show how the problem may be solved. Often many other approaches are both practical and possible; after all, "the human race has not really started to 'think'." - Edward De Bono

Outlined on this page is a general problem solving approach that may help you to develop the problem solving skills of your students.

Inevitably, students are more likely to be successful if they:

- *have the courage to try,*
- *can find a place to start and*
- *have approach options to choose from.*

Best wishes

The Maths Mate Team

FIRST:

- * Accept the challenge.
- * Read the problem.
- * Read the problem out loud.

THEN:

- * Find out the meaning of any unknown terms.
- * Highlight the essential truths.
- * Restate the problem in your own words.
- * Break the problem up into parts.

BE SURE ABOUT:

- * What you know from the problem. (Given)
- * What you need to find out. (Goal)

CHOOSE YOUR SOLUTION STRATEGY/STRATEGIES:

1. Write a numerical/algebraic equation deciding which operations to use, given the word statements.
2. Look for a pattern then make and test generalisations/conjectures that describe the relationship between variables.
3. Draw a diagram: sketch
table
graph
number line

OR Make a model.
4. Apply standard techniques or models.
e.g. Pythagoras' Theorem
5. Simplify the problem and work on a reduced version. Extrapolate back to the original problem.
6. Be systematic. Make a list. Progress step by step.
7. Work backwards if you have the answer.
8. Use trial and error. Estimate, check against the facts and then refine your estimation.

WHERE TO START:

- * Start: with what is known
with an odd or distinctive feature
with the smallest
with the easiest.

FINALLY:

- * Double check your answer against the original statements. Does your answer satisfy all the conditions of the problem?

PRESENTATION:

- * Choose suitable modes of communication to present and explain your outcomes and results.



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 $\rightarrow (-3)^{22} = 3^{22} > 0$

Rule 2 $\rightarrow (-2)^{33} = -2^{33} < 0$

A positive number is always greater than a negative number:

$$3^{22} > -2^{33}$$

so $(-3)^{22} > (-2)^{33}$

$(-3)^{22}$ 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 $a > b$ and $c > d$
then $a \times c > b \times d$ 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:

$$1 \times \begin{matrix} 3 \\ 2 \end{matrix} \times \begin{matrix} 5 \\ 4 \end{matrix} \times \begin{matrix} 7 \\ 6 \end{matrix} \times \dots \times \begin{matrix} 101 \\ 100 \end{matrix}$$

Then	Term	Inequality
		1
	(1)	$3 > 2$
	(2)	$5 > 4$
	⋮	⋮
	(50)	$101 > 100$

Using $a \times c > b \times d$:

Then $(1 \times 3 \times 5 \times \dots \times 101) > (2 \times 4 \times \dots \times 100)$

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 $AB = 10A + B$ is the two-digit number then $BA = 10B + A$ is its reverse

When 2 is added to double AB , AB is reversed:

$$\begin{aligned} 2(10A + B) + 2 &= 10B + A && \text{expand} \\ 20A + 2B + 2 &= 10B + A && \text{add like terms} \\ 19A &= 8B - 2 && \text{solve for } A \end{aligned}$$

$$A = \frac{8B - 2}{19}$$

$8B - 2$ 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 \times Time
OR Time = $\frac{\text{Distance travelled}}{\text{Speed}}$

Solution:

Time taken to travel 10 km at 60 km/h is

$$\frac{10}{60} = \frac{1}{6} \text{ h} = \frac{1}{6} \times 60 \text{ min} = 10 \text{ min}$$

Time taken to travel 10 km at 100 km/h is

$$\frac{10}{100} = \frac{1}{10} \text{ h} = \frac{1}{10} \times 60 \text{ min} = 6 \text{ min}$$

The time saved by travelling at 100 km/h is

$$10 \text{ min} - 6 \text{ min} = \mathbf{4 \text{ min}}$$

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:

$$1 \times 1 \times \dots \times 1 \times \underbrace{(-1) \times (-1) \times \dots \times (-1)}_{15 \text{ times}} = 1 \times (-1) = -1$$

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:

$$\begin{aligned} & \left(1 + \frac{1}{2}\right)\left(1 + \frac{1}{3}\right)\left(1 + \frac{1}{4}\right)\left(1 + \frac{1}{5}\right)\left(1 + \frac{1}{6}\right) \\ &= \frac{\cancel{3}}{2} \times \frac{\cancel{4}}{\cancel{3}} \times \frac{\cancel{5}}{\cancel{4}} \times \frac{\cancel{6}}{\cancel{5}} \times \frac{7}{\cancel{6}} \\ &= \frac{7}{2} \\ &= 3.5 \end{aligned}$$

1.5

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

RULE 1:

Integer $(n) \times 2 = 2n$ 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.

$$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time}}$$

Solution: The next palindromic number must be as close as possible to 15951.

As a result, staying with the 1 in the tens of thousands

(10001) 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

$$16061 - 15951 = 110 \text{ km}$$

Speed = Distance travelled / Time

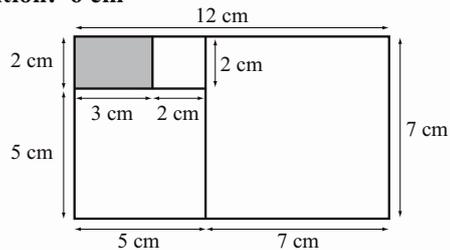
$$\text{Speed} = \frac{110}{2} = 55 \text{ km/h}$$

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 cm^2



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 $E \times B = E$.

Having only 1 double digit answer that starts with 1, the multiplication table must be that of 7, 8 or 9.

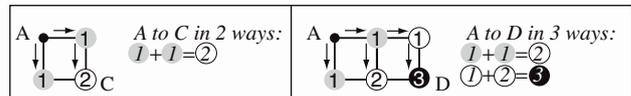
It can't be the $9 \times$ multiplication table because $9 \times 9 = 81$ and $E \times E = HI$ doesn't end in 1.

It can't be the $8 \times$ multiplication table because there is an answer that ends in 1.

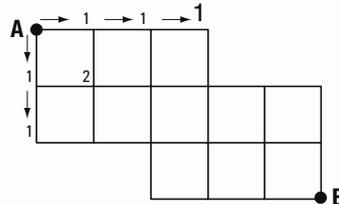
So it is the $7 \times$ multiplication table.

1.7

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

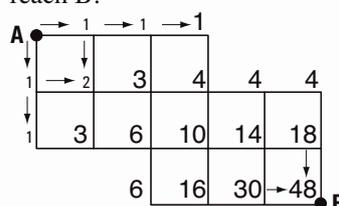


Solution: Working from A consider all the points on the grid that give only one possible path to that intersection. Mark them with 1.



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.

1.7 (cont.)

33. **Hint:** $Speed = \frac{Distance\ travelled}{Time}$

Solution: The remaining distance of 40 km must be travelled in 20 minutes or $\frac{1}{3}$ hours.

Speed = Distance travelled / Time

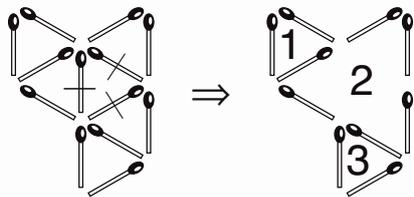
$$Speed = \frac{40}{\frac{1}{3}} = 40 \times \frac{3}{1} = 120 \text{ km/h}$$

You must average **120 km/h** so as not to be late.

1.8

32. **Hint:** Make a model. Use trial and error.

Solution:



33. **Hint:** $Distance\ travelled = Speed \times Time$
Tabulate and graph the data.

OR Use algebra.

Solution: On the graph below:

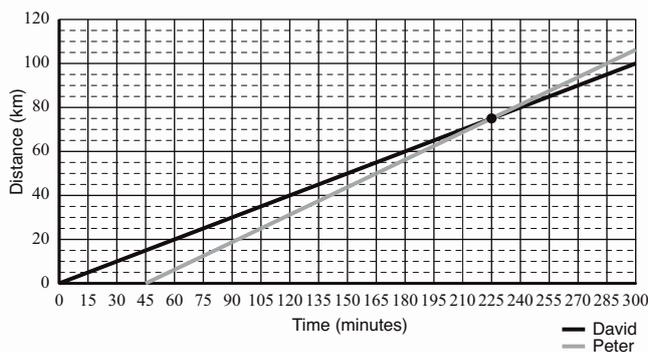
Peter starts riding at the 45 min mark when David has already travelled 15 km.

At the 105 min mark, David has travelled 35 km and Peter 25 km, so the distance between them is 10 km.

At the 165 min mark, David has travelled 55 km and Peter 50 km, so the distance between them is 5 km.

At the 225 min mark, David has travelled 75 km and Peter has also travelled 75 km, so Peter has caught up to David.

Time (min)	Distance (km)	
	David	Peter
0	0	
15	5	
30	10	
45	15	0
60	20	6.25
75	25	12.5
90	30	18.75
105	35	25
120	40	31.25
135	45	37.5
150	50	43.75
165	55	50
180	60	56.25
195	65	62.5
210	70	68.75
225	75	75
240	80	81.25
255	85	87.5
270	90	93.75
285	95	100



OR

At 45 mins when Peter starts riding David has travelled at 20 km/h for 45 min or $\frac{3}{4}$ h (diagram 1)

$$d = 20 \times \frac{3}{4} = 15 \text{ km}$$



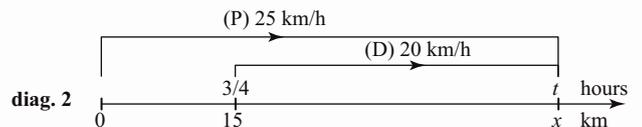
After t hours, Peter catches up to David:
Peter travels at 25 km/h for t hours:

$$(1) \quad x = 25 \times t \text{ km (diagram 2)}$$

David travels at 20 km/h for t hours:

$$(2) \quad x - 15 = 20 \times t \text{ km (diagram 2)}$$

$$(1) \quad t = \frac{x}{25}$$



Substitute equation (1) into equation (2):

$$(2) \quad x - 15 = 20 \times \frac{x}{25}$$

$$x - 15 = 4 \times \frac{x}{5}$$

$$5x - 75 = 4x$$

$$x = 75$$

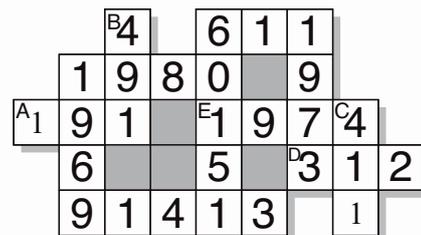
So David will be **75 km** down the road when Peter catches up with him.

2.1

32. **Hint:** Establish the position for the three digit numbers first. Work systematically.

Solution: Of the three digit numbers only 191 begins with a 1, so it goes from A. Because all the 4 digit numbers have 9 as their second digit, 491 is the only 3 digit number ending in 1 that can go from B. Looking at the remaining three digit numbers, 411 must go from C because no 4 digit numbers end in a 6. This similarly means that 312 must go from D and 1974 goes from E.

Continue by a process of elimination.



2.1 (cont.)

33. **Hint:** Check the relationship between the product and the answer in each equation.

Solution: Equation (A) $\bigcirc \times \bigcirc - \bigcirc = 30$

Equation (B) $\bigcirc \times \bigcirc + \bigcirc = 30$

Equation (C) $\bigcirc \times \bigcirc \div \bigcirc = 30$

Possible relationships are:

For (A) only those products between 30 & 40

$$4 \times 9, 4 \times 8, 5 \times 7, 6 \times 6$$

For (B) only those products between 20 & 30

$$3 \times 9, 3 \times 8, 3 \times 7$$

$$4 \times 7, 4 \times 6$$

$$5 \times 5$$

For (C) only those products that are multiples of 30

$$5 \times 6$$

So (C) is $5 \times 6 \div 1 = 30$

then (A) can be $4 \times 9 - 6 = 30$ but 6 is in (C)

OR $4 \times 8 - 2 = 30$

Therefore (A) is $4 \times 8 - 2 = 30$

(C) is $5 \times 6 \div 1 = 30$

and (B) becomes $3 \times 7 + 9 = 30$

to make all equations true:

Equation (A) $\textcircled{8} \times \textcircled{4} - \textcircled{2} = 30$

Equation (B) $\textcircled{3} \times \textcircled{7} + \textcircled{9} = 30$

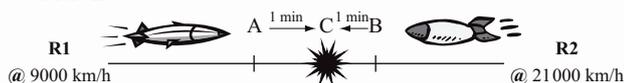
Equation (C) $\textcircled{6} \times \textcircled{5} \div \textcircled{1} = 30$

2.2

32. **Hint:** Distance travelled = Speed \times Time

Draw a diagram.

Solution:



Rocket 1 (R1) can travel the distance AC in 1 minute:

$$AC = 9000 \times \frac{1}{60} = 150 \text{ km}$$

Rocket 2 (R2) can travel the distance BC in 1 minute:

$$BC = 21\,000 \times \frac{1}{60} = 350 \text{ km}$$

The distance between the rockets 1 minute before the collision is:

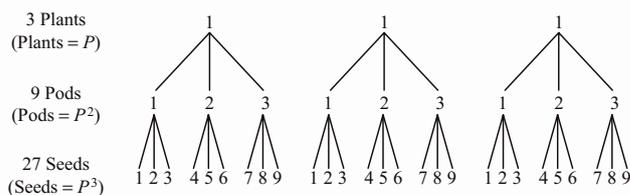
$$AB = AC + BC = 150 + 350 = \mathbf{500 \text{ km.}}$$



2.1 - 2.3

33. **Hint:** Look for a pattern. Use trial and error.

Solution: The relationship between plants, pods and seeds can be illustrated by a tree diagram.



Using trial and error we find the remainder when dividing P^3 by 7 is always 0, 1 or 6.

Plants (P)	1	2	3	4	5	6	7	8	9	10
Seeds (P^3)	1	8	27	64	125	216	343	512	729	1000
Remainder ($\frac{P^3}{7}$)	1	1	6	1	6	6	0	1	1	6

Given the plural phrasing of the question, "the few remaining seeds", Breanna planted **6** seeds.

2.3

32. **Hint:** Work through the multiplication from right to left.

Solution: Using

$$\begin{array}{r} \text{A B C D E 9} \\ \times \quad \quad \quad 4 \\ \hline 9 \text{ A B C D E} \end{array}$$

$4 \times 9 = 36$ ends in 6

Therefore **E = 6** (carry 3)

$4 \times 6 = 24$ plus the carried 3 makes 27 which ends in 7

Therefore **D = 7** (carry 2)

$4 \times 7 = 28$ plus the carried 2 makes 30 which ends in 0

Therefore **C = 0** (carry 3)

$4 \times 0 = 0$ plus the carried 3 makes 3

Therefore **B = 3**

$4 \times 3 = 12$ which ends in 2

Therefore **A = 2** (carry 1)

Check:

$$\begin{array}{r} 2\ 3\ 0\ 7\ 6\ 9 \\ \times \quad \quad \quad 4 \\ \hline 9\ 2\ 3\ 0\ 7\ 6 \end{array}$$

The original number was **923 076**.

33. **Hint:** Establish the facts for the number of marbles.

Solution: Let m = the number of marbles.

Fact 1: Patrick has fewer than 35 marbles:
 $m < 35$

Fact 2: Piles of 3, no marbles left over:
 m must be a multiple of 3.

Possible answers: 3, 6, 9, ..., 33 (*Facts 1 and 2*)

Fact 3: Piles of 2, one marble left over:
 m must be an odd number.

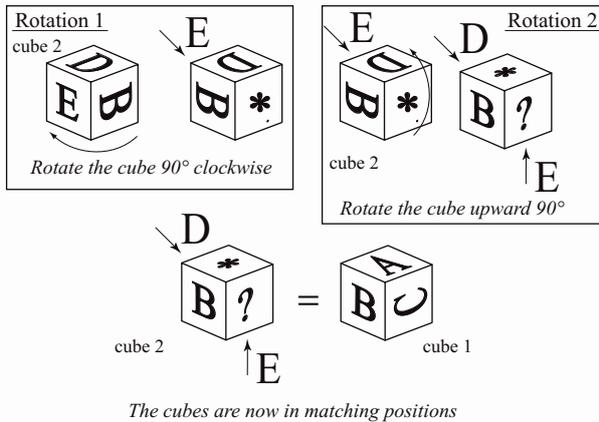
Possible answers: 3, 9, 15, 21, 27 or 33 (*Facts 1, 2 and 3*)

Fact 4: Piles of 5, one marble left over:
 m must end in 1 or 6.

Possible answer: 21 (*Facts 1, 2, 3 and 4*)

Patrick has **21** marbles.

32. **Hint:** Make a model. Alternatively mentally rotate the right hand die so that the B's match. What do you see?
Solution: Rotating the second die so that it is in the same position as the first, takes two rotations as shown.



? and * are the unknown faces that appear so ? is C and * is A. C is on the face opposite to D.

33. **Hint:** Find the values of the frequencies of C4 and C5. Use substitution.

Solution: For the note C4, $n = 0$ and for C5, $n = 12$

Substitute into the formula: $F_n = 440 \times 2^{(\frac{n}{12})}$
 $n = 0$ frequency of C4 = $F_0 = 440 \times 2^{(\frac{0}{12})}$
 $n = 12$ frequency of C5 = $F_{12} = 440 \times 2^{(\frac{12}{12})}$

$$\frac{\text{frequency of C4}}{\text{frequency of C5}} = \frac{F_0}{F_{12}}$$

$$= \frac{440 \times 2^{(\frac{0}{12})}}{440 \times 2^{(\frac{12}{12})}} = \frac{440 \times 2^0}{440 \times 2^1}$$

$$= \frac{440 \times 1}{440 \times 2} = \frac{440}{880} = \frac{1}{2}$$

The ratio is $\frac{1}{2}$

2.5

32. **Hint:** Solve algebraically.
Solution:

Original size	x
Reduced size (Scale Factor $66\frac{2}{3}\%$)	$66\frac{2}{3}\%$ of x means $\frac{66\frac{2}{3}}{100} \times x = \frac{2}{3} \times x$
Original size (Scale Factor $y\%$)	$\frac{y}{100} \times \frac{2 \times x}{3} = x$ Divide both sides by x $\frac{y}{100} \times \frac{2}{3} = 1$ $y = \frac{300}{2} = 150\%$

The drawing must be changed by **150%** to return it to its original size.

33. **Hint:** Use the formulas for the perimeter and area of a rectangle. Use algebra. OR Use trial and error.

Solution: The perimeter equals the area.

Algebraically $2x + 2y = x \times y$

$(y - 2) = 2y$ solve for x

$x \times y = x \times y$

$x = \frac{2y}{y-2}$ write as a sum of two fractions with denominator $y-2$, so one fraction can be reduced to a whole number.

$x = \frac{2y-4+4}{y-2}$ factorise

$x = \frac{2(y-2)+4}{y-2}$ write as a sum of two fractions

$x = \frac{2(y-2)}{y-2} + \frac{4}{y-2}$

$x = 2 + \frac{4}{y-2}$

Then $y - 2$ must be a positive factor of 4.

If $y - 2 = 1$ then $y = 3$ and $x = 6$

$y - 2 = 2$ then $y = 4$ and $x = 4$

$y - 2 = 4$ then $y = 6$ and $x = 3$

The rectangles would have the dimensions

$3 \times 6, 4 \times 4.$

OR

x	y	$P = 2(x + y)$	$A = xy$	Result
1	1	4	1	$P - A = 3$
1	2	6	2	$P - A = 4$
1	3	8	3	$P - A = 5$
2	2	8	4	$P - A = 4$
2	3	10	6	$P - A = 4$
2	4	12	8	$P - A = 4$
3	3	12	9	$P - A = 3$
3	4	14	12	$P - A = 2$
3	5	16	15	$P - A = 1$
3	6	18	18	$P - A = 0$
4	4	16	16	$P - A = 0$
4	5	18	20	$A - P = 2$
4	6	20	24	$A - P = 4$
5	5	20	25	$A - P = 5$
6	6	24	36	$A - P = 12$

$P - A$ increases by 1, so it cannot lead to 0.

$P - A = 4$, so it cannot lead to 0.

$P = A$

$P = A$

$A - P$ increases by 2, so it cannot lead to 0.

For bigger numbers, the difference $A - P$ increases, so we cannot have equality.

The rectangles that have the area equal to the perimeter are 3×6 and $4 \times 4.$

32. **Hint:** Write 2 algebraic equations for what is given.

Solution: Let c = the amount of money Charles has and d = the amount of money Di has

$$(1) c = \frac{3}{5} \times d$$

$$(2) d = c + 6$$

Substitute (2) into (1): $c = \frac{3}{5} \times (c + 6)$

$$c = \frac{3c + 18}{5}$$

$$5c = 3c + 18$$

$$2c = 18$$

$$c = 9$$

Charles has \$9.

33. **Hint:** Place the largest digits in the hundreds and tens and the smallest digits in the units. Use trial and error.

Solution:

$$\begin{array}{r} 4,3 \\ \downarrow \downarrow \\ \boxed{5} \downarrow \downarrow \\ \times \quad \boxed{} \boxed{} \\ \hline \end{array}$$

There are four combinations to try

$\begin{array}{r} 542 \\ \times 31 \\ \hline 542 \\ 16260 \\ \hline 16802 \end{array}$	$\begin{array}{r} 541 \\ \times 32 \\ \hline 1082 \\ 16230 \\ \hline 17312 \end{array}$	$\begin{array}{r} 532 \\ \times 41 \\ \hline 532 \\ 21280 \\ \hline 21812 \end{array}$	$\begin{array}{r} 531 \\ \times 42 \\ \hline 1062 \\ 21240 \\ \hline 22302 \end{array}$
--	---	--	---

$$\begin{array}{r} 5,3 \\ \downarrow \downarrow \\ \boxed{4} \downarrow \downarrow \\ \times \quad \boxed{} \boxed{} \\ \hline \end{array}$$

There are four combinations to try

$\begin{array}{r} 452 \\ \times 31 \\ \hline 452 \\ 13560 \\ \hline 14012 \end{array}$	$\begin{array}{r} 451 \\ \times 32 \\ \hline 902 \\ 13530 \\ \hline 14432 \end{array}$	$\begin{array}{r} 432 \\ \times 51 \\ \hline 432 \\ 21600 \\ \hline 22032 \end{array}$	$\begin{array}{r} 431 \\ \times 52 \\ \hline 862 \\ 21550 \\ \hline 22412 \end{array}$
--	--	--	--

The combination that gives the largest product is $431 \times 52 = 22\,412$

2.7

32. **Hint:** Determine the rate of water pumping for each pump, in megalitres/hour (ML/h).

Solution: We can assume that the capacity of the dam is 12 megalitres (ML). Any number can be chosen, but for convenience we chose 12, which is the LCM of 3 and 12.

Large pump works at a rate of $\frac{12}{3} = 4$ ML/h

Small pump works at a rate of $\frac{12}{12} = 1$ ML/h

If both pumps work together, their rate is $4 + 1 = 5$ ML/h

12 ML at a rate of 5 ML/h can be pumped in

$$\frac{12}{5} \text{ h} = 2\frac{2}{5} \text{ h} = 2 \text{ h} + \frac{2}{5} \times 60 \text{ min} = 2 \text{ h } 24 \text{ min}$$

33. **Hint:** Factorise using the difference of two squares:

$$a^2 - b^2 = (a - b)(a + b)$$

Solution: $a^2b^2 + c^4 = b^4 + a^2c^2$

$$a^2b^2 - a^2c^2 + c^4 - b^4 = 0 \quad \text{factorise by grouping}$$

$$a^2(b^2 - c^2) - (b^4 - c^4) = 0 \quad \text{difference of 2 squares}$$

$$a^2(b^2 - c^2) - (b^2 + c^2)(b^2 - c^2) = 0 \quad \text{factorise}$$

$$(b^2 - c^2)[a^2 - (b^2 + c^2)] = 0 \quad \text{difference of 2 squares}$$

$$(b - c)(b + c)[a^2 - (b^2 + c^2)] = 0$$

The last equation is true if one of the following is true:

$$b - c = 0$$

or $b = c \rightarrow$ isosceles triangle

$$\text{or } a^2 - (b^2 + c^2) = 0$$

$$a^2 = b^2 + c^2 \rightarrow \text{right-angled triangle}$$

The triangle can be either **isosceles** or **right-angled**.

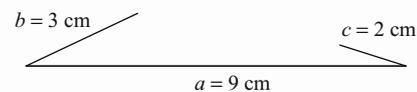
2.8

32. **Hint:** List all the different triplets of whole numbers $\{a, b, c\}$ that add to 14. Establish the rule:

Rule: In any triangle with side lengths a, b, c , any one side must always be smaller than the sum of the other two sides.

$a < b + c, b < c + a$ and $c < a + b$ must all be true.

e.g. A triangle with side lengths of 2, 3, 9 results in $a < b + c$ being false so it is an impossible triangle.



Solution: The different triplets of whole numbers that add to 14 are: $\{1,1,12\}$ $\{2,2,10\}$ $\{3,3,8\}$ $\{4,4,6\}$

$$\{1,2,11\} \quad \{2,3,9\} \quad \{3,4,7\} \quad \{4,5,5\}$$

$$\{1,3,10\} \quad \{2,4,8\} \quad \{3,5,6\}$$

$$\{1,4,9\} \quad \{2,5,7\}$$

$$\{1,5,8\} \quad \{2,6,6\}$$

$$\{1,6,7\}$$

Using the rule, impossible triangles have been eliminated. The only possible triangles are $\{2,6,6\}$, $\{3,5,6\}$, $\{4,4,6\}$ and $\{4,5,5\}$.

Using 14 matchsticks, 4 different triangles can be formed.

33. **Hint:** Use the difference of two squares:

$$a^2 - b^2 = (a - b)(a + b)$$

Solution:

$$\sqrt{2} \times \sqrt{2 + \sqrt{2}} \times \sqrt{\frac{2 + \sqrt{2 + \sqrt{2}}}{a + b}} \times \sqrt{\frac{2 - \sqrt{2 + \sqrt{2}}}{a - b}}$$

$$= \sqrt{2} \times \sqrt{2 + \sqrt{2}} \times \sqrt{\frac{4 - (2 + \sqrt{2})}{a^2 - b^2}}$$

$$= \sqrt{2} \times \sqrt{2 + \sqrt{2}} \times \sqrt{\frac{2 - \sqrt{2}}{a + b} \times \frac{2 - \sqrt{2}}{a - b}}$$

$$= \sqrt{2} \times \sqrt{4 - 2}$$

$$= \sqrt{2} \times \sqrt{2}$$

$$= 2$$

32. **Hint:** Determine the value of the missing symbols working from the smallest to the largest value.
Solution: Using the fewest symbols possible, the value for 3 is |•.
 5 must be +• and 6 will be +|
 7 must be +|• and 9 will be □•.
 10 must be □|

33. **Hint:** List all possible pairings. Use algebra.
Solution: Let (a,b) , (a,c) , (a,d) , (b,c) , (b,d) , (c,d) represent the possible pairings of the four students' weights. Then let's assume: (1) $a + b = 103$
 (2) $a + c = 105$
 (3) $a + d = 106$
 (4) $b + c = 106$
 (5) $b + d = 107$
 (6) $c + d = 109$

The sum of the total weights, (1) + (2) + + (6) is
 $3a + 3b + 3c + 3d = 636$ divide by 3

$$(7) \quad a + b + c + d = 212$$

Adding equations (1), (2) and (3):

$$(8) \quad 3a + b + c + d = 314 \quad \text{subtract (7) from (8)}$$

$$2a = 102$$

$$a = 51$$

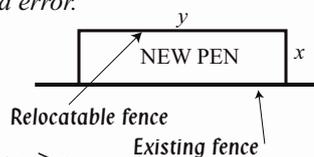
This means $b = 52$, $c = 54$ and $d = 55$.

So the weight of the lightest student is **51 kg**.

3.2

32. **Hint:** Determine what is the best way to use the existing fence? Use trial and error.

Solution: Let x and y represent the sides of the rectangular pen.



To best use the existing fence $y \geq x$.

We need to find the largest possible value of $x \times y$ knowing $2x + y = 100$

Trial	x	y	$2x + y$	Area $x \times y$
1	20	60	100	1200
2	24	52	100	1248
3	25	50	100	1250
4	26	48	100	1248
5	30	40	100	1200

So the largest possible area of the pen is **1250 m²**

33. **Hint:** Draw a diagram. Use the formula for the circumference of a circle $C = 2\pi r$ (r is the radius).

Solution: Let C_1 be the inner boundary and C_2 be the boundary 5 metres out.

$$C_1 = 2\pi r$$

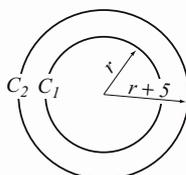
$$C_2 = 2\pi(r + 5)$$

$$C_2 - C_1 = 2\pi(r + 5) - 2\pi r = 10\pi$$

Use $\pi \approx 3.14$

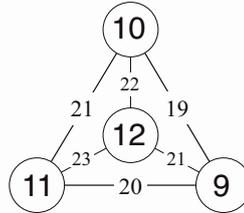
$$\text{Then } C_2 - C_1 \approx 10 \times 3.14 = 31.4$$

The difference in the circumference of the outer C_2 and inner C_1 boundaries is **31.4 m**.



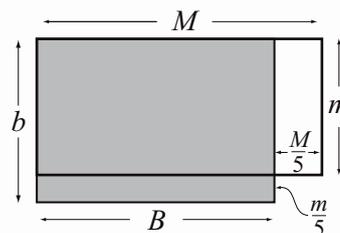
32. **Hint:** First find the answers for the 3 outer circles. Try any reasonable guess in the top circle and observe your results. Then find the inner circle.

Solution: Whatever you place in the top circle to get 19 and 21 on the sides, your base circles must have the same difference, which is 2. So you require two numbers that have a difference of 2 but add to 20. By trial and error we get to 11 and 9. The 11 must go on the left where the largest number is required for the 21. The 9 goes on the right and this leads to a 10 at the top. The central number must be 12.



33. **Hint:** Draw a diagram. Use the formula for the area of a rectangle $A = L \times W$

Solution:



Let Mm = area of Old MacDonald's farm and Bb = area of Farmer Brown's farm.

B is 20% shorter than M :

$$B = M - \frac{20}{100} \times M = M - \frac{M}{5} = \frac{4M}{5}$$

b is 20% wider than m :

$$b = m + \frac{20}{100} \times m = m + \frac{m}{5} = \frac{6m}{5}$$

Express Bb in terms of Mm :

$$Bb = \frac{4M}{5} \times \frac{6m}{5} = \frac{24Mm}{25}$$

Substitute into $Bb = Mm - 10$

$$\frac{24Mm}{25} = Mm - 10$$

$$24Mm = 25Mm - 250$$

$$Mm = 250$$

So Old MacDonald owns **250 ha**.

32. **Hint: Diagonals of a hexagon ($n = 6$):**

In a hexagon we can draw 5 lines from A to each of B, C, D, E and F. Two of these lines (AB and AF) are sides of the hexagon, so diagonals from A = $5 - 2 = 3$. In total we have $6 \times 3 = 18$ diagonals. But lines from A to C and C to A are the same so we have exactly half of 18 different diagonals, which is 9.

Use this to find the general formula for the number of diagonals of a polygon with n sides.

Solution:

For any polygon with n sides (vertices) we can draw $n - 1$ lines from each corner (vertex) to the others. Two of these lines are sides of the polygon. So we are left with $(n - 1) - 2 = n - 3$ diagonals from each vertex. That leads to a total of $n(n - 3)$ diagonals. As with the hint, lines double up so we have exactly half of $n(n - 3)$ different diagonals.

Therefore the formula for the number of diagonals of a polygon with n sides is $\frac{n(n-3)}{2}$

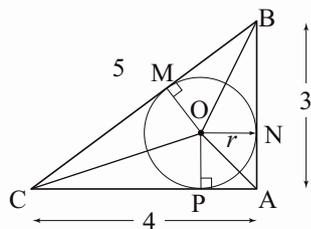
Substituting $n = 15$ in the formula:

$$\frac{n(n-3)}{2} = \frac{15 \times (15-3)}{2} = \frac{180}{2} = 90$$

A regular polygon with 15 sides has **90** diagonals.

33. **Hint: The centre O of the inscribed circle is equidistant to the sides of the triangle: $OM = ON = OP = r$ and OM, ON and OP are perpendicular to the sides of the triangle. Use the formula for the area of a triangle:**

$$A = \frac{\text{base} \times \text{height}}{2}$$



Solution: You can create 3 smaller triangles within $\triangle ABC$, each with a height length of r .

$$(1) \text{ Area } \triangle ABC = \text{Area } \triangle AOC + \text{Area } \triangle BOC + \text{Area } \triangle AOB$$

$$\text{Area } \triangle ABC = \frac{3 \times 4}{2} = 6$$

$$\text{Area } \triangle AOC = \frac{4 \times r}{2} = 2r$$

$$\text{Area } \triangle BOC = \frac{5 \times r}{2} = \frac{5}{2}r$$

$$\text{Area } \triangle AOB = \frac{3 \times r}{2} = \frac{3}{2}r$$

Substituting in equation (1):

$$6 = 2r + \frac{5}{2}r + \frac{3}{2}r$$

$$6 = 2r + 4r$$

$$6 = 6r$$

$$r = 1$$

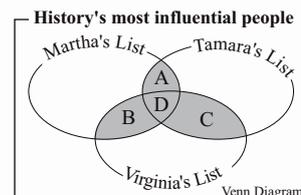
The radius r of the inscribed circle is **1**.

32. **Hint: Draw a Venn Diagram. Use algebra.****Solution:**

$$(1) A + B + D = 45$$

$$(2) A + D + C = 34$$

$$(3) B + D + C = 28$$



By adding equations (1) to (3) we get:

$$2A + 2B + 2C + 3D = 107$$

$$2(A + B + C + D) = 107 - D$$

$$A + B + C + D = \frac{107 - D}{2}$$

$A + B + C + D$ is at its maximum, if and only if,

$$\frac{107 - D}{2} \text{ is also at its maximum.}$$

If $D = 0$

$$(1) A + B = 45$$

$$(2) A + C = 34$$

$$(3) B + C = 28 \quad \text{add these equations together}$$

$2(A + B + C) = 107$ which is false because the result can't be an odd number. An odd number would result in half a person! So D can't be 0.

Then D must be 1. Then the maximum number of names that might have reached the shortlist is

$$\frac{107 - 1}{2} = 53$$

33. **Hint: Write 1200 as a product of its prime factors.**

OR Use trial and error.

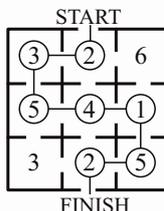
$$\begin{aligned} \text{Solution: } 1200 &= 12 \times 100 \\ &= 2^2 \times 3 \times 2^2 \times 5^2 \\ &= 2^4 \times 3 \times 5^2 \end{aligned}$$

Knowing this, the path around the rooms must contain four 2's, one 3 and two 5's

or two 2's, one 4, one 3 and two 5's.

1 can be in the path because it doesn't change the value of the product.

The path becomes **2, 3, 5, 4, 1, 5 and 2**.

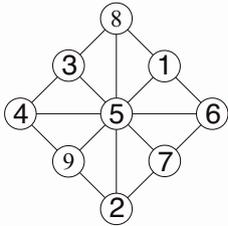


32. **Hint:** List all possible combinations of 3 digits that add to 15. Think about the best number to put in the centre given these combinations.

Solution: The three number combinations that add to 15 are: (9,5,1) (8,6,1) (7,6,2) (6,5,4)
(9,4,2) (8,5,2) (7,5,3)
(8,4,3)

5 is the most used number. It should be in the centre of the diagram, where 4 lines cross.

Continuing the process of elimination you arrive at the following solution.



33. **Hint:** Draw a diagram. Be systematic.

Solution: The maximum number of people who can cross in any one time is:

1 woman (W) or 2 children (cc).

You must start by sending 2 children across so one can return with the canoe or nothing is achieved. After this a variety of solutions exist, but all take 9 trips.

WAITING!	Travellers	STAYERS?	Time Spent (min)
WW	cc →		10
∅ ∅	c ←	c	20
WW	W →	W	30
c	c ←		40
W	cc →	W	50
∅ ∅	c ←	c	60
W	W →	WW	70
c	c ←		80
∅ ∅	cc →	WW	90
	c c		

The minimum time in which all 4 people can cross the river is **90 minutes**.

3.7

32. **Hint:** Look for a pattern. Use trial and error. Tabulate your results.

Solution: Trial for $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ to find the relationship between x and the size of the term.

Trial	$\frac{1}{x^2}$	$\frac{1}{x}$	x	x^2	x^3
$x = \frac{1}{4}$	16	4	$\frac{1}{4}$	$\frac{1}{16}$	$\frac{1}{64}$
$x = \frac{1}{2}$	4	2	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
$x = \frac{3}{4}$	$\frac{16}{9}$	$1\frac{1}{3}$	$\frac{3}{4}$	$\frac{9}{16}$	$\frac{27}{64}$

So the largest possible option is $\frac{1}{x^2}$ or A.

33. **Hint:** Consider the pattern and extend it to fig 4 if necessary. Work systematically. Draw a table.

Solution:

Figure	No. of triangles	No. of matches
1	1	$3 \times (1) = 3$
2	$1 + 2$	$3 \times (1 + 2) = 9$
3	$1 + 2 + 3$	$3 \times (1 + 2 + 3) = 18$
4	$1 + 2 + 3 + 4$	$3 \times (1 + 2 + 3 + 4) = 30$
10	$1 + 2 + \dots + 10$	$3 \times (1 + 2 + 3 + \dots + 10) =$ $= 3 \times (55)$ $= 165$

The tenth figure in this pattern requires **165 matches**.

3.8

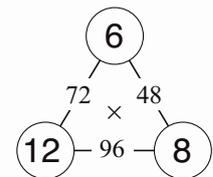
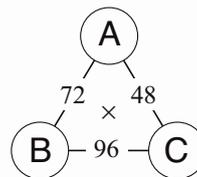
32. **Hint:** List the pairs of whole numbers that have the product of 48. Then do the same for 72 and 96. Use trial and error. OR Write 48, 72 and 96 as products of their prime factors and solve algebraically.

Solution: The factors are:

48	72	96
(1,48)	(1,72)	(1,96)
(2,24)	(2,36)	(2,48)
(3,16)	(3,24)	(3,32)
(4,12)	(4,18)	(4,24)
(6,8)	(6,12)	(6,16)
	(8,9)	(8,12)

Trying these factors, starting with (A,C) you get:

- (A,C) = (1,48) → (C,B) = (48,2) and (B,A) = (2,1) (X)
- (A,C) = (2,24) → (C,B) = (24,4) and (B,A) = (4,2) (X)
- (A,C) = (3,16) → (C,B) = (16,6) and (B,A) = (6,3) (X)
- (A,C) = (4,12) → (C,B) = (12,8) and (B,A) = (8,4) (X)
- (A,C) = (6,8) → (C,B) = (8,12) and (B,A) = (12,6) (✓)



OR Using prime factors and algebra:

- (1) $A \times C = 48 = 2^4 \times 3$
- (2) $B \times C = 96 = 2^5 \times 3$
- (3) $A \times B = 72 = 2^3 \times 3^2$

Multiply (1), (2) and (3)
Use $a^m \times a^n = a^{m+n}$

$A^2 \times B^2 \times C^2 = 2^{12} \times 3^4$
(4) $A \times B \times C = 2^6 \times 3^2$

Reduce the squares

- (4) ÷ (1) $B = (2^6 \times 3^2) \div (2^4 \times 3) = 2^2 \times 3 = 12$
- (4) ÷ (2) $A = (2^6 \times 3^2) \div (2^5 \times 3) = 2^1 \times 3 = 6$
- (4) ÷ (3) $C = (2^6 \times 3^2) \div (2^3 \times 3^2) = 2^3 = 8$

Therefore $A = 6$, $B = 12$ and $C = 8$

3.8 (cont.)

33. **Hint:** Look at the win/loss results first, then consider the draws. Goals must also be taken into consideration. Use trial and error.

Solution:

Group F

Team	MP	W	D	L	GF	GA	Pts
	matches played	wins	draws	losses	goals for	goals against	points
Brazil	2	2	0	0	3	0	6
Australia	2	1	0	1	3	3	3
Croatia	2	0	1	1	0	1	1
Japan	2	0	1	1	1	3	1

According to the W to D to L ratio, one round of games was:

Brazil v Australia (Brazil won)

Croatia v Japan (draw)

For the other round there are two possibilities:

Brazil v Japan (Brazil won)

Australia v Croatia (Australia won)

(R2 trial 1)

Brazil v Croatia (Brazil won)

Australia v Japan (Australia won)

(R2 trial 2)

Trials should consider the number of goals scored:

Japan = 1GF and 3GA and

Brazil = 3GF and 0GA

We know that the only possible score for the draw

Croatia v Japan is 0 - 0 in R1, because Croatia did not score any goal.

R2 trial 1

Therefore in the second round the only possible score for

Brazil v Japan is 3 - 1, because Japan = 1GF and 3GA.

This is false, because Brazil has 0 goals against.

Therefore Japan played Australia in the second round and

Brazil in the third round.

4.1

32. **Hint:** Start with the row, column or diagonal that is complete and determine its sum. Then work with the lines with only one unknown.

Solution: Start with the diagonal

$$1 + 8 + 5 + 7 + 4 = 25$$

Then choose the top horizontal row and so on.

The solution is:

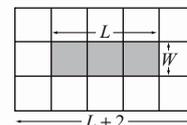
1	5	9	3	7
4	8	2	1	10
2	6	5	9	3
10	4	3	7	1
8	2	6	5	4

33. **Hint:** Consider the formula for finding the area of a rectangle.

Solution: Area rectangle = LW

Area border = $2(L + 2 + W)$

But given the same number of pavers in each color is required:



Area rectangle = Area border

$$LW = 2(L + 2 + W)$$

expand

$$LW - 2L = 4 + 2W$$

$$L(W - 2) = 4 + 2W$$

solve for L

$$L = \frac{4 + 2W + 4 - 4}{W - 2}$$

write as a sum of two fractions with denominator $W - 2$, so one fraction can be reduced to a whole number.

$$L = \frac{8 + 2(W - 2)}{W - 2}$$

write as a sum of two fractions

$$L = \frac{2(W - 2)}{W - 2} + \frac{8}{W - 2}$$

reduce the first fraction

$$L = 2 + \frac{8}{W - 2}$$

L and W must be positive numbers and $W - 2$ must equal the factors of 8 i.e. 1, 2, 4 or 8.

As a table then:

$W - 2$	Width (W)	Length (L)	Area rectangle	Area border
1	3	10	30	30
2	4	6	24	24
4	6	4	24	24
8	10	3	30	30

The largest paved area uses 30 pavers of each kind, so the total number of pavers needed is **60**.

4.2

32. **Hint:** Use trial and error. A table format may help.
OR Use algebra.

Solution: Let x = days worked
 y = days rested

Trials should consider that $x + y = 30$

Trials	Work		Rest		Total		Result
	x	coins + 5/day	y	coins - 6/day	days	coins	coins
1	20	100	10	-60	30	40	✗
2	19	95	11	-66	30	29	✗
3	18	90	12	-72	30	18	✓

OR Write the equations:

(1) $x + y = 30$ for the number of days

(2) $5x - 6y = 18$ for the number of coins

or (1) $y = 30 - x$

Substitute equation (1) into equation (2) to eliminate y :

$5x - 6(30 - x) = 18$ expand brackets

$5x - 180 + 6x = 18$ add like terms

$11x = 198$ divide both sides by 11

$x = 18$

There were **18** days worked by the builder.

33. **Hint:** Establish the number of bricks broken in each order. Work systematically always considering the breakages. OR Use algebra.

Solution: 6% of 100 bricks or 1 lot, gives 6 broken bricks per lot.

Not considering breakages you need 8000 bricks or 80 lots of 100.

Assume all possible breakages occur, then

$80 \times 6 = 480$ broken bricks included.

This leaves $8000 - 480 = 7520$ useful bricks.

We still need at least 5 more lots or 500 bricks. Again assume all possible breakages occur,

then $5 \times 6 = 30$ broken bricks included.

This leaves $500 - 30 = 470$ useful bricks.

This gives $7520 + 470 = 7990$ useful bricks in 85 lots.

So 1 more lot of 100 bricks is required to cover breakages. 86 lots of 100 bricks are required to cover possible breakages or **8600 bricks**.

OR

Let x = number of bricks ordered to finish the job.

Knowing the number of bricks ordered take away 6% of that order must be ≥ 8000 , the inequality for x becomes:

$$x - \frac{6}{100} \times x \geq 8000$$

$$\frac{94x}{100} \geq 8000$$

$$94x \geq 800\,000$$

$$x \geq \frac{800\,000}{94}$$

$$x \geq 8510.63$$

But bricks can only be ordered in lots of 100, so

$x = \mathbf{8600}$

4.3



4.2 - 4.3

32. **Hint:** Write each decimal as a fraction.

Solution:

$$\frac{0.6 \times 0.125}{0.25 \times 0.1} = \frac{\frac{2}{3} \times \frac{1}{8}}{\frac{1}{4} \times \frac{1}{10}} = \frac{\frac{1}{12}}{\frac{1}{40}} = \frac{1}{12} \times \frac{40}{1} = \frac{40}{12} = 3\frac{1}{3}$$

33. **Hint:** Be systematic Be clear about the relationship between bets and wins, and bets and losses. Tabulate the results.

Solution: Given that the order of a win or a loss is irrelevant to the result, we can assume that the gambler has 5 wins in a row and then 5 losses in a row.

Bet #	Start (\$)	Bet (\$)	Win (\$)	Loss (\$)
1	1024	512	512	
2	1536	768	768	
3	2304	1152	1152	
4	3456	1728	1728	
5	5184	2592	2592	
6	7776	3888		3888
7	3888	1944		1944
8	1944	972		972
9	972	486		486
10	486	243		243

The gambler, after 10 bets, has **\$243**.

4.4

32. **Hint:** Use algebra.

Solution:

$$\begin{aligned}
 (1) \quad a + a = b &\Rightarrow 2a = b \\
 (2) \quad b + b = c &\Rightarrow 2b = c \Rightarrow \\
 (3) \quad c + c = d &\Rightarrow 2c = d \\
 (4) \quad a + b + c + d &= 360 && \text{multiply by 2} \\
 2a + 2b + 2c + 2d &= 720 && \text{express in terms of } b \text{ and } d \\
 b + 2b + d + 2d &= 720 \\
 3b + 3d &= 720 && \text{divide by 3} \\
 b + d &= 240 && \text{express in terms of } c \\
 \frac{c}{2} + 2c &= 240 \\
 \frac{c + 4c}{2} &= 240 \\
 5c &= 480 \\
 c &= 96
 \end{aligned}$$

Substitute $c = 96$ into

$$\begin{aligned}
 (3) \quad 96 + 96 = d, \text{ so } d &= 192 \\
 (2) \quad 2b = 96, \text{ so } b &= 48 \\
 (1) \quad 2a = 48, \text{ so } a &= 24
 \end{aligned}$$

33. **Hint:** Establish the rule:

Sum of a sequence of consecutive numbers = middle term \times number of terms

e.g. For 7, 8, 9 $7 + 8 + 9 = 8 \times 3$

For 5, 6, 7, 8 $5 + 6 + 7 + 8 = 6.5 \times 4$

6.5 is the average of the two middle terms

Solution: Let m = the middle term of the sequence of x consecutive numbers.

Using the rule, the equation becomes:

$$12x + 4 = m \times x \quad \text{solve for } m$$

$$m = \frac{12x + 4}{x} \quad \text{express as a sum of two fractions}$$

$$m = \frac{12x}{x} + \frac{4}{x} \quad \text{reduce the first fraction}$$

$$m = 12 + \frac{4}{x}$$

m must be either a whole number or the average of

2 whole numbers (e.g. $\frac{6+7}{2} = 6.5$)

So $x = 1, x = 2, x = 4$ or $x = 8$

The maximum possible value of x is 8.

Then $m = 12.5$ and the sequence is:

$$9 + 10 + 11 + 12 + 13 + 14 + 15 + 16 = 100$$

4.5

32. **Hint:** List the squares up to 56. Use trial and error.

$$\begin{aligned}
 \text{Solution: } 1^2 &= 1 & 2^2 &= 4 \\
 3^2 &= 9 & 4^2 &= 16 \\
 5^2 &= 25 & 6^2 &= 36 \\
 7^2 &= 49
 \end{aligned}$$

Try combinations of up to four squares:

$$\begin{aligned}
 7^2 + 3^2 &= 49 + 9 = 58 \\
 7^2 + 2^2 + 1^2 + 1^2 &= 49 + 4 + 1 + 1 = 55 \\
 6^2 + 5^2 &= 36 + 25 = 61 \\
 6^2 + 4^2 + 2^2 &= 36 + 16 + 4 = 56
 \end{aligned}$$

33. **Hint:** Consider the options for the number of points needed to win any one game. Tabulate the choices.

Solution:

Possible points in a game of tennis		
Points FOR	Points AGAINST	Margin
4	0	4
4	1	3
4	2	2
5	3	2
7	5	2
⋮	⋮	⋮

Deuce

Given that the points must be equal and we need to find the least possible games, then the games Gabby wins must be by the largest margin of 4 points.

Then her opponent's 6 games wins must be by the smallest margin of 2 points:

Games	1	2	3	4	5	6	Points Margin
Gabby	+4	+4	+4				12
Opponent	+2	+2	+2	+2	+2	+2	12

The least number of games Gabby must have won is 3.

4.6

32. **Hint:** Start with what is given or can be deduced. Use trial and error.

Solution: Start with the SOS clue: S = 3 and O = 2
Then R = S + S = 6

Continue by trying your answers against a checklist.

$$\begin{array}{r}
 \text{CROSS} \\
 + \text{ROADS} \\
 \hline
 \text{DANGER}
 \end{array}
 \Rightarrow
 \begin{array}{r}
 \text{C 6 2 3 3} \\
 + \text{6 2 A D 3} \\
 \hline
 \text{D ANGE 6}
 \end{array}$$

We now know that D = 1 so E = 4.

Use trial and error to place 5, 7, 8 and 9.

N = 8, A = 5, G = 7 and C = 9.

$$\begin{array}{r}
 \text{C 6 2 3 3} \\
 + \text{6 2 A 1 3} \\
 \hline
 \text{1 AN G 4 6}
 \end{array}
 \Rightarrow
 \begin{array}{r}
 \text{9 6 2 3 3} \\
 + \text{6 2 5 1 3} \\
 \hline
 \text{1 5 8 7 4 6}
 \end{array}$$

1 = D
2 = O
3 = S
4 = E
5 = A
6 = R
7 = G
8 = N
9 = C

MATHS MATE



Teacher Resource



Teacher's Guide to the Use of Maths Mate

pages i - viii



Student Pad Answers

pages 3 - 72



Student Pad Short Answers

pages 1 - 8



Problem Solving Hints & Solutions

pages 1 - 16



Test Masters

pages 1 - 32



Test Answers

pages 1 - 32



Record Keeping Sheets

pages 1 - 6



Name:

1. [Long \times ,+] $648 \div 6 =$

2. [Decimal +,-] $6.25 + 7.35 =$

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

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

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

6. [Percentages] 25% of 300 =

7. [Integer +,-] $(-4) - (+6) =$

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

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 : $2x - 4 = 12$

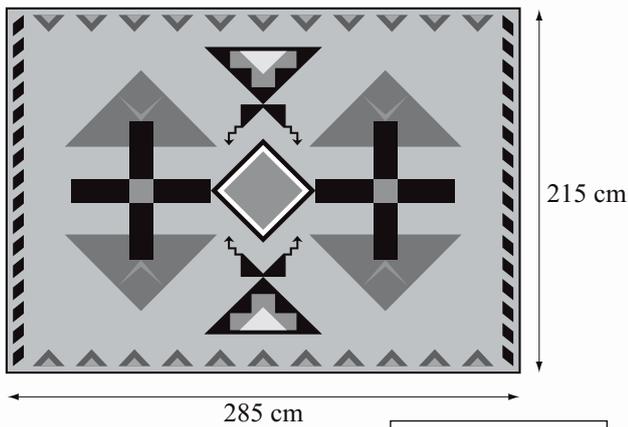
21. [Graphs & Functions] Complete the table for the rule $y = 2x - 4$

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?

23. [Perimeter]

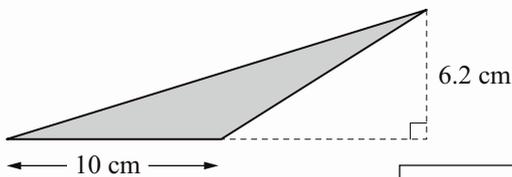
Find the perimeter of the floor rug.



cm

24. [Area]

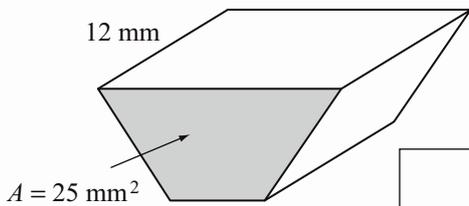
Find the area of the obtuse-angled triangle.



cm²

25. [Volume]

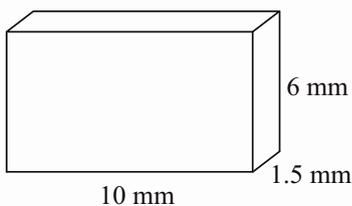
Find the volume of the prism.



mm³

26. [Surface Area]

Find the total surface area of the rectangular prism.



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.]

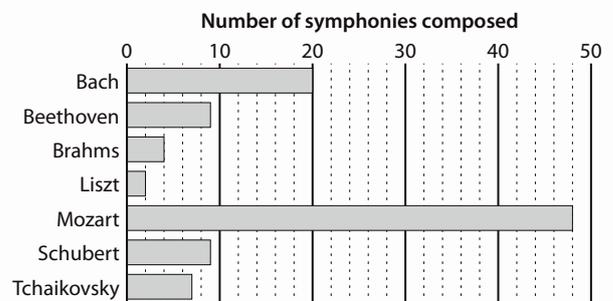


29. [Angles]

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

30. [Statistics]

Which musician composed 12 times less symphonies than Mozart?



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:

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

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	—

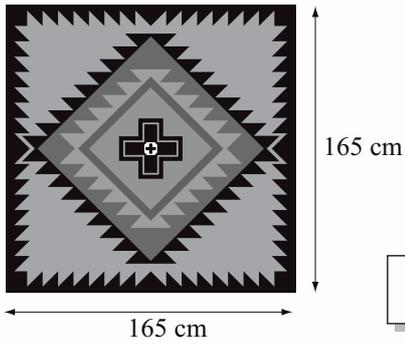


Name:

1. [Long \times, \div]
 $639 \div 9 =$
2. [Decimal $+, -$]
 $5.7 - 3.8 =$
3. [Decimal \times, \div]
 $1000 \times 0.04 =$
4. [Fraction $+, -$]
 $\frac{7}{10} + \frac{3}{10} =$
5. [Fraction \times, \div]
 $\frac{2}{3} \div \frac{7}{9} =$
6. [Percentages]
75% of 200 =
7. [Integer $+, -$]
 $(+8) + (-3) =$
8. [Integer \times, \div]
 $(+18) \div (-6) =$
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 $\frac{5^6}{5^3}$
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 $y = -3x + 2$

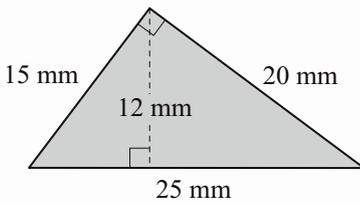
x	$y = -3x + 2$	(x, y)
1	$y = -3 \times 1 + 2$	(1, -1)
2		
3		
4		
5		
22. [Units of Measurement / Time]
How many months are there from January 1st 2010 until July 1st 2013?

23. [Perimeter]
Find the perimeter of the floor rug.



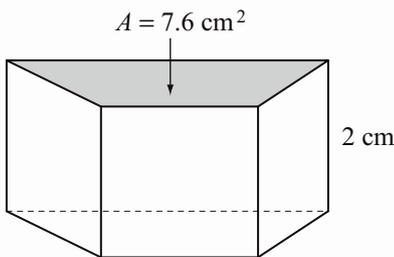
cm

24. [Area]
Find the area of the triangle.



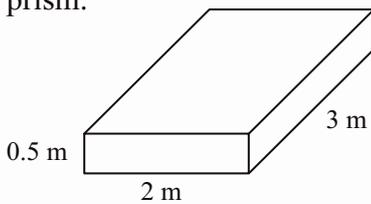
mm²

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



cm³

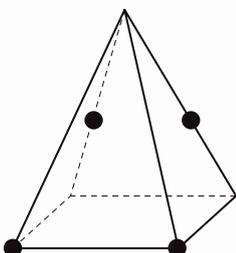
26. [Surface Area]
Find the total surface area of the rectangular prism.



m²

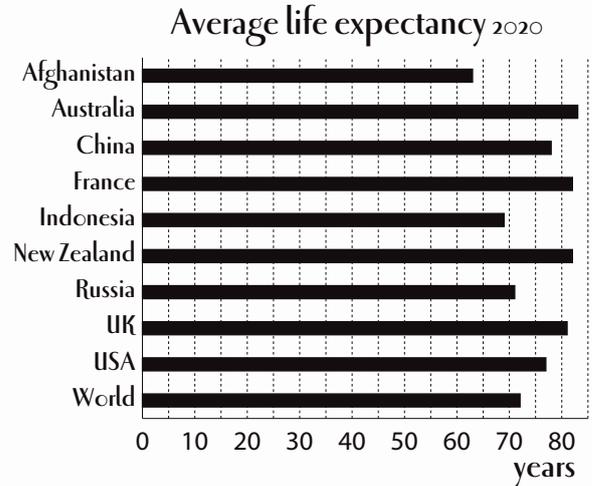
27. [Pythagoras / Trigonometry]
Find the positive solution for a :
 $a^2 + 576 = 625$

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?



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:
 $(-1)^1 \times (-1)^2 \times (-1)^3 \times \dots \times (-1)^{55}$

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	—

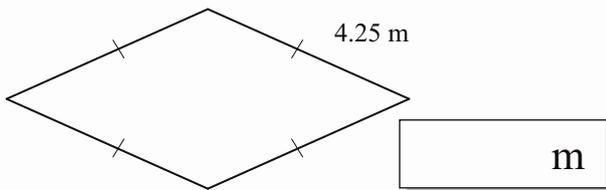


Name:

1. [Long \times ,+] $58 \times 26 =$
2. [Decimal +,-] $20 - 6.07 =$
3. [Decimal \times ,+] $1.6 \times 0.1 =$
4. [Fraction +,-] $3\frac{7}{8} - 1\frac{5}{8} =$
5. [Fraction \times ,+] $\frac{7}{3} \times \frac{9}{8} =$
6. [Percentages] 15% of 12 m = millimetres
7. [Integer +,-] $(+2) - (+5) =$
8. [Integer \times ,+] $(+3) \times (-9) =$
9. [Rates / Ratios] In written English, about 5% of all letters are d's. How many d's would you expect to find in an article containing 2500 letters?
10. [Indices] Simplify $\frac{8c^6}{2c^3}$
11. [Square Roots / Surds] Evaluate $\sqrt{0.09}$
12. [Order of Operations] $(4 + 4 \times 4)^2 =$
13. [Exploring Number] Place in ascending order: $2.05, \frac{1}{4}, 2.5\%$
14. [Scientific Notation] Express 15.29 correct to 1 decimal place.
15. [Number Patterns] Complete the pattern: 3, 9, 14, 18, 21, ,
16. [Expressions] Simplify $2k - k + 6 + k$
17. [Substitution] If $y = x(x - 3)$, find the value of y when $x = 5$
18. [Expansion] Expand $4j(1 - 2j)$
19. [Factorisation] Factorise $5y^3z - 10y^2z$
20. [Equations] Solve for x : $\frac{x}{2} - 2 = 2$
21. [Graphs & Functions] Complete the table of values for the rule $y = 4x - 3$

x	-3	-2	-1	0	1	2	3
y	-15						
22. [Units of Measurement / Time] Complete the statement: $3\frac{1}{4}$ years = months

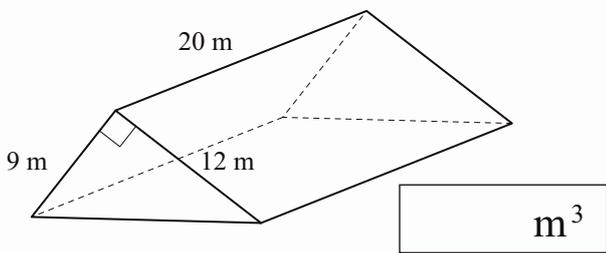
23. [Perimeter]
Find the perimeter of the rhombus.



m

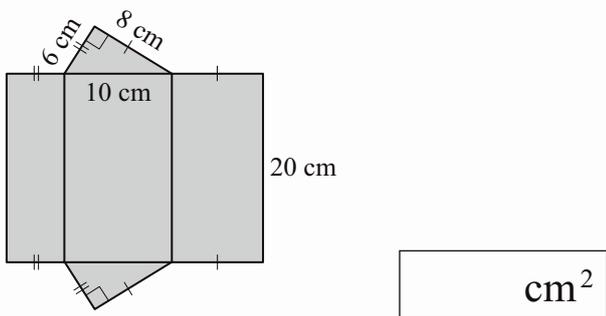
24. [Area]
A square paddock has a perimeter of 1.2 km.
Find its area in hectares (ha).

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



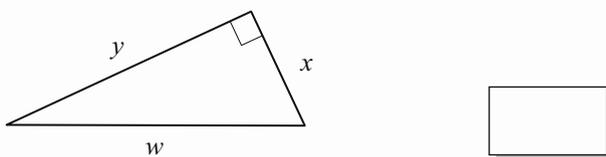
m³

26. [Surface Area]
Find the area of the net.

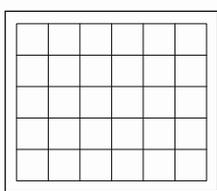
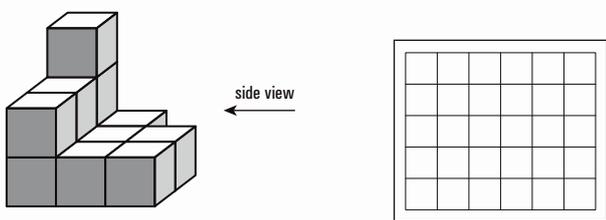


cm²

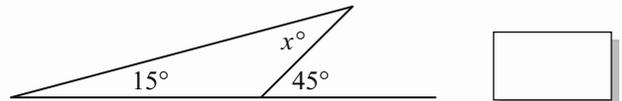
27. [Pythagoras / Trigonometry]
Which letter corresponds to the hypotenuse of the right-angled triangle?



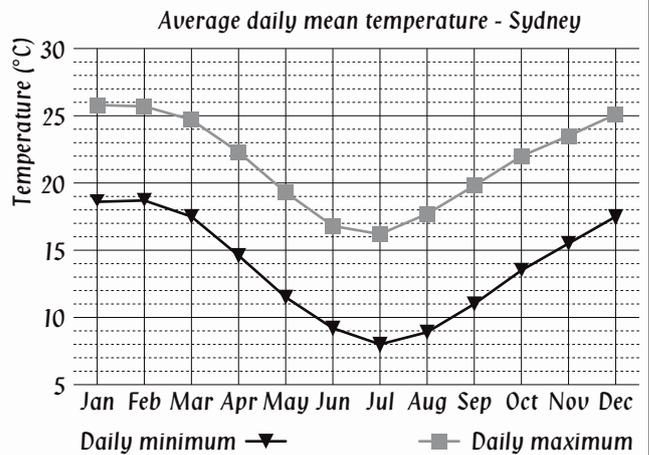
28. [Shape / Location]
Draw the side view of the solid.



29. [Angles]
Find the value of x° .



30. [Statistics]
In which month in Sydney is the daily maximum temperature closest to twice the daily minimum temperature?



31. [Probability]
A card is drawn at random from a deck of 52 playing cards. What is the probability that it is a court card (K, Q, J)?



32. [Problem Solving 1]
If n is a negative integer, which of the following has the greatest value?

- A) $-n$ B) $n - n$
C) $n + n$ D) n^2
E) n^3

33. [Problem Solving 2]
The lines of a multiplication table are shown jumbled. Which times table is it?

- W × V = TS
W × Z = RU
W × R = XQ
W × W = ST
W × U = VZ
W × Q = UR
W × T = W
W × X = QX
W × S = ZV

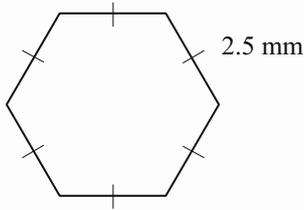


Name:

1. [Long \times ,+] $27 \times 31 =$
2. [Decimal +,-] $0.4 + 9.2 =$
3. [Decimal \times ,+] $5.8 \div 0.1 =$
4. [Fraction +,-] $2\frac{3}{5} + 1\frac{2}{5} =$
5. [Fraction \times ,+] $\frac{7}{5} \div \frac{4}{10} =$
6. [Percentages] 20% of 1 hour = minutes
7. [Integer +,-] $(-6) + (+4) =$
8. [Integer \times ,+] $(+18) \div (-2) =$
9. [Rates / Ratios] In written English, about 2% of all letters are z's. How many z's would you expect to find in an article containing 15 000 letters?
10. [Indices] Simplify $\frac{10w^4}{5w}$
11. [Square Roots / Surds] Evaluate $\sqrt{1\frac{24}{25}}$
12. [Order of Operations] $3 \times (8 - 3)^2 =$
13. [Exploring Number] Place in descending order: $\frac{1}{5}$, 2%, 0.22
14. [Scientific Notation] Round 31.456 to the nearest whole number.
15. [Number Patterns] Complete the pattern: 2, 10, 17, 23, 28, ,
16. [Expressions] Simplify $8g - 8 + 8g + 8$
17. [Substitution] If $y = \frac{x}{5} + 4$, find the value of y when $x = 5$
18. [Expansion] Expand $2z(z + 4)$
19. [Factorisation] Factorise $x^2y + 2xy^2$
20. [Equations] Solve for x: $\frac{x}{4} + 2 = 3$
21. [Graphs & Functions] Complete the table of values for the rule $y = -x + 6$

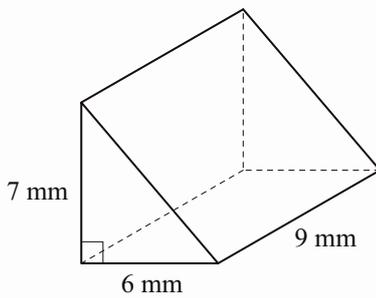
x	-3	-2	-1	0	1	2	3
y	9						
22. [Units of Measurement / Time] Convert 4:30 pm to 24 hour time.

23. [Perimeter]
Find the perimeter of the hexagon.

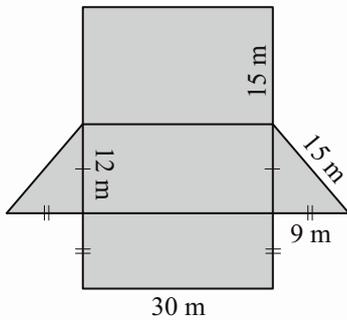


24. [Area]
The perimeter of a rectangle is 24 cm. If its length is twice its width, find its area.

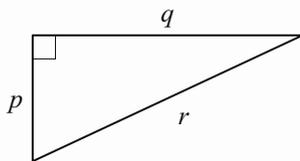
25. [Volume]
Find the volume of the triangular prism.



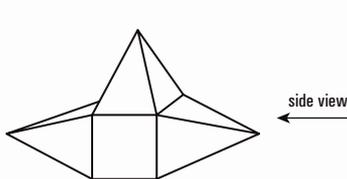
26. [Surface Area]
Find the area of the net.



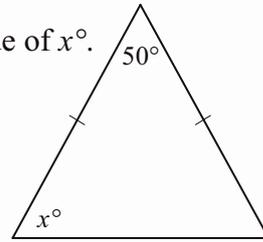
27. [Pythagoras / Trigonometry]
Which letter corresponds to the hypotenuse of the right-angled triangle?



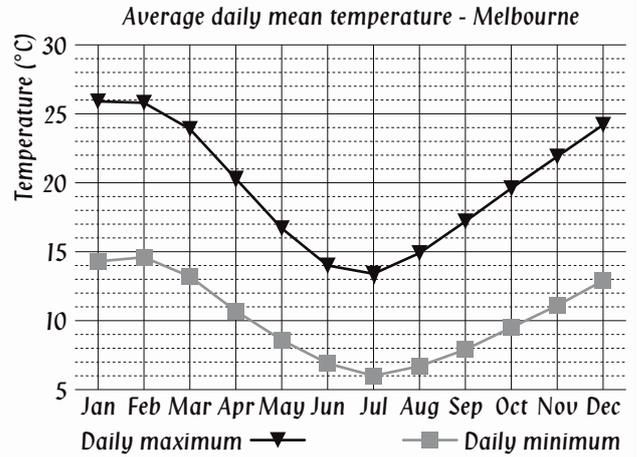
28. [Shape / Location]
Draw the side view of this solid.



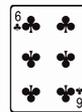
29. [Angles]
Find the value of x° .



30. [Statistics]
In which month in Melbourne is the daily minimum temperature closest to 8°C ?



31. [Probability]
A card is drawn at random from a deck of 52 playing cards. What is the probability that it is a black card?



32. [Problem Solving 1]
If $3n$ is an even number, which of the following must be an odd number?

- A) n B) $2n$
C) $n + 1$ D) $n + 2$
E) n^2

33. [Problem Solving 2]
The lines of a multiplication table are shown jumbled below. Which times table is it?

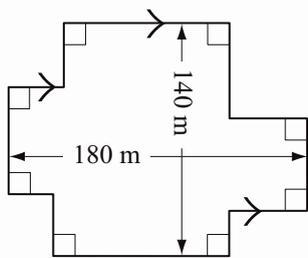
- H \times F = JD
H \times E = JC
H \times A = DB
H \times J = GD
H \times H = GC
H \times C = DH
H \times I = DF
H \times G = H
H \times D = F



Name:

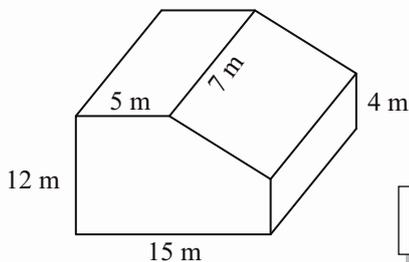
- | | |
|---|---|
| <p>1. [Long \times, \div]
$420 \div 5 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>2. [Decimal $+, -$]
$7 - 4.7 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>3. [Decimal \times, \div]
$1.2 \div 0.4 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>4. [Fraction $+, -$]
$2 - \frac{3}{5} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>5. [Fraction \times, \div]
$\frac{2}{9} \times 4\frac{1}{2} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>6. [Percentages]
Express 18 out of 60 as a percentage. <input style="width: 60px; height: 25px;" type="text"/></p> <p>7. [Integer $+, -$]
$(-8) - (+3) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>8. [Integer \times, \div]
$(+9) \times (+12) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>9. [Rates / Ratios]
Of the 25 friends going to the football, 10 are wearing hats. Find the ratio of friends with hats to those without. <input style="width: 60px; height: 25px;" type="text"/></p> <p>10. [Indices]
Evaluate $(-5)^3$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>11. [Square Roots / Surds]
Evaluate $\sqrt{81} - \sqrt{64}$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>12. [Order of Operations]
$6 + 5 \times 24 \div 3 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>13. [Exploring Number]
$-2.35 < -3.25$ True or false? <input style="width: 60px; height: 25px;" type="text"/></p> | <p>14. [Scientific Notation]
Express 2.3×10^3 as a basic numeral. <input style="width: 60px; height: 25px;" type="text"/></p> <p>15. [Number Patterns]
Complete the pattern:
0, 12, 24, 36, <input style="width: 60px; height: 25px;" type="text"/>, <input style="width: 60px; height: 25px;" type="text"/></p> <p>16. [Expressions]
Simplify $6 \times s \times s^2 \div 3$ without using \times and \div signs. <input style="width: 60px; height: 25px;" type="text"/></p> <p>17. [Substitution]
If $m = 5$ and $n = 10$, find the value of $n(m - 3)$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>18. [Expansion]
Expand and simplify $2(4v - 1) - 5v$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>19. [Factorisation]
Factorise, then evaluate $16 \times 27 + 16 \times 73$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>20. [Equations]
Solve the inequality: $5x < x + 20$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>21. [Graphs & Functions]
Complete the missing coordinates given that A, B and C lie on the line defined by the rule $y = x + 2$
A(3, <input style="width: 30px; height: 25px;" type="text"/>) , B(-2, <input style="width: 30px; height: 25px;" type="text"/>) , C(<input style="width: 30px; height: 25px;" type="text"/>, -2)</p> <p>22. [Units of Measurement / Time]
How many centimetres in 3.5 metres? <input style="width: 60px; height: 25px;" type="text"/></p> |
|---|---|

23. [Perimeter]
Find the perimeter of the polygon.

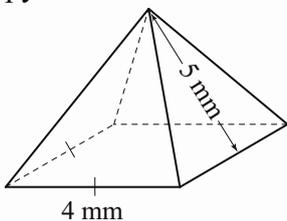


24. [Area]
A square has an area of 9 cm^2 . If you triple the side length of the square, what is the area of the new square?

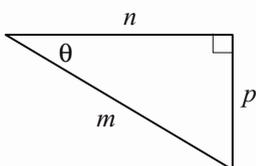
25. [Volume]
Find the volume of the prism.



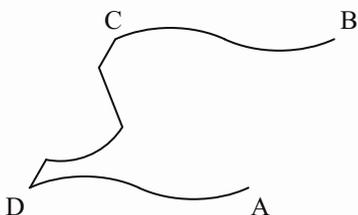
26. [Surface Area]
Find the total surface area of the square pyramid.



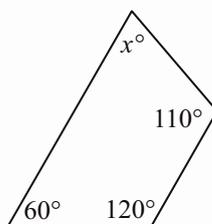
27. [Pythagoras / Trigonometry]
Which perpendicular side is adjacent to the angle θ in the triangle?



28. [Shape / Location]
If ABCD is a parallelogram, join A to B in such a way that the completed shape will tessellate.

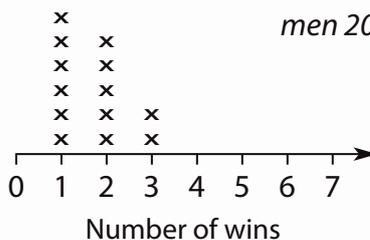


29. [Angles]
Find the value of x° .

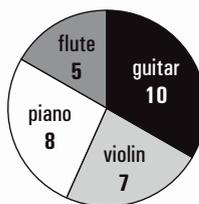


30. [Statistics]
How many men have won the Hawaii Ironman title twice?

Hawaii Ironman Triathlon Winners
men 2000 - 2022

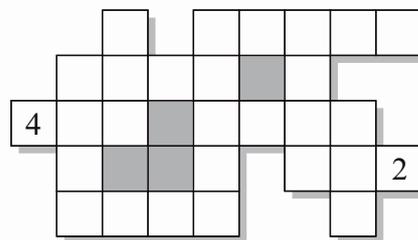


31. [Probability]
What is the probability that a student selected at random is studying the guitar?



Choice of musical instrument by students

32. [Problem Solving 1]
Fill in the cross number puzzle using the following numbers:
3 digits: 191, 712, 491, 611
4 digits: 1954, 1956, 1957, 1960, 1961
5 digits: 74 150, 78 113



33. [Problem Solving 2]
The first digit of a six-digit number is 6. If this 6 is moved to the end of the number, the new six-digit number is only a quarter of the original number. Find the original number.

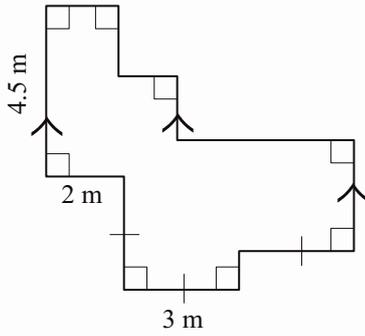
$$\begin{array}{r} A B C D E 6 \\ \times \quad \quad \quad 4 \\ \hline 6 A B C D E \end{array}$$



Name:

- | | |
|--|--|
| <p>1. [Long \times, \div]
$225 \div 3 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>2. [Decimal $+, -$]
$5 - 0.4 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>3. [Decimal \times, \div]
$0.75 \div 0.5 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>4. [Fraction $+, -$]
$5 - \frac{5}{8} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>5. [Fraction \times, \div]
$2\frac{2}{3} \times 1\frac{1}{8} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>6. [Percentages]
Express 18 out of 90 as a percentage. <input style="width: 60px; height: 25px;" type="text"/></p> <p>7. [Integer $+, -$]
$(+9) + (-1) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>8. [Integer \times, \div]
$(+35) \div (-7) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>9. [Rates / Ratios]
The ratio of fat to meat in a pork chop is 6 : 19. Find the percentage of fat in the chop. <input style="width: 60px; height: 25px;" type="text"/></p> <p>10. [Indices]
Evaluate $\left(-\frac{2}{3}\right)^2$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>11. [Square Roots / Surds]
Evaluate $\sqrt{4} + \sqrt{16}$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>12. [Order of Operations]
$7 + 6 - 27 \div 3 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>13. [Exploring Number]
$-1.95 > -1.905$ True or false? <input style="width: 60px; height: 25px;" type="text"/></p> | <p>14. [Scientific Notation]
Express 1.702×10^6 as a basic numeral. <input style="width: 120px; height: 25px;" type="text"/></p> <p>15. [Number Patterns]
Complete the pattern:
2, 11, 20, 29, <input style="width: 60px; height: 25px;" type="text"/>, <input style="width: 60px; height: 25px;" type="text"/></p> <p>16. [Expressions]
Simplify $5 \times d - 2 \div d$ without using \times and \div signs. <input style="width: 100px; height: 25px;" type="text"/></p> <p>17. [Substitution]
If $g = 7$ and $h = 8$, find the value of $g(h - 5)$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>18. [Expansion]
Expand and simplify $5(2c - 3) - 4c$ <input style="width: 120px; height: 25px;" type="text"/></p> <p>19. [Factorisation]
Factorise, then evaluate $\frac{7}{8} \times 57 - \frac{7}{8} \times 17$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>20. [Equations]
Solve the inequality: $5x \geq 11x + 36$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>21. [Graphs & Functions]
Complete the missing coordinates given that A, B and C lie on the line defined by the rule $y = -x + 2$
A(<input style="width: 30px; height: 20px;" type="text"/>, -2), B(0, <input style="width: 30px; height: 20px;" type="text"/>), C(<input style="width: 30px; height: 20px;" type="text"/>, -4)</p> <p>22. [Units of Measurement / Time]
How many grams in 0.03 kilograms? <input style="width: 120px; height: 25px;" type="text"/></p> |
|--|--|

23. [Perimeter]
Find the perimeter of the polygon.

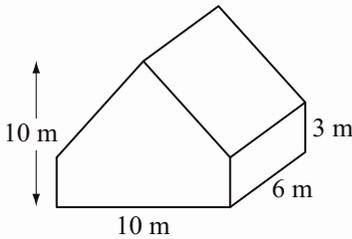


m

24. [Area]
Find the length of the base of a triangle whose height is 3 cm and area is 34.5 cm^2 .

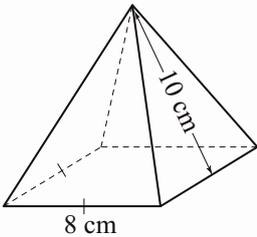
cm

25. [Volume]
What is the volume of air inside the shed?



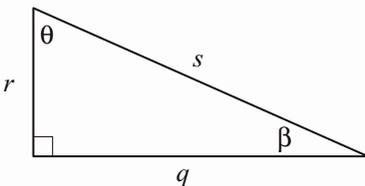
m³

26. [Surface Area]
Find the total surface area of the square pyramid.



cm²

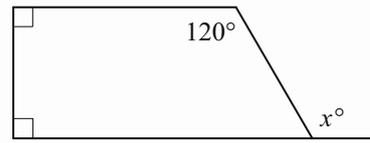
27. [Pythagoras / Trigonometry]
Which side is opposite the angle θ in the triangle?



28. [Shape / Location]
Euler's formula $E = V + F - 2$ defines the relationship between Edges, Vertices and Faces of any polyhedron. Verify Euler's formula for a cube.

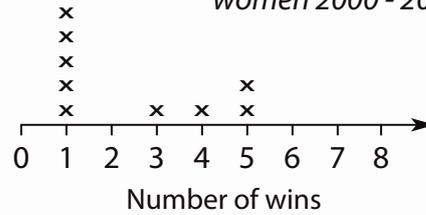
= + - 2

29. [Angles]
Find the value of x° .

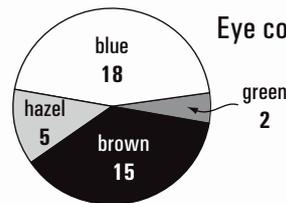


30. [Statistics]
How many women have won the Hawaii Ironman title once only?

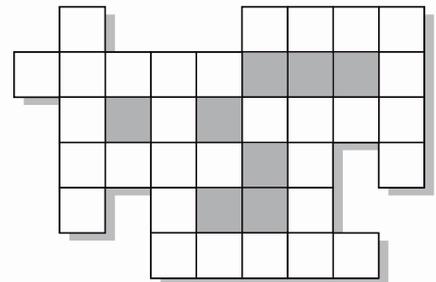
Hawaii Ironman Triathlon Winners
women 2000 - 2022



31. [Probability]
If a student is chosen at random from the group, what is the probability that they will have blue eyes?



32. [Problem Solving 1]
Fill in the cross number puzzle using the following numbers:
4 digits: 1234, 1496, 2468, 6543, 7421
5 digits: 11235, 13579, 43210, 56789



33. [Problem Solving 2]
The last digit of a six-digit number is 1. If the 1 is moved to the start of the number, the new six-digit number is only a third of the original number. Find the original number.

$$\begin{array}{r} 1 \ A \ B \ C \ D \ E \\ \times \qquad \qquad \qquad 3 \\ \hline A \ B \ C \ D \ E \ 1 \end{array}$$



Name:

- | | |
|--|---|
| <p>1. [Long \times,+]
$67 \times 35 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>2. [Decimal +,-]
$5.7 + 0.739 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>3. [Decimal \times,+]
$1.4 \times 0.7 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>4. [Fraction +,-]
$2\frac{4}{11} - \frac{7}{11} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>5. [Fraction \times,+]
$\frac{1}{3} \div 1\frac{1}{9} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>6. [Percentages]
Increase \$200 by 15%. <input style="width: 60px; height: 25px;" type="text"/> \$</p> <p>7. [Integer +,-]
$(+6) - (+3) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>8. [Integer \times,+]
$(+5) \times (+5) \times (-2) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>9. [Rates / Ratios]
A giraffe can reach speeds of 50 km/h. How much time does it take to cover 500 m at this speed? <input style="width: 60px; height: 25px;" type="text"/> s</p> <p>10. [Indices]
Simplify $(4y)^2$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>11. [Square Roots / Surds]
Between which two consecutive whole numbers does $\sqrt{85}$ lie? <input style="width: 60px; height: 25px;" type="text"/></p> <p>12. [Order of Operations]
$(3 - 1)^3 + 2^3 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>13. [Exploring Number]
Which item is cheaper per gram?
A) \$8.50 for 400 g
B) \$21.50 for 1 kg <input style="width: 60px; height: 25px;" type="text"/></p> | <p>14. [Scientific Notation]
Which is larger:
8.4×10^{-5} or 4.8×10^{-3}? <input style="width: 60px; height: 25px;" type="text"/></p> <p>15. [Number Patterns]
Complete the pattern:
0.4, 0.8, 1.6, 3.2, <input style="width: 60px; height: 25px;" type="text"/> , <input style="width: 60px; height: 25px;" type="text"/></p> <p>16. [Expressions]
The expression $5(y + 5)$ can also be written as:
$5 + (y + 5)$, $5 \times (y + 5)$ or $5 - (y + 5)$
<input style="width: 60px; height: 25px;" type="text"/></p> <p>17. [Substitution]
Given $v = \frac{x}{t}$, find v
when $x = 36$ and $t = 6$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>18. [Expansion]
Expand $-2x(x + 1)$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>19. [Factorisation]
Factorise
$x(2x + 1) - 2(2x + 1)$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>20. [Equations]
Solve for x: $5(x + 1) = 45$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>21. [Graphs & Functions]
Find the x-intercept for the straight line of equation $5x + 3y = 15$
[Let $y = 0$ in the relation] <input style="width: 60px; height: 25px;" type="text"/></p> <p>22. [Units of Measurement / Time]
At 1200 hours in Melbourne it is 0300 hours in Rome. What day and time is it in Rome if it is 1900 hours on Wednesday in Melbourne?
<input style="width: 60px; height: 25px;" type="text"/></p> |
|--|---|

23. [Perimeter]
A tennis court set up for doubles play has a length of 23.8 metres and a width of 11.0 metres. Calculate the perimeter of a doubles court.

24. [Area]
Find the area of the shape.

25. [Volume]
Using $\pi \approx 3.14$ find the volume of the cylinder.

26. [Surface Area]
Find the total surface area of a plank of wood in the shape of a rectangular prism 15 cm by 400 cm by 2 cm.

27. [Pythagoras / Trigonometry]
Using Pythagoras' theorem $a^2 + b^2 = c^2$, find the length of the hypotenuse.

28. [Shape / Location]
Determine the scale factor of the enlargement of the square ABCD in the diagram.

29. [Angles]
Find the value of x° .

30. [Statistics]
The ages of the teachers of a small primary school are:
40, 35, 28, 40, 52, ~~23~~, 39, 53, 45, 60, 49, 53, 27, 48, 36, 39.

Complete the stem-and-leaf plot to find the median of this data.

stem	leaves
2	3 _ _
_	_ _ _ _
_	_ _ _ _ _
_	_ _ _
_	_ _

31. [Probability]
What is the probability that a person chosen at random from the audience is a boy who prefers rock music? [Complete the two-way table.]

	Boys	Girls	Total
Pop music	14	12	
Rock music	10		
Total		21	

32. [Problem Solving 1]
Using the main exit only, it takes 1 minute for the audience to be evacuated from the theatre. Using only the small gate, it would take 3 minutes. How long would it take if both exits were opened?

33. [Problem Solving 2]
Use the digits 1, 3, 5, 7 and 9 (once each) to complete the multiplication so that the answer is as large as possible.

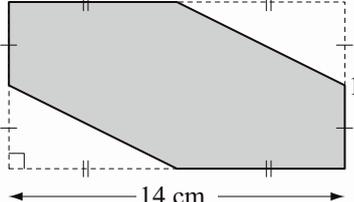
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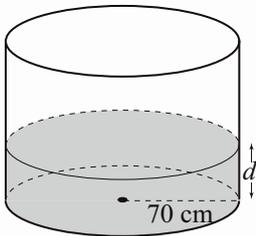


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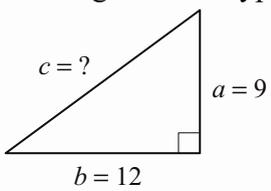
- | | |
|--|---|
| <p>1. [Long \times,+]
$35 \times 22 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>2. [Decimal +,-]
$3.9 + 0.611 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>3. [Decimal \times,+]
$300 \times 0.25 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>4. [Fraction +,-]
$4\frac{3}{7} - \frac{5}{7} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>5. [Fraction \times,+]
$1\frac{2}{5} \div \frac{7}{10} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>6. [Percentages]
Increase \$75 by 20%. <input style="width: 60px; height: 25px;" type="text"/> \$</p> <p>7. [Integer +,-]
$(-5) + (+6) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>8. [Integer \times,+]
$(+6) \times (-6) \times (-2) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>9. [Rates / Ratios]
Elephants can run 40 km/h. At this speed, how far can they run in 3 minutes? <input style="width: 60px; height: 25px;" type="text"/> km</p> <p>10. [Indices]
Simplify $(3k^3)^2$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>11. [Square Roots / Surds]
Between which two consecutive whole numbers does $\sqrt{14}$ lie? <input style="width: 60px; height: 25px;" type="text"/></p> <p>12. [Order of Operations]
$2 \times 8 + 35 \div 7 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>13. [Exploring Number]
Which item is cheaper per gram?
A) \$1.25 for 300 g
B) \$6 for 1.5 kg <input style="width: 60px; height: 25px;" type="text"/></p> | <p>14. [Scientific Notation]
Which is larger:
1.42×10^3 or 1.402×10^3? <input style="width: 60px; height: 25px;" type="text"/></p> <p>15. [Number Patterns]
Complete the pattern:
0.35, 0.7, 1.4, 2.8, <input style="width: 60px; height: 25px;" type="text"/>, <input style="width: 60px; height: 25px;" type="text"/></p> <p>16. [Expressions]
The expression $4 \times b \times b \times c \times c \times c \times d$ can also be written as:
$4bc^2d$, $4b^2c^3d$ or $4b^2cd^2$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>17. [Substitution]
If $P = 2(l + w)$, find P when $l = 6$ and $w = 2$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>18. [Expansion]
Expand $-2w(w - 5)$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>19. [Factorisation]
Factorise $4(x + 2) - 2x(x + 2)$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>20. [Equations]
Solve for x:
$6(x + 2) = 18$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>21. [Graphs & Functions]
Find the y-intercept for the straight line defined by the equation $4x + 6y = 12$
[Let $x = 0$ in the relation] <input style="width: 60px; height: 25px;" type="text"/></p> <p>22. [Units of Measurement / Time]
At 1200 hours on Saturday in Brisbane it is 1800 hours on Friday in Vancouver. What day and time is it in Vancouver if it is 2300 hours on Tuesday in Brisbane? <input style="width: 60px; height: 25px;" type="text"/></p> |
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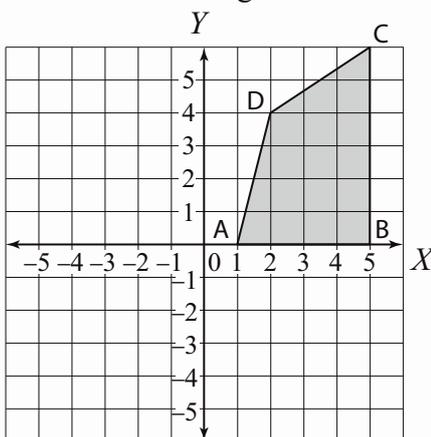
23. [Perimeter]
Tiananmen Square in Beijing, China, is a square with side length of approximately 1.5 km. Find the perimeter of the square.

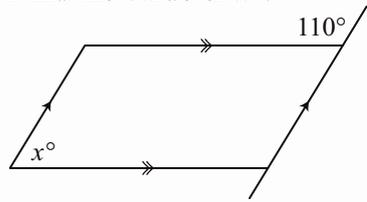
24. [Area]
Find the area of the shaded region.


25. [Volume]
In this cylindrical water tank there are 308 L of water. Using $\pi \approx \frac{22}{7}$ find the depth of the water in the tank. [Hint: 1 L = 1000 cm³]


26. [Surface Area]
Find the total surface area of a rectangular prism with dimensions 3 cm by 5 cm by 10 cm.

27. [Pythagoras / Trigonometry]
Using Pythagoras' theorem $a^2 + b^2 = c^2$, find the length of the hypotenuse.


28. [Shape / Location]
Redraw the shape shown after a rotation of 180° about the origin.


29. [Angles]
Find the value of x° .


30. [Statistics]
According to the stem-and-leaf plot, what is the median monthly rainfall for Sydney?
Monthly Average Rainfall (mm) - Sydney

stem	leaves
7	2 7
8	0 3 6
9	4
10	1 4
11	5
12	5 9
13	
14	0

31. [Probability]
What is the probability that a student chosen at random is aged more than 12 and walks to school? [Complete the two-way table.]

	Walk	Bus/Car	Bicycle	Total
Aged 12 or less	12%	16%		51%
Aged more than 12			18%	
Total	29%	30%		

32. [Problem Solving 1]
Using the tap it takes Ling 4 minutes to fill his wading pool. Using the neighbour's hose it takes 12 minutes. How long would it take if he used both the tap and the hose?

33. [Problem Solving 2]
Use the digits 2, 4, 6 and 8 (once each) to complete the multiplication so that the answer is as large as possible.

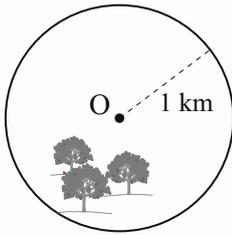
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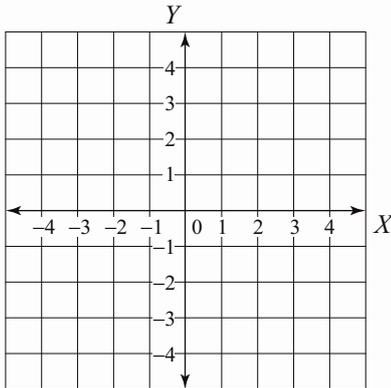
Name:

- | | |
|--|---|
| <p>1. [Long \times, \div]
 $924 \div 11 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>2. [Decimal $+$, $-$]
 $8.72 + 0.49 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>3. [Decimal \times, \div]
 $2.4 \times 0.7 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>4. [Fraction $+$, $-$]
 $\frac{2}{3} + \frac{1}{6} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>5. [Fraction \times, \div]
 $\frac{5}{2} \times 8 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>6. [Percentages]
 Of the 60 oranges we bought, 5% were split.
 How many split oranges were there? <input style="width: 60px; height: 25px;" type="text"/></p> <p>7. [Integer $+$, $-$]
 $(-5) - (-7) - (+9) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>8. [Integer \times, \div]
 $(-3) \times (+5) \div (-5) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>9. [Rates / Ratios]
 An inefficient toilet wastes up to 125 litres of water in a month. How much water is wasted in a year?
 <input style="width: 60px; height: 25px; text-align: center;" type="text"/> L</p> <p>10. [Indices]
 Evaluate $\frac{1}{3^{-3}}$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>11. [Square Roots / Surds]
 Evaluate $3\sqrt{16} - \sqrt{16}$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>12. [Order of Operations]
 $6 \times [(2 + 3)^2 - 5]^2 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>13. [Exploring Number]
 Fill in with the appropriate symbol ($<$, $>$, $=$)
 $7416 \div 1.2$ <input style="width: 30px; height: 25px;" type="text"/> 7416</p> | <p>14. [Scientific Notation]
 Round 0.0048 correct to 3 decimal places. <input style="width: 60px; height: 25px;" type="text"/></p> <p>15. [Number Patterns]
 Complete the pattern:
 $\frac{1}{12}, \frac{1}{2}, 3, 18,$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>16. [Expressions]
 Write the following as an algebraic expression:
 A number that is equal to six less than g
 <input style="width: 60px; height: 25px;" type="text"/></p> <p>17. [Substitution]
 If $z = -2$, find the value of $4z^2 + z$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>18. [Expansion]
 Expand and simplify
 $3(x - 1) + 2(x + 2)$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>19. [Factorisation]
 Factorise $x^2 - 4$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>20. [Equations]
 Solve the inequality:
 $\frac{4x - 1}{5} < 3$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>21. [Graphs & Functions]
 Sketch the line defined by the equation $y = -3x$ using the set of coordinate axes below.</p> <div style="text-align: center;"> </div> <p>22. [Units of Measurement / Time]
 How many millilitres in 0.34 litres? <input style="width: 60px; height: 25px;" type="text"/></p> |
|--|---|

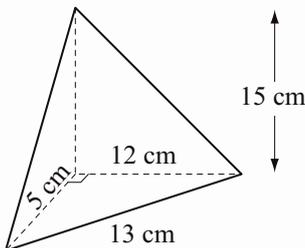
23. [Perimeter]
Using $\pi \approx 3.14$ find the circumference of the circular park.



24. [Area]
Plot the points A(-2,2), B(4,-2) and C(-2,-4) and use them to find the area of triangle ABC.

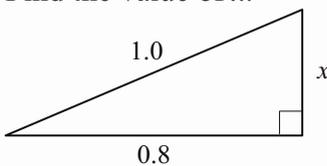


25. [Volume]
Using $V = \frac{1}{3} \times \text{base area} \times \text{height}$ find the volume of the triangular pyramid shown.

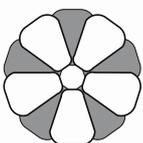


26. [Surface Area]
Using $TSA = 2\pi r(r + h)$ where $\pi \approx 3.14$, find the total surface area of a cylindrical pellet of radius 1 cm and height 4 cm.

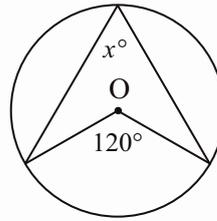
27. [Pythagoras / Trigonometry]
Find the value of x .



28. [Shape / Location]
Draw all axes of symmetry and show the centre of symmetry for the shape.



29. [Angles]
Find the value of x° .



30. [Statistics]
How is the variable 'length of whales' best defined?

- A) Ordinal (ranked opinion e.g. favourite song)
B) Nominal (described e.g. car colour)
C) Continuous (measured e.g. weight)
D) Discrete (counted e.g. crowd size)

31. [Probability]
A coin and a die are tossed. What is the probability of throwing a tail and a 5?



32. [Problem Solving 1]
An ancient civilization used the following number system:

$\bullet = 1, | = 2, + = 4, \square = 8$

and $\boxplus = 16$. Other numbers were drawn using combinations of these symbols.

So 3 was written $| \bullet$.

Using as few symbols as possible, how would you represent the number 23?

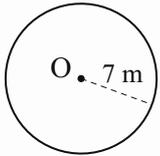
33. [Problem Solving 2]
Four students on an excursion came across an old weighing machine and decided to weigh themselves.

"Sorry," said the owner, "that machine is only accurate for weights over 100 kg."

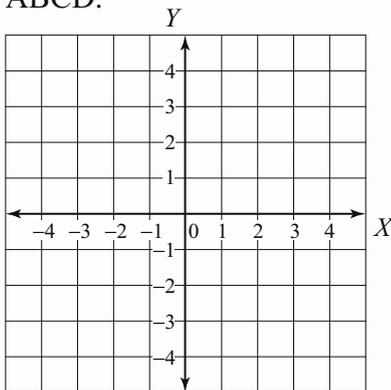
"That's OK," replied one student, "we will hop on two at a time."

The results of the pairings in kilograms were: 105, 107, 110, 110, 113, and 115. What was the mass, in kilograms, of the heaviest student?

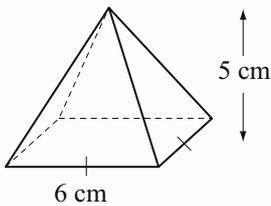
23. [Perimeter]
Using $\pi \approx \frac{22}{7}$ find the circumference of the circle.



24. [Area]
Plot the points A(-2,0), B(0,4), C(2,0) and D(0,-4) and use them to find the area of ABCD.

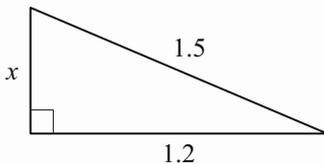


25. [Volume]
Using $V = \frac{1}{3} \times \text{base area} \times \text{height}$ find the volume of the square pyramid.



26. [Surface Area]
Using $TSA = 2\pi r(r + h)$ where $\pi \approx 3.14$, find the total surface area of a cylindrical ice hockey puck with a radius of 2 cm and height 3 cm.

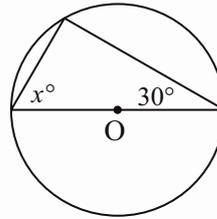
27. [Pythagoras / Trigonometry]
Find the value of x .



28. [Shape / Location]
Draw all axes of symmetry and mark the centre of symmetry for the shape.



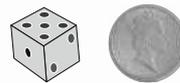
29. [Angles]
Find the value of x° .



30. [Statistics]
How is the variable 'motel quality' best defined?

- A) Ordinal (ranked opinion e.g. favourite song)
B) Nominal (described e.g. car colour)
C) Continuous (measured e.g. weight)
D) Discrete (counted e.g. crowd size)

31. [Probability]
A coin and a die are tossed. Find the probability of getting a head and a number greater than 4.



32. [Problem Solving 1]
An ancient civilization used the following number system:

$\bullet = 1, | = 2, + = 4, \square = 8$

and $\boxplus = 16$. Other numbers were drawn using combinations of these symbols.

For example, 19 was $\boxplus | \bullet$.

What is the smallest number that could not be represented without having to repeat any symbol?

33. [Problem Solving 2]

The houses along our side of the street are numbered in consecutive odd numbers, the even numbers being on the other side of the street. Our house is number 69, but, had the numbering commenced at the other end of the street, our house would have been number 41. How many houses are there on our side of the street?



Name:

1. [Long \times ,+] $16.9 \times 23 =$

2. [Decimal +,-] $5 - 0.03 =$

3. [Decimal \times ,+] $3 \div 0.04 =$

4. [Fraction +,-] $1\frac{1}{3} - \frac{1}{6} =$

5. [Fraction \times ,+] $\frac{5}{9} \times 5 =$

6. [Percentages] Reduce \$8.00 by 40%. \$

7. [Integer +,-] $(+4) + (-6) + (-18) =$

8. [Integer \times ,+] $\frac{(-24)}{(-4)} =$

9. [Rates / Ratios] Divide \$210 in the ratio 2 : 5 \$: \$

10. [Indices] Simplify $\frac{12r^2s}{4r}$

11. [Square Roots / Surds] Simplify $\sqrt{500}$

12. [Order of Operations] $(\sqrt{25} + \sqrt{9})^2 =$

13. [Exploring Number] Write $\frac{5}{6}$ as a recurring decimal.

14. [Scientific Notation] Write 0.0215 in scientific notation.

15. [Number Patterns] Complete the pattern:
3, 3, 6, 9, 15, ,

16. [Expressions] Write the following as an algebraic expression:
A number that is equal to nine less than a third of k

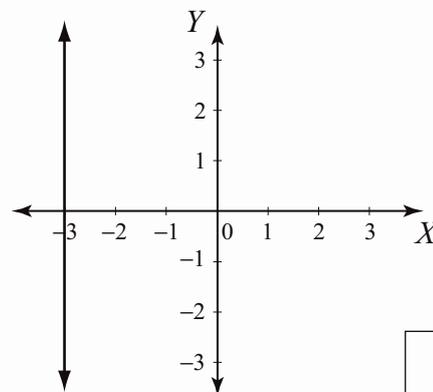
17. [Substitution] If $y = 2x + 3$, what value of x will make $y = 3$?

18. [Expansion] Expand and simplify $(c + 2)(c - 5)$

19. [Factorisation] Factorise and simplify $\frac{12x^2 + 3x}{8x + 2}$

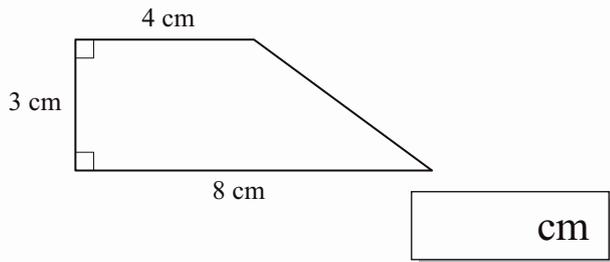
20. [Equations] Solve for x : $\frac{5(x + 1)}{7} = 5$

21. [Graphs & Functions] Find the equation of the straight line.



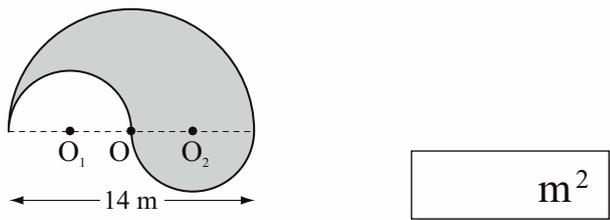
22. [Units of Measurement / Time] Convert 3 hectares to square metres.

23. [Perimeter]
Find the perimeter of the trapezium.
[Hint: Pythagoras' theorem will help.]



cm

24. [Area]
Use $\pi \approx \frac{22}{7}$ to find the area of the shape.

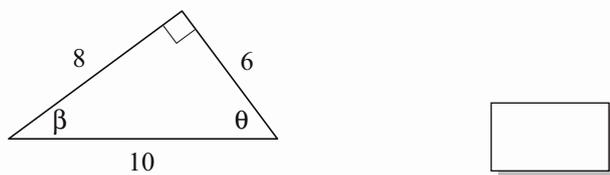


m²

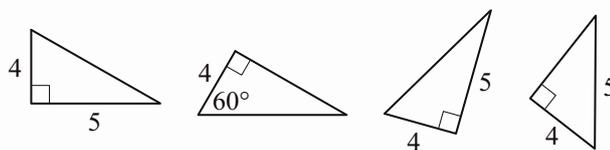
25. [Volume]
A water-wise person places a brick 10 cm by 10 cm by 25 cm in the toilet cistern. How many litres of water will the family save each week if the toilet is used 60 times? [Hint: 1 L = 1000 cm³]

26. [Surface Area]
The side length of a cube is doubled. By what factor will the surface area increase?

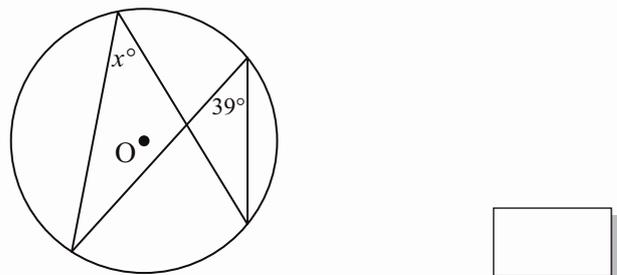
27. [Pythagoras / Trigonometry]
For which angle is the cosine ratio 0.8?



28. [Shape / Location]
Circle the two congruent triangles and give your reason: SSS, SAS, ASA or RHS



29. [Angles]
Find the value of x° .

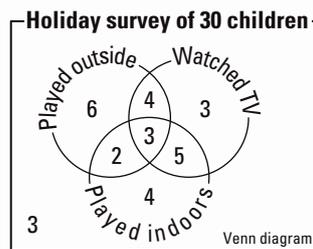


30. [Statistics]
The frequency table shows the number of letters in the first names of all students in a class. Find the median and mode of this data.

Number of letters	3	4	5	6	7	8	9	10
Frequency	4	5	7	6	5	5	0	1

median = mode =

31. [Probability]
If a child surveyed during the holiday is chosen at random, what is the probability that the child did not play outside on the day of the survey?



32. [Problem Solving 1]
If $0 < x < 1$, which is the largest?
A) x B) $2x$
C) x^2 D) x^3
E) $x + 1$

33. [Problem Solving 2]
This table shows the team standings after 2 rounds of the 2006 F.I.F.A. World Cup. Who did the Netherlands play in its third round robin game? [Each team plays every other team in the group once, and 3 points are awarded for a win, 1 for a draw and none for a lost game.]

Team	MP	W	D	L	GF	GA	Pts
	matches played	wins	draws	losses	goals for	goals against	points
Argentina	2	2	0	0	8	1	6
Netherlands	2	2	0	0	3	1	6
Cote d'Ivoire	2	0	0	2	2	4	0
Serbia & Montenegro	2	0	0	2	0	7	0

Netherlands:



Name:

1. [Long \times ,+] $14.8 \times 15 =$

2. [Decimal +,-] $50 - 0.03 =$

3. [Decimal \times ,+] $1.7 \times 0.04 =$

4. [Fraction +,-] $\frac{4}{7} - \frac{3}{14} =$

5. [Fraction \times ,+] $5 \div \frac{5}{8} =$

6. [Percentages] Reduce \$230 by 20%.

7. [Integer +,-] $(-9) - (-7) + (+14) =$

8. [Integer \times ,+] $\frac{(-48)}{6} =$

9. [Rates / Ratios] Share 54 oranges in the ratio 2 : 7

10. [Indices] Simplify $\frac{6x^2y^5}{3x^4y^3}$

11. [Square Roots / Surds] Simplify $\sqrt{45}$

12. [Order of Operations] $\sqrt{13^2 - 5^2} =$

13. [Exploring Number] Change $\frac{17}{9}$ into a recurring decimal.

14. [Scientific Notation] Write 0.1147 in scientific notation.

15. [Number Patterns] Complete the pattern:
1, 2, 3, 5, 8, ,

16. [Expressions] Write the following as an algebraic expression:
A number that is three more than four lots of x

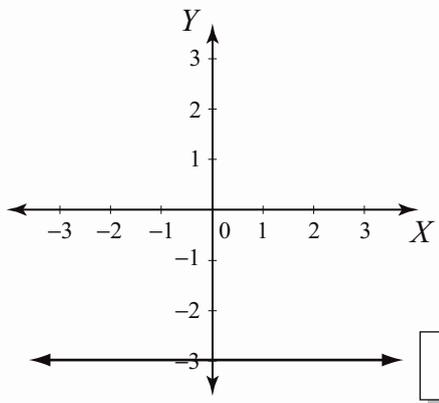
17. [Substitution] If $y = x^2 + x - 2$, find the value of y when $x = 0$

18. [Expansion] Expand and simplify $2x(x + 1) + (5 - x)$

19. [Factorisation] Factorise and simplify $\frac{8x^2 + 4x}{10x + 5}$

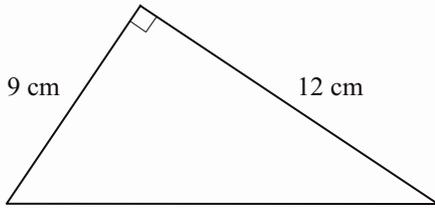
20. [Equations] Solve for x : $\frac{6(x - 2)}{5} = 12$

21. [Graphs & Functions] Find the equation of the straight line.



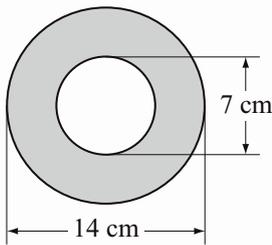
22. [Units of Measurement / Time] Convert 40 cm^2 to mm^2 .

23. [Perimeter]
Find the perimeter of the triangle.
[Hint: Pythagoras' theorem will help.]



cm

24. [Area]
Use $\pi \approx \frac{22}{7}$ to find the area of the shaded annulus.



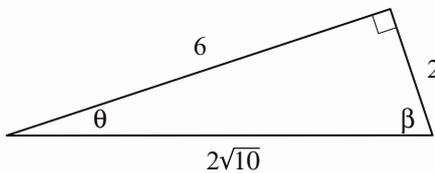
cm²

25. [Volume]
Find the volume of milk (in litres) that could be stored in a carton 25 cm by 10 cm by 8 cm.
[Hint: 1 L = 1000 cm³]

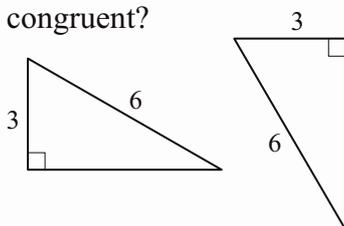
26. [Surface Area]
The surface area of a cube is 24 cm². What is its side length?

cm

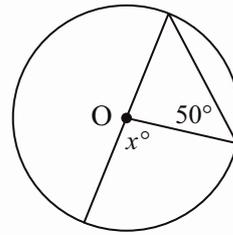
27. [Pythagoras / Trigonometry]
For which angle is the tangent ratio $\frac{1}{3}$?



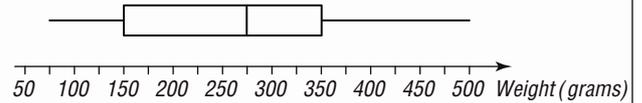
28. [Shape / Location]
Which test (SSS, SAS, ASA, RHS) could be used to show the following triangles are congruent?



29. [Angles]
Find the value of x° .

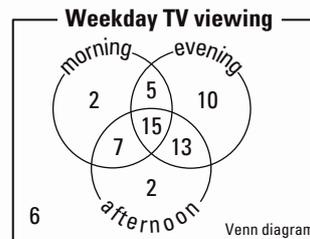


30. [Statistics]
Find the median and range for the weights sampled in this box-and-whisker plot.



median = range =

31. [Probability]
What is the probability that a surveyed person chosen at random only watched television in the evening?



32. [Problem Solving 1]
If $-1 < x < 0$, which of the following is the largest?

- A) -1 B) x
C) $2x$ D) x^3
E) $x - 1$

33. [Problem Solving 2]
This table shows the team standings after 2 rounds of the 2006 F.I.F.A. World Cup. Who did Ecuador play in its third round robin game?
[Each team plays every other team in the group once, and 3 points are awarded for a win, 1 for a draw and none for a lost game.]

Group A

Team	MP	W	D	L	GF	GA	Pts
	matches played	wins	draws	losses	goals for	goals against	points
Ecuador	2	2	0	0	5	0	6
Germany	2	2	0	0	5	2	6
Poland	2	0	0	2	0	3	0
Costa Rica	2	0	0	2	2	7	0

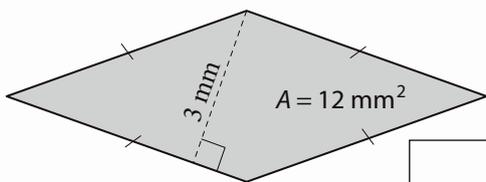
Ecuador:



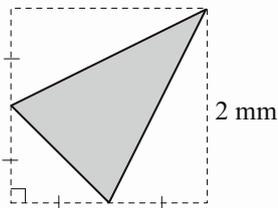
Name:

- | | |
|---|--|
| <p>1. [Long \times,\div]
$21.6 \div 5 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>2. [Decimal $+$,$-$]
$1.55 - 0.08 + 0.14 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>3. [Decimal \times,\div]
$0.8 \times 0.3 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>4. [Fraction $+$,$-$]
$\frac{1}{5} + \frac{1}{4} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>5. [Fraction \times,\div]
$1\frac{1}{4} \times \frac{6}{10} =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>6. [Percentages]
Find 100%, given that 10% is \$32. <input style="width: 60px; height: 25px;" type="text"/> \$</p> <p>7. [Integer $+$,$-$]
$-4 + (2 - 3) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>8. [Integer \times,\div]
$(-2x) \times (-7) =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>9. [Rates / Ratios]
Rhonda built a Lego house using white, blue and red blocks in the ratio 3 : 5 : 2. Of the 250 blocks used, how many were red? <input style="width: 60px; height: 25px;" type="text"/></p> <p>10. [Indices]
Simplify $\frac{h^3}{h^{-2}}$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>11. [Square Roots / Surds]
Evaluate $\frac{3\sqrt{27}}{18\sqrt{3}}$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>12. [Order of Operations]
$17 \times 29 \times (5 - 5) + 19 =$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>13. [Exploring Number]
Express $\frac{3}{10}$ of 1 hectare in square metres. <input style="width: 60px; height: 25px;" type="text"/></p> | <p>14. [Scientific Notation]
How many significant figures are there in 0.02? <input style="width: 60px; height: 25px;" type="text"/></p> <p>15. [Number Patterns]
Write the first four terms of the sequence $t_n = 3n$ where $n \geq 1$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>16. [Expressions]
Simplify:
$(x^2 + x + 3) + (x^2 + 3x - 2)$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>17. [Substitution]
If $a = 5$, $b = 3$ and $c = 1$, write true or false for the statement:
$2a + b + c = 9$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>18. [Expansion]
Expand and simplify
$(c - 2)^2 + 3c$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>19. [Factorisation]
Factorise
$x^2 + 9x + 20$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>20. [Equations]
Solve for x:
$(x - 5)(x - 2) = 0$ <input style="width: 60px; height: 25px;" type="text"/></p> <p>21. [Graphs & Functions]
Use the rule $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line joining the points E(-1,-1) and F(0,3) <input style="width: 60px; height: 25px;" type="text"/></p> <p>22. [Units of Measurement / Time]
Change 72 kilometres per hour into metres per second. <input style="width: 60px; height: 25px;" type="text"/></p> |
|---|--|

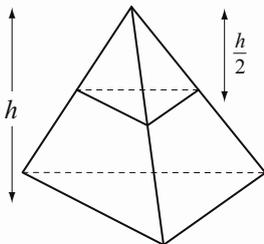
23. [Perimeter]
Find the perimeter of the rhombus.



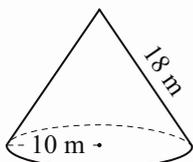
24. [Area]
Find the area of the shaded triangle.



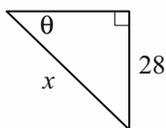
25. [Volume]
For the pyramids shown, find the ratio:
Volume of pyramid with height h
Volume of pyramid with height $\frac{h}{2}$



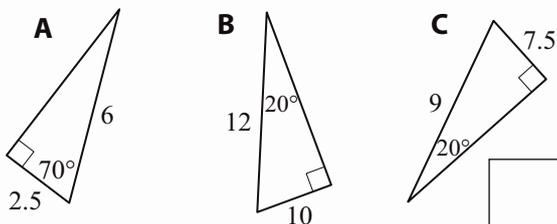
26. [Surface Area]
Use $TSA = \pi r(r + s)$ and $\pi \approx \frac{22}{7}$ to find the total surface area of the cone.



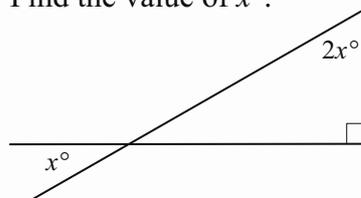
27. [Pythagoras / Trigonometry]
Find the value of x , given $\sin \theta = 0.7$



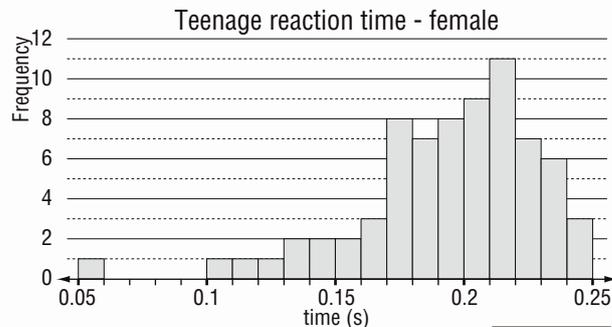
28. [Shape / Location]
Two of these triangles are similar. Which is the odd one out?



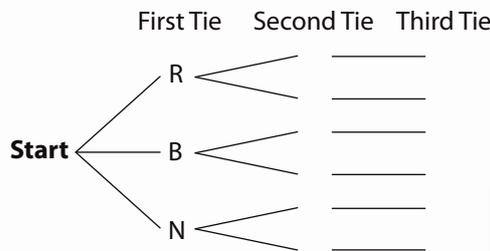
29. [Angles]
Find the value of x° .



30. [Statistics]
How many teenage females had a reaction time of less than 0.15 seconds?



31. [Probability]
A drawer contains 3 coloured ties: one red (R), one black (B) and one navy (N). The ties are picked from the drawer one after the other without replacement. What is the probability that the black tie was picked before the red one? [Complete the tree diagram to help solve the problem.]



32. [Problem Solving 1]
Find positive integers a, b, c and d if:
 $a + a = b$,
 $b + b = c$,
 $c + c = d$, and
 $d + 15 = 31$

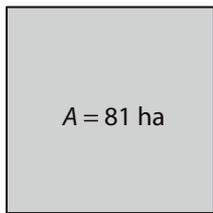
33. [Problem Solving 2]
The sum of x consecutive numbers is $22x + 2$. Find the maximum possible value for x .



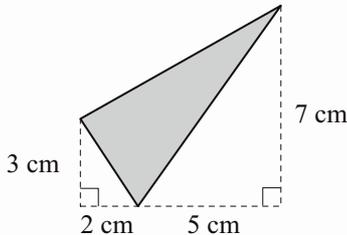
Name:

- | | |
|--|--|
| <p>1. [Long \times,\div]
$29.4 \div 6 =$ <input type="text"/></p> <p>2. [Decimal $+$,$-$]
$6.2 - 3.7 + 1.6 =$ <input type="text"/></p> <p>3. [Decimal \times,\div]
$60 \div 1.5 =$ <input type="text"/></p> <p>4. [Fraction $+$,$-$]
$\frac{1}{3} - \frac{1}{4} =$ <input type="text"/></p> <p>5. [Fraction \times,\div]
$3\frac{2}{3} \div 9 =$ <input type="text"/></p> <p>6. [Percentages]
Find 100%, given that 50% is \$55. <input type="text" value="\$"/></p> <p>7. [Integer $+$,$-$]
$7 - (4 - 8) =$ <input type="text"/></p> <p>8. [Integer \times,\div]
$(-6) \times (+4y) =$ <input type="text"/></p> <p>9. [Rates / Ratios]
The ratio of the pages Yiannis has read, to those he hasn't read from a book of 240 pages is 3 : 5. How many pages has Yiannis read? <input type="text"/></p> <p>10. [Indices]
Simplify $\frac{a^{-3}}{a^{-4}}$ <input type="text"/></p> <p>11. [Square Roots / Surds]
Evaluate $\frac{2\sqrt{5} \times 3\sqrt{5}}{4}$ <input type="text"/></p> <p>12. [Order of Operations]
$(6 - 6)^7 \div 2012 =$ <input type="text"/></p> <p>13. [Exploring Number]
Express $\frac{5}{6}$ of 1 minute in seconds. <input type="text"/></p> | <p>14. [Scientific Notation]
How many significant figures are there in 24.05? <input type="text"/></p> <p>15. [Number Patterns]
Write the first four terms of the sequence $t_n = 3n + 1$ where $n \geq 1$ <input type="text"/></p> <p>16. [Expressions]
Simplify:
$(x + 2y + 3) + (2x + y - 2)$ <input type="text"/></p> <p>17. [Substitution]
If $a = 5$, $b = 3$ and $c = 1$, write true or false for the statement:
$2a - 3b = c$ <input type="text"/></p> <p>18. [Expansion]
Expand $(z - 4)^2$ <input type="text"/></p> <p>19. [Factorisation]
Factorise $x^2 + 7x + 6$ <input type="text"/></p> <p>20. [Equations]
Solve for x:
$(x + 6)(x + 2) = 0$ <input type="text"/></p> <p>21. [Graphs & Functions]
Use the rule $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line joining the points P(0,-2) and R(-1,1) <input type="text"/></p> <p>22. [Units of Measurement / Time]
Convert a speed of 100 metres per second into kilometres per hour. <input type="text"/></p> |
|--|--|

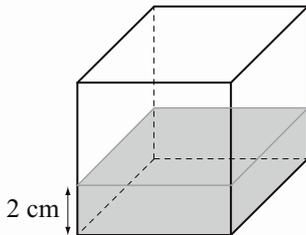
23. [Perimeter]
Find the perimeter of the square.



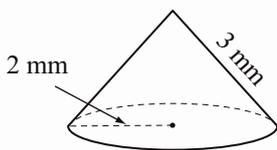
24. [Area]
Find the area of the shaded triangle.



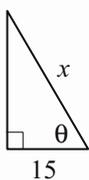
25. [Volume]
Find the volume of liquid in the cube, given it is one third full.



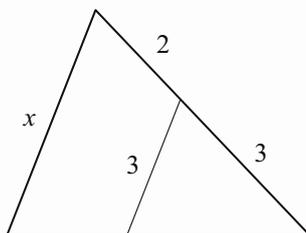
26. [Surface Area]
Use $TSA = \pi r(r + s)$ and $\pi \approx 3.14$ to find the total surface area of the cone.



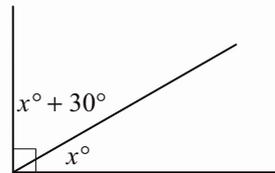
27. [Pythagoras / Trigonometry]
Find the value of x , given $\cos \theta = 0.5$



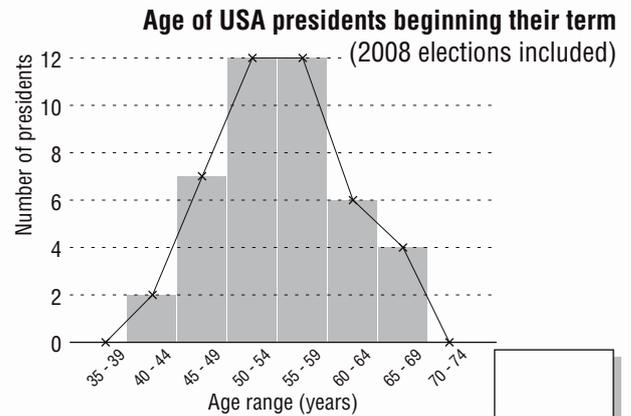
28. [Shape / Location]
Find the value of x .
[All measurements are in cm.]



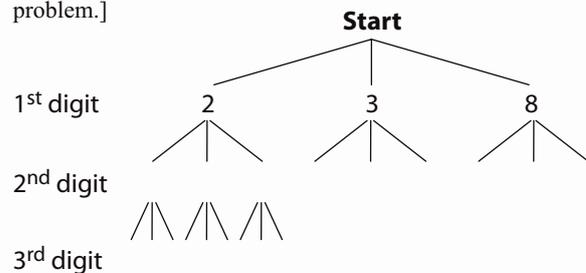
29. [Angles]
Find the value of x° .



30. [Statistics]
How many presidents began their term in office before the age of 60?



31. [Probability]
The numbers 2, 3 and 8 are written on cards. One card is selected at random. The number is recorded, the card is replaced in the deck, and the deck is shuffled. This is repeated a second and third time. Find the probability that the three-digit number formed is greater than 350. [Complete the tree diagram to help solve the problem.]



32. [Problem Solving 1]
Find positive integers a , b and c if:
 $a + a + a = b$,
 $b + a + a = c$ and
 $b + c + a = 18$

33. [Problem Solving 2]
The sum of x consecutive numbers is $10x + 3$. Find the maximum possible value of x .

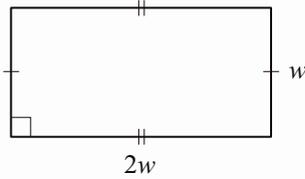


Name:

1. [Long $\times, +$]
 $41.2 \times 17 =$
2. [Decimal $+, -$]
 $14 - 0.05 + 1.16 =$
3. [Decimal $\times, +$]
 $10.8 \div 0.09 =$
4. [Fraction $+, -$]
 $\frac{1}{2} - \frac{1}{3} + \frac{1}{6} =$
5. [Fraction $\times, +$]
 $5 \times 5\frac{1}{5} =$
6. [Percentages]
If the 10% GST on the price of a TV is \$50, what is the total price? \$
7. [Integer $+, -$]
 $(9 - 2) - (2 - 9) =$
8. [Integer $\times, +$]
 $(7 - 5) \times (5 - 7) =$
9. [Rates / Ratios]
Find the missing term in the proportion:
 $\frac{x}{5} = \frac{10}{25}$ $x =$
10. [Indices]
If $5^x = 0.2$, then $x =$
11. [Square Roots / Surds]
Simplify $7\sqrt{5} + 3\sqrt{20}$
12. [Order of Operations]
 $(10001 - 10^4) \times 2010 =$
13. [Exploring Number]
Can you buy 60 litres of LPG at 51.9 cents/L, with \$36?
14. [Scientific Notation]
Evaluate $(6.3 \times 10^{11}) \div (7 \times 10^{10})$
15. [Number Patterns]
Write the first four terms of the sequence $t_n = 22 - 2n$ where $n \geq 1$
16. [Expressions]
Using algebraic notation, write three consecutive whole numbers starting with $n + 2$.
17. [Substitution]
If $v = at$ find the speed v , in m/s, when $a = 2 \text{ m/s}^2$ and $t = 15 \text{ s}$.
18. [Expansion]
Expand $(p + 3)^2$
19. [Factorisation]
Factorise and simplify $\frac{x^2 + 5x + 4}{x + 1}$
20. [Equations]
Solve for x :
 $\frac{x}{3} + \frac{x}{5} = 8$
21. [Graphs & Functions]
Complete the table:

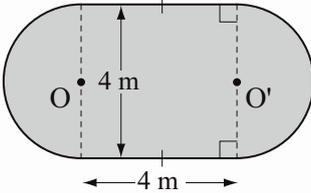
rule	gradient (m)	x -intercept	y -intercept (c)
$y = x - 4$			
$y = 2x - 4$			
22. [Units of Measurement / Time]
How many tonnes are there in n kg?

23. [Perimeter]
Write a formula for the perimeter P of the rectangle.



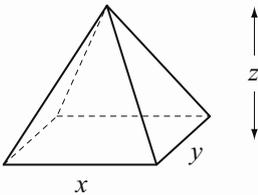
$P =$

24. [Area]
Use $\pi \approx 3.14$ to find the area of the shape.



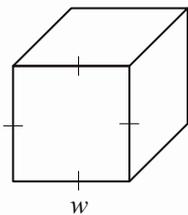
m^2

25. [Volume]
Using $V = \frac{1}{3} \times \text{base area} \times \text{height}$, write a formula for the volume V of the rectangular pyramid.



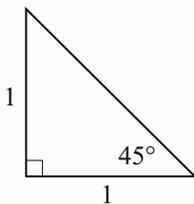
$V =$

26. [Surface Area]
Write a formula for the total surface area (TSA) of the cube.



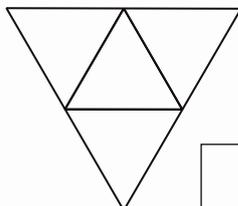
$TSA =$

27. [Pythagoras / Trigonometry]
Find the length of the hypotenuse of the isosceles triangle. [Express your answer in surd form.]

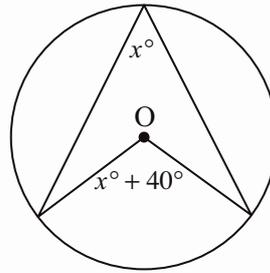


28. [Shape / Location]
What shape can this net be used to make?

- A) cube
- B) square pyramid
- C) triangular prism
- D) rectangular prism
- E) tetrahedron



29. [Angles]
Find the value of x° .



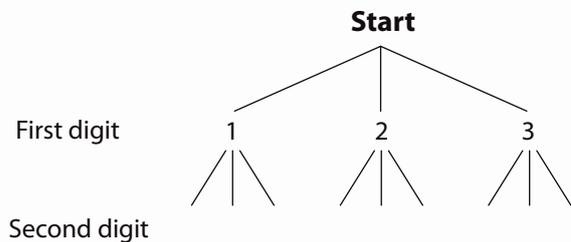
30. [Statistics]
Calculate the mean and range for the data displayed in the frequency table.

Score	1	2	3	4	5	6
Frequency	7	6	2	2	1	2

mean =

range =

31. [Probability]
How many different two-digit numbers can be made from the digits 1, 2 and 3 if the digits can be used more than once?
[Complete the tree diagram to help solve the problem.]



Second digit

32. [Problem Solving 1]
Pierre de Fermat, a 17th century French lawyer, stated that any whole number can be written as the sum of four, or fewer, square numbers. For example: $15 = 3^2 + 2^2 + 1^2 + 1^2$
Write 44 as the sum of four, or fewer, square numbers.

33. [Problem Solving 2]
What is the last digit in the expansion of 8^{2012} ?

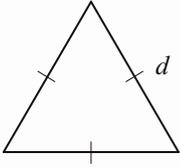


Name:

1. [Long \times, \div]
 $14.9 \times 45 =$
2. [Decimal $+, -$]
 $8 - 0.2 + 1.53 =$
3. [Decimal \times, \div]
 $3 \div 0.03 =$
4. [Fraction $+, -$]
 $\frac{1}{2} + \frac{2}{3} - \frac{1}{6} =$
5. [Fraction \times, \div]
 $8 \div 1\frac{2}{8} =$
6. [Percentages]
If the 10% GST on the price of a vase is \$4,
what is the total price of the vase? \$
7. [Integer $+, -$]
 $(3 - 8) - (1 - 9) =$
8. [Integer \times, \div]
 $(4 - 9) \times (4 - 9) =$
9. [Rates / Ratios]
Find the missing term in the proportion:
 $\frac{6}{15} = \frac{x}{25}$ $x =$
10. [Indices]
If $10^k = 0.001$, then $k =$
11. [Square Roots / Surds]
Simplify $6 + 3\sqrt{2} - 5 + \sqrt{8}$
12. [Order of Operations]
 $(108 \times 66 \div 9)^0 + 12 =$
13. [Exploring Number]
A fabric costs \$6.30 per metre. How many
whole metres can you buy for \$62?
14. [Scientific Notation]
Evaluate $(1.2 \times 10^7) \div (2 \times 10^3)$
15. [Number Patterns]
Write the first four terms of the sequence
 $t_n = 3(n + 2)$ where $n \geq 1$
16. [Expressions]
Using algebraic notation, write three
consecutive whole numbers starting with
 $2n$.
17. [Substitution]
Given $F = ma$ find the force F , in Newtons,
when $m = 50$ kg and $a = 9.8$ m/s²
[Note: 1 Newton = 1 kgm/s²]
18. [Expansion]
Expand and simplify
 $(2n - 1)(n + 4)$
19. [Factorisation]
Factorise and simplify
 $\frac{x^2 - 5x + 6}{x - 3}$
20. [Equations]
Solve for x :
 $\frac{x}{6} - \frac{x}{2} = 3$
21. [Graphs & Functions]
Complete the table:

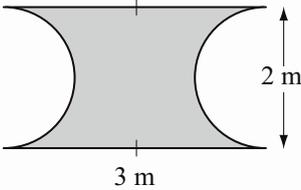
rule	gradient (m)	x -intercept	y -intercept (c)
$y = 2x$			
$y = 2x - 1$			
22. [Units of Measurement / Time]
How many metres are there in x centimetres?

23. [Perimeter]
Write a formula for the perimeter P of the triangle.



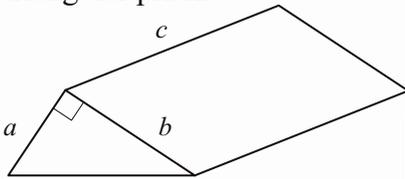
$P =$

24. [Area]
Find the area of the shaded region.
(Use $\pi \approx 3.14$)



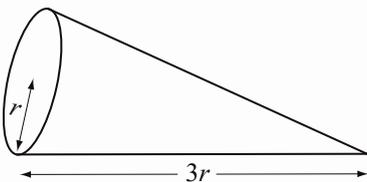
m^2

25. [Volume]
Write a formula for the volume V of the triangular prism.



$V =$

26. [Surface Area]
Write a simple formula for the total surface area of the cone in terms of the symbols given. [Note: Leave your answer as a multiple of π .]

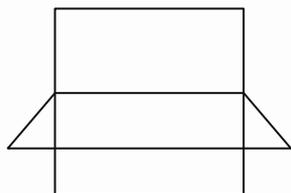


$TSA =$

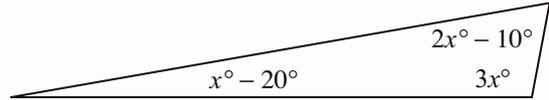
27. [Pythagoras / Trigonometry]
A triangle has sides of lengths 33 mm, 44 mm and 55 mm. Is it a right-angled triangle?

28. [Shape / Location]
What shape can this net be used to make?

- A) cube
- B) square pyramid
- C) triangular prism
- D) rectangular prism
- E) none of the above



29. [Angles]
Find the value of the smallest angle in the triangle. [Triangle not drawn to scale.]

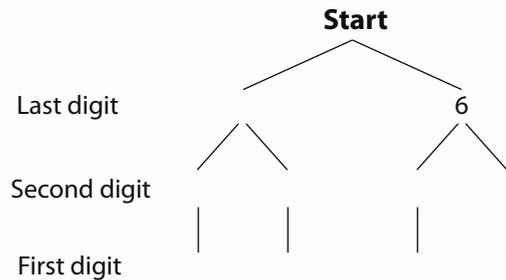


30. [Statistics]
Calculate the mean and range for the data displayed in the frequency table.

Score	1	2	3	4	5
Frequency	3	2	1	4	2

mean = range =

31. [Probability]
How many even three-digit numbers can be made using the digits 4, 5 and 6 once each?
[Complete the tree diagram to help solve the problem.]



32. [Problem Solving 1]
Pierre de Fermat, a 17th century French lawyer, stated that any whole number can be written as the sum of four, or fewer, square numbers. For example: $15 = 3^2 + 2^2 + 1^2 + 1^2$
Write 47 as the sum of four, or fewer, square numbers.

33. [Problem Solving 2]
What is the last digit in the expansion of 7^{77} ?

MATHS MATE



Teacher Resource



Teacher's Guide to the Use of Maths Mate

pages i - viii



Student Pad Answers

pages 3 - 72



Student Pad Short Answers

pages 1 - 8



Problem Solving Hints & Solutions

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Test Masters

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Test Answers

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Record Keeping Sheets

pages 1 - 6

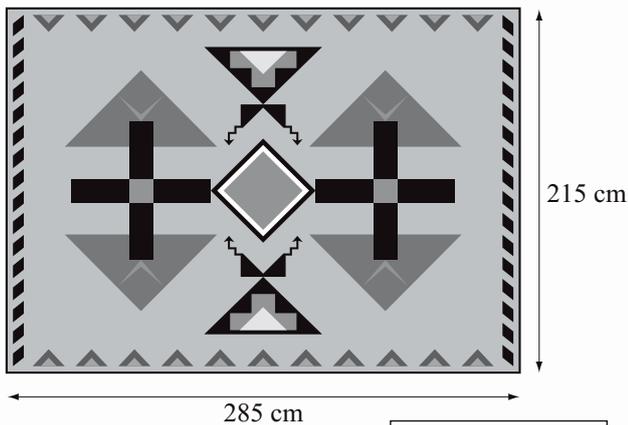


Name:

1. [Long \times, \div]
 $648 \div 6 =$ 108
2. [Decimal $+, -$]
 $6.25 + 7.35 =$ 13.6
3. [Decimal \times, \div]
 $4.2 \times 1000 =$ 4200
4. [Fraction $+, -$]
 $\frac{6}{9} - \frac{3}{9} =$ $\frac{1}{3}$
5. [Fraction \times, \div]
 $\frac{5}{2} \times \frac{6}{7} =$ $2\frac{1}{7}$
6. [Percentages]
25% of 300 = 75
7. [Integer $+, -$]
 $(-4) - (+6) =$ -10
8. [Integer \times, \div]
 $(+5) \times (+9) =$ 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?
13 km
10. [Indices]
Evaluate $\frac{3^7}{3^5}$ 9
11. [Square Roots / Surds]
Evaluate $\sqrt{\frac{9}{16}}$ $\frac{3}{4}$
12. [Order of Operations]
 $6 \times (4 - 24 \div 8) =$ 6
13. [Exploring Number]
Write 0.5% as a fraction in simplest form. $\frac{1}{200}$
14. [Scientific Notation]
Express 8.3×10^5 as a basic numeral. 830 000
15. [Number Patterns]
Complete the pattern:
41, 37, 33, 29, 25, 21
16. [Expressions]
Select the two like terms:
 $4g^2, 4, g^2$ $4g^2, g^2$
17. [Substitution]
If $y = 4x + 1$, find the value of y when $x = 5$ 21
18. [Expansion]
Expand $4(3a + 5)$ $12a + 20$
19. [Factorisation]
Factorise $12p + 9pq$ $3p(4 + 3q)$
20. [Equations]
Solve for x : $2x - 4 = 12$ 8
21. [Graphs & Functions]
Complete the table for the rule $y = 2x - 4$

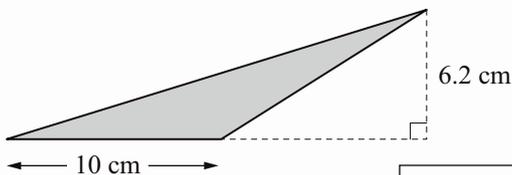
x	$y = 2x - 4$	(x, y)
1	$y = 2 \times 1 - 4$	(1, -2)
2	$y = 2 \times 2 - 4$	(2, 0)
3	$y = 2 \times 3 - 4$	(3, 2)
4	$y = 2 \times 4 - 4$	(4, 4)
5	$y = 2 \times 5 - 4$	(5, 6)
22. [Units of Measurement / Time]
How many hours from 0900 hours one day until 1400 hours the next? 29 hours

23. [Perimeter]
Find the perimeter of the floor rug.



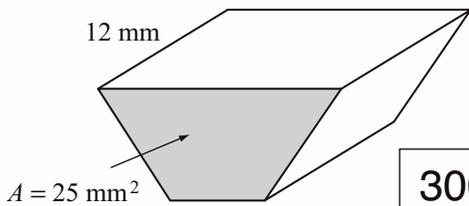
1000 cm

24. [Area]
Find the area of the obtuse-angled triangle.



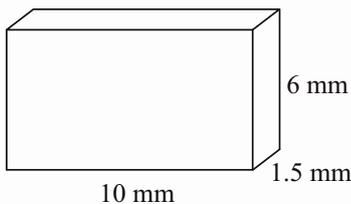
31 cm²

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



300 mm³

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

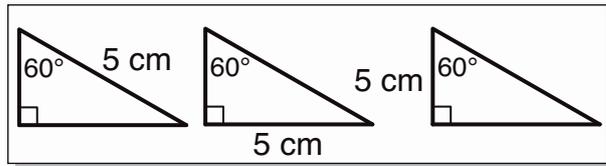


168 mm²

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

9

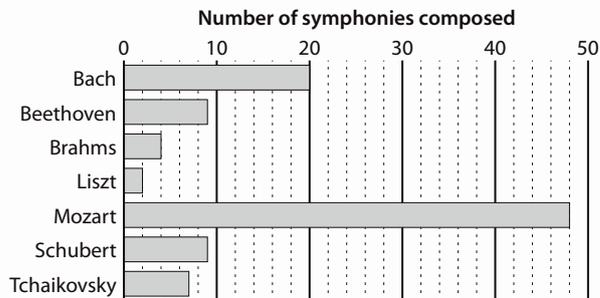
28. [Shape / Location]
Sketch and label as many different triangles as you can where one side is 5 cm long, one angle is 90° and another angle is 60°.
[Drawings need not be to scale.]



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

C

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



Brahms

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

$\frac{19}{20}$

32. [Problem Solving 1]
Find the value of the sum:
 $(-1)^1 + (-1)^2 + (-1)^3 + \dots + (-1)^{50}$

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	—

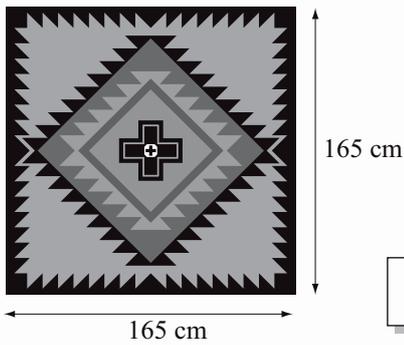
138



Name:

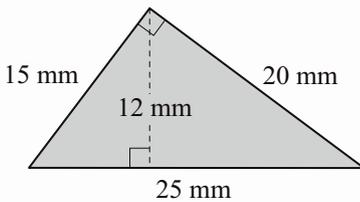
1. [Long \times, \div]
 $639 \div 9 =$ 71
2. [Decimal $+, -$]
 $5.7 - 3.8 =$ 1.9
3. [Decimal \times, \div]
 $1000 \times 0.04 =$ 40
4. [Fraction $+, -$]
 $\frac{7}{10} + \frac{3}{10} =$ 1
5. [Fraction \times, \div]
 $\frac{2}{3} \div \frac{7}{9} =$ $\frac{6}{7}$
6. [Percentages]
 75% of 200 = 150
7. [Integer $+, -$]
 $(+8) + (-3) =$ 5
8. [Integer \times, \div]
 $(+18) \div (-6) =$ -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 $\frac{5^6}{5^3}$ 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.
 $\frac{39}{500}$
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.



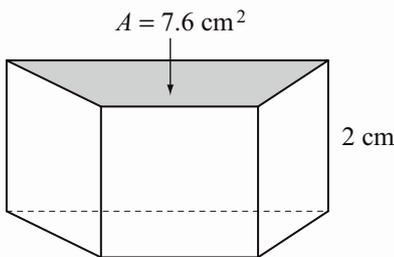
660 cm

24. [Area]
Find the area of the triangle.



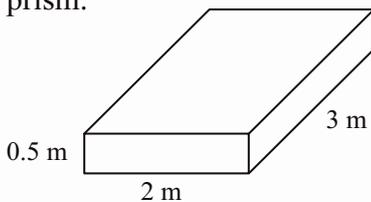
150 mm²

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



15.2 cm³

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

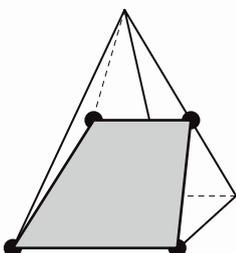


17 m²

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?

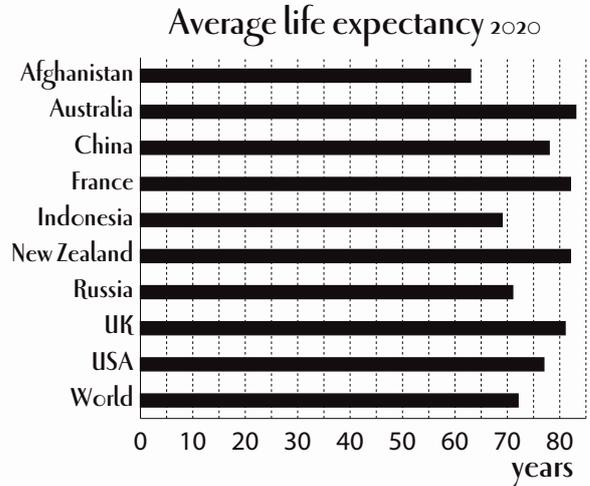


trapezium

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?



2

31. [Probability]
Join the following probabilities to their best description:

Pr = 0.1	<input type="checkbox"/> A	<input checked="" type="checkbox"/> 1	certain to happen
Pr = 0	<input type="checkbox"/> B	<input checked="" type="checkbox"/> 2	very unlikely to occur
Pr = 1	<input type="checkbox"/> C	<input checked="" type="checkbox"/> 3	likely to occur
Pr = 0.8	<input type="checkbox"/> D	<input checked="" type="checkbox"/> 4	will not happen

32. [Problem Solving 1]
Find the value of the product:
 $(-1)^1 \times (-1)^2 \times (-1)^3 \times \dots \times (-1)^{55}$

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

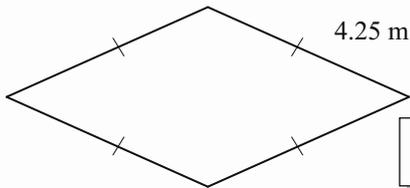


Name:

1. [Long \times ,+] $58 \times 26 =$ 1508
2. [Decimal +,-] $20 - 6.07 =$ 13.93
3. [Decimal \times ,+] $1.6 \times 0.1 =$ 0.16
4. [Fraction +,-] $3\frac{7}{8} - 1\frac{5}{8} =$ $2\frac{1}{4}$
5. [Fraction \times ,+] $\frac{7}{2} \times \frac{9}{8} =$ $2\frac{5}{8}$
6. [Percentages] 15% of 12 m = 1800 millimetres
7. [Integer +,-] $(+2) - (+5) =$ -3
8. [Integer \times ,+] $(+3) \times (-9) =$ -27
9. [Rates / Ratios] In written English, about 5% of all letters are d's. How many d's would you expect to find in an article containing 2500 letters? 125
10. [Indices] Simplify $\frac{8c^6}{2c^3}$ $4c^3$
11. [Square Roots / Surds] Evaluate $\sqrt{0.09}$ 0.3
12. [Order of Operations] $(4 + 4 \times 4)^2 =$ 400
13. [Exploring Number] Place in ascending order: $2.05, \frac{1}{4}, 2.5\%$ $2.5\%, \frac{1}{4}, 2.05$
14. [Scientific Notation] Express 15.29 correct to 1 decimal place. 15.3
15. [Number Patterns] Complete the pattern: 3, 9, 14, 18, 21, 23, 24
16. [Expressions] Simplify $2k - k + 6 + k$ $2k + 6$
17. [Substitution] If $y = x(x - 3)$, find the value of y when $x = 5$ 10
18. [Expansion] Expand $4j(1 - 2j)$ $4j - 8j^2$
19. [Factorisation] Factorise $5y^3z - 10y^2z$ $5y^2z(y - 2)$
20. [Equations] Solve for x : $\frac{x}{2} - 2 = 2$ 8
21. [Graphs & Functions] Complete the table of values for the rule $y = 4x - 3$

x	-3	-2	-1	0	1	2	3
y	-15	-11	-7	-3	1	5	9
22. [Units of Measurement / Time] Complete the statement: $3\frac{1}{4}$ years = 39 months

23. [Perimeter]
Find the perimeter of the rhombus.

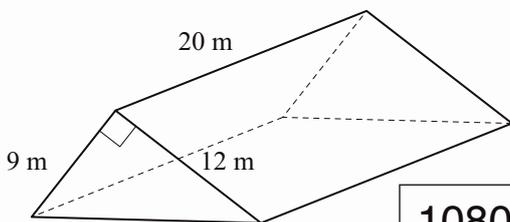


17 m

24. [Area]
A square paddock has a perimeter of 1.2 km.
Find its area in hectares (ha).

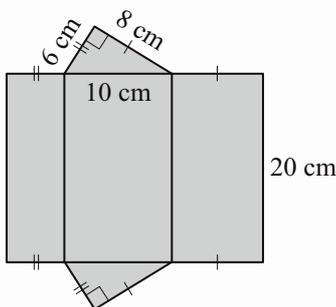
9 ha

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



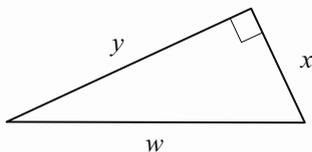
1080 m³

26. [Surface Area]
Find the area of the net.



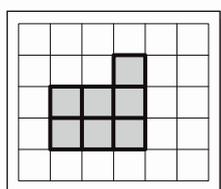
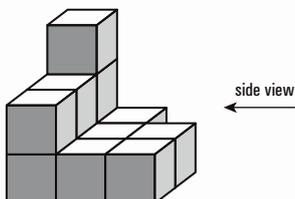
528 cm²

27. [Pythagoras / Trigonometry]
Which letter corresponds to the hypotenuse of the right-angled triangle?



w

28. [Shape / Location]
Draw the side view of the solid.

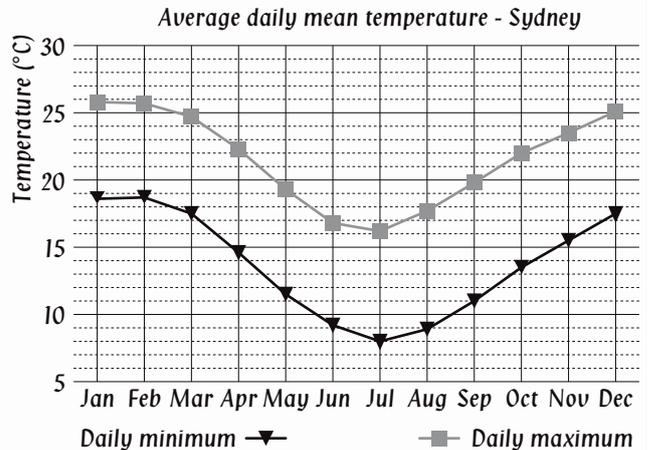


29. [Angles]
Find the value of x° .



30°

30. [Statistics]
In which month in Sydney is the daily maximum temperature closest to twice the daily minimum temperature?



July

31. [Probability]
A card is drawn at random from a deck of 52 playing cards. What is the probability that it is a court card (K, Q, J)?



$\frac{3}{13}$

32. [Problem Solving 1]
If n is a negative integer, which of the following has the greatest value?

- A) $-n$ B) $n - n$
C) $n + n$ D) n^2
E) n^3

D

33. [Problem Solving 2]
The lines of a multiplication table are shown jumbled. Which times table is it?

W × V = TS
W × Z = RU
W × R = XQ
W × W = ST
W × U = VZ
W × Q = UR
W × T = W
W × X = QX
W × S = ZV

9

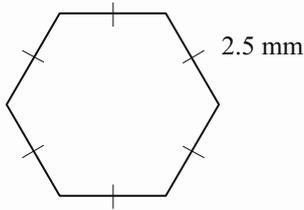


Name:

1. [Long \times ,+] $27 \times 31 =$ 837
2. [Decimal +,-] $0.4 + 9.2 =$ 9.6
3. [Decimal \times ,+] $5.8 \div 0.1 =$ 58
4. [Fraction +,-] $2\frac{3}{5} + 1\frac{2}{5} =$ 4
5. [Fraction \times ,+] $\frac{7}{5} \div \frac{4}{10} =$ $3\frac{1}{2}$
6. [Percentages] 20% of 1 hour = 12 minutes
7. [Integer +,-] $(-6) + (+4) =$ -2
8. [Integer \times ,+] $(+18) \div (-2) =$ -9
9. [Rates / Ratios] In written English, about 2% of all letters are z's. How many z's would you expect to find in an article containing 15 000 letters? 300
10. [Indices] Simplify $\frac{10w^4}{5w}$ $2w^3$
11. [Square Roots / Surds] Evaluate $\sqrt{1\frac{24}{25}}$ $1\frac{2}{5}$
12. [Order of Operations] $3 \times (8 - 3)^2 =$ 75
13. [Exploring Number] Place in descending order: $\frac{1}{5}$, 2%, 0.22 $0.22, \frac{1}{5}, 2\%$
14. [Scientific Notation] Round 31.456 to the nearest whole number. 31
15. [Number Patterns] Complete the pattern: 2, 10, 17, 23, 28, 32, 35
16. [Expressions] Simplify $8g - 8 + 8g + 8$ 16g
17. [Substitution] If $y = \frac{x}{5} + 4$, find the value of y when $x = 5$ 5
18. [Expansion] Expand $2z(z + 4)$ $2z^2 + 8z$
19. [Factorisation] Factorise $x^2y + 2xy^2$ $xy(x + 2y)$
20. [Equations] Solve for x: $\frac{x}{4} + 2 = 3$ 4
21. [Graphs & Functions] Complete the table of values for the rule $y = -x + 6$

x	-3	-2	-1	0	1	2	3
y	9	8	7	6	5	4	3
22. [Units of Measurement / Time] Convert 4:30 pm to 24 hour time. 1630 hours

23. [Perimeter]
Find the perimeter of the hexagon.

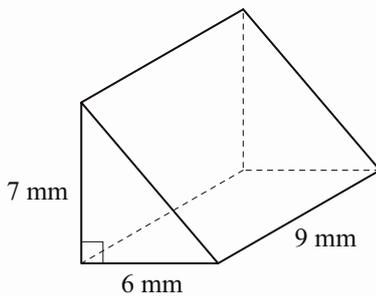


15 mm

24. [Area]
The perimeter of a rectangle is 24 cm. If its length is twice its width, find its area.

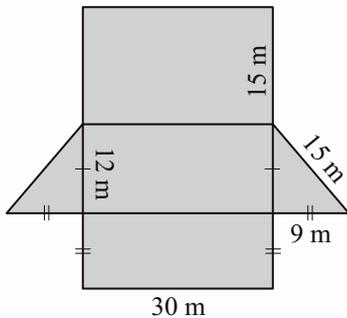
32 cm²

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



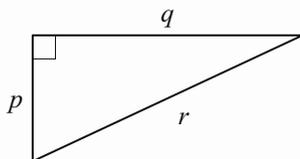
189 mm³

26. [Surface Area]
Find the area of the net.



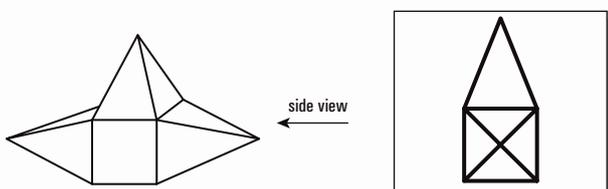
1188 m²

27. [Pythagoras / Trigonometry]
Which letter corresponds to the hypotenuse of the right-angled triangle?

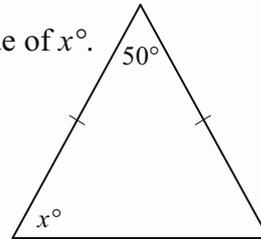


r

28. [Shape / Location]
Draw the side view of this solid.

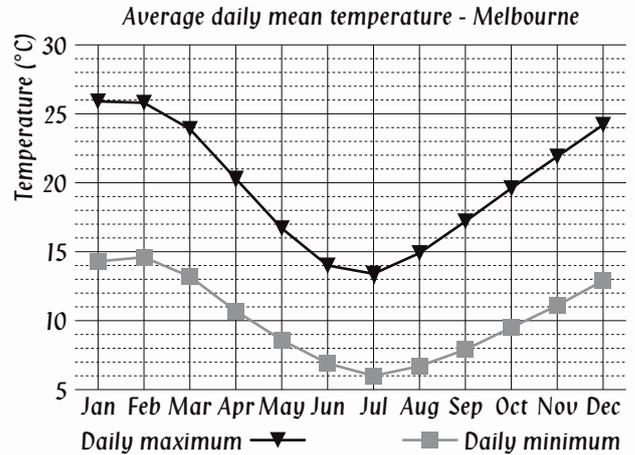


29. [Angles]
Find the value of x° .



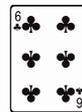
65°

30. [Statistics]
In which month in Melbourne is the daily minimum temperature closest to 8°C?



September

31. [Probability]
A card is drawn at random from a deck of 52 playing cards. What is the probability that it is a black card?



or 0.5

$\frac{1}{2}$

32. [Problem Solving 1]
If $3n$ is an even number, which of the following must be an odd number?

- A) n B) $2n$
C) $n + 1$ D) $n + 2$
E) n^2

C

33. [Problem Solving 2]
The lines of a multiplication table are shown jumbled below. Which times table is it?

H × F = JD
H × E = JC
H × A = DB
H × J = GD
H × H = GC
H × C = DH
H × I = DF
H × G = H
H × D = F

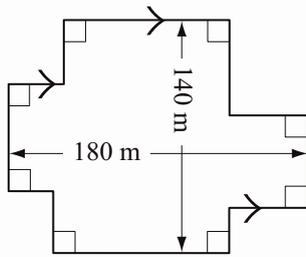
4



Name:

- | | |
|--|--|
| <p>1. [Long \times, \div]
$420 \div 5 =$ 84</p> <p>2. [Decimal $+, -$]
$7 - 4.7 =$ 2.3</p> <p>3. [Decimal \times, \div]
$1.2 \div 0.4 =$ 3</p> <p>4. [Fraction $+, -$]
$2 - \frac{3}{5} =$ $1\frac{2}{5}$</p> <p>5. [Fraction \times, \div]
$\frac{2}{9} \times 4\frac{1}{2} =$ 1</p> <p>6. [Percentages]
Express 18 out of 60 as a percentage. 30%</p> <p>7. [Integer $+, -$]
$(-8) - (+3) =$ -11</p> <p>8. [Integer \times, \div]
$(+9) \times (+12) =$ 108</p> <p>9. [Rates / Ratios]
Of the 25 friends going to the football, 10 are wearing hats. Find the ratio of friends with hats to those without. 2 : 3</p> <p>10. [Indices]
Evaluate $(-5)^3$ -125</p> <p>11. [Square Roots / Surds]
Evaluate $\sqrt{81} - \sqrt{64}$ 1</p> <p>12. [Order of Operations]
$6 + 5 \times 24 \div 3 =$ 46</p> <p>13. [Exploring Number]
$-2.35 < -3.25$ True or false? false</p> | <p>14. [Scientific Notation]
Express 2.3×10^3 as a basic numeral. 2300</p> <p>15. [Number Patterns]
Complete the pattern:
0, 12, 24, 36, <u>48</u>, <u>60</u></p> <p>16. [Expressions]
Simplify $6 \times s \times s^2 \div 3$ without using \times and \div signs. $2s^3$</p> <p>17. [Substitution]
If $m = 5$ and $n = 10$, find the value of $n(m - 3)$ 20</p> <p>18. [Expansion]
Expand and simplify $2(4v - 1) - 5v$ $3v - 2$</p> <p>19. [Factorisation]
Factorise, then evaluate $16 \times 27 + 16 \times 73$ 1600</p> <p>20. [Equations]
Solve the inequality: $5x < x + 20$ $x < 5$</p> <p>21. [Graphs & Functions]
Complete the missing coordinates given that A, B and C lie on the line defined by the rule $y = x + 2$
A(3, 5), B(-2, 0), C(-4, -2)</p> <p>22. [Units of Measurement / Time]
How many centimetres in 3.5 metres? 350 cm</p> |
|--|--|

23. [Perimeter]
Find the perimeter of the polygon.

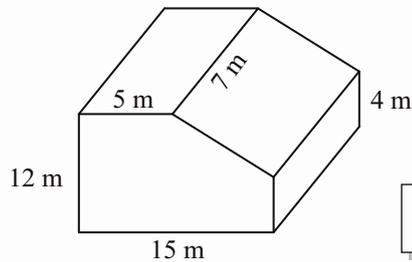


640 m

24. [Area]
A square has an area of 9 cm^2 . If you triple the side length of the square, what is the area of the new square?

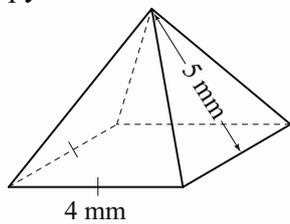
81 cm^2

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



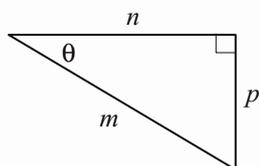
980 m^3

26. [Surface Area]
Find the total surface area of the square pyramid.



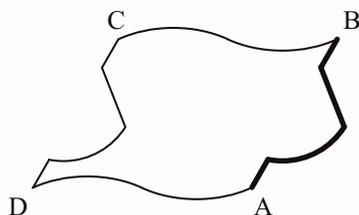
56 mm^2

27. [Pythagoras / Trigonometry]
Which perpendicular side is adjacent to the angle θ in the triangle?

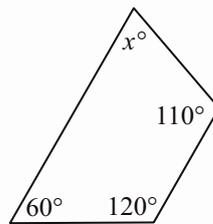


n

28. [Shape / Location]
If ABCD is a parallelogram, join A to B in such a way that the completed shape will tessellate.



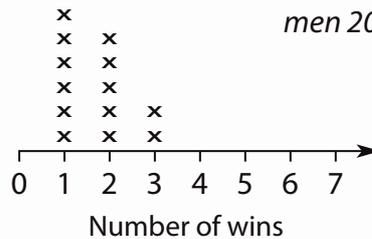
29. [Angles]
Find the value of x° .



70°

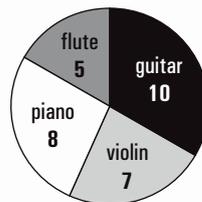
30. [Statistics]
How many men have won the Hawaii Ironman title twice?

Hawaii Ironman Triathlon Winners
men 2000 - 2022



5

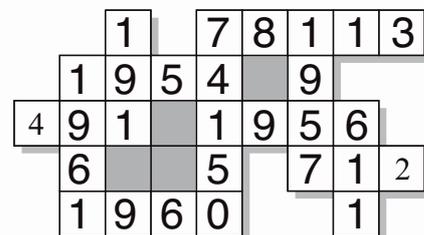
31. [Probability]
What is the probability that a student selected at random is studying the guitar?



Choice of musical instrument by students

or $0.\dot{3}$ $\frac{1}{3}$

32. [Problem Solving 1]
Fill in the cross number puzzle using the following numbers:
3 digits: 191, 712, 491, 611
4 digits: 1954, 1956, 1957, 1960, 1961
5 digits: 74150, 78113



33. [Problem Solving 2]
The first digit of a six-digit number is 6. If this 6 is moved to the end of the number, the new six-digit number is only a quarter of the original number. Find the original number.

$$\begin{array}{r} A B C D E 6 \\ \times \quad \quad \quad 4 \\ \hline 6 A B C D E \end{array}$$

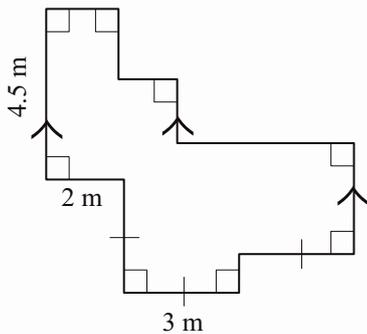
615384



Name:

- | | |
|---|--|
| <p>1. [Long \times, \div]
$225 \div 3 =$ 75</p> <p>2. [Decimal $+$, $-$]
$5 - 0.4 =$ 4.6</p> <p>3. [Decimal \times, \div]
$0.75 \div 0.5 =$ 1.5</p> <p>4. [Fraction $+$, $-$]
$5 - \frac{5}{8} =$ $4\frac{3}{8}$</p> <p>5. [Fraction \times, \div]
$2\frac{2}{3} \times 1\frac{1}{8} =$ 3</p> <p>6. [Percentages]
Express 18 out of 90 as a percentage.
20%</p> <p>7. [Integer $+$, $-$]
$(+9) + (-1) =$ 8</p> <p>8. [Integer \times, \div]
$(+35) \div (-7) =$ -5</p> <p>9. [Rates / Ratios]
The ratio of fat to meat in a pork chop is 6 : 19. Find the percentage of fat in the chop.
24%</p> <p>10. [Indices]
Evaluate $\left(-\frac{2}{3}\right)^2$ $\frac{4}{9}$</p> <p>11. [Square Roots / Surds]
Evaluate $\sqrt{4} + \sqrt{16}$ 6</p> <p>12. [Order of Operations]
$7 + 6 - 27 \div 3 =$ 4</p> <p>13. [Exploring Number]
$-1.95 > -1.905$ True or false?
false</p> | <p>14. [Scientific Notation]
Express 1.702×10^6 as a basic numeral.
1 702 000</p> <p>15. [Number Patterns]
Complete the pattern:
2, 11, 20, 29, <u>38</u>, <u>47</u></p> <p>16. [Expressions]
Simplify $5 \times d - 2 \div d$ without using \times and \div signs.
$5d - \frac{2}{d}$</p> <p>17. [Substitution]
If $g = 7$ and $h = 8$, find the value of $g(h - 5)$
21</p> <p>18. [Expansion]
Expand and simplify $5(2c - 3) - 4c$
$6c - 15$</p> <p>19. [Factorisation]
Factorise, then evaluate $\frac{7}{8} \times 57 - \frac{7}{8} \times 17$
35</p> <p>20. [Equations]
Solve the inequality: $5x \geq 11x + 36$
$x \leq -6$</p> <p>21. [Graphs & Functions]
Complete the missing coordinates given that A, B and C lie on the line defined by the rule $y = -x + 2$
A(4, -2), B(0, 2), C(6, -4)</p> <p>22. [Units of Measurement / Time]
How many grams in 0.03 kilograms?
30 g</p> |
|---|--|

23. [Perimeter]
Find the perimeter of the polygon.

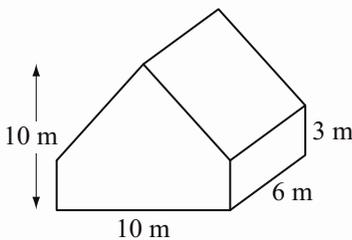


31 m

24. [Area]
Find the length of the base of a triangle whose height is 3 cm and area is 34.5 cm^2 .

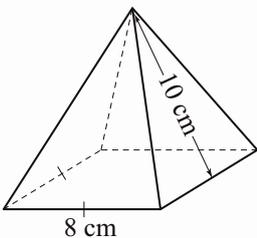
23 cm

25. [Volume]
What is the volume of air inside the shed?



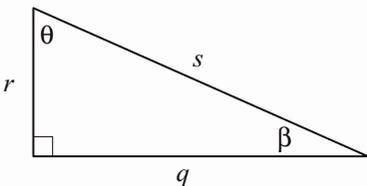
390 m^3

26. [Surface Area]
Find the total surface area of the square pyramid.



224 cm^2

27. [Pythagoras / Trigonometry]
Which side is opposite the angle θ in the triangle?

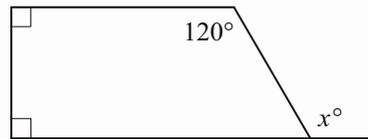


q

28. [Shape / Location]
Euler's formula $E = V + F - 2$ defines the relationship between Edges, Vertices and Faces of any polyhedron. Verify Euler's formula for a cube.

$12 = 8 + 6 - 2$

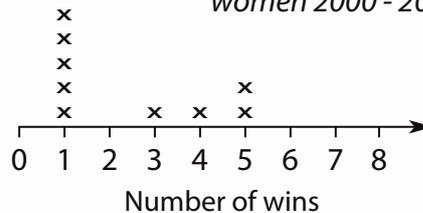
29. [Angles]
Find the value of x° .



120°

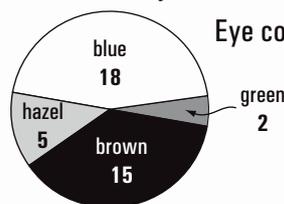
30. [Statistics]
How many women have won the Hawaii Ironman title once only?

Hawaii Ironman Triathlon Winners
women 2000 - 2022



5

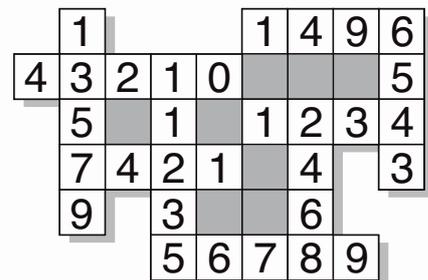
31. [Probability]
If a student is chosen at random from the group, what is the probability that they will have blue eyes?



or 0.45

$\frac{9}{20}$

32. [Problem Solving 1]
Fill in the cross number puzzle using the following numbers:
4 digits: 1234, 1496, 2468, 6543, 7421
5 digits: 11235, 13579, 43210, 56789



33. [Problem Solving 2]
The last digit of a six-digit number is 1. If the 1 is moved to the start of the number, the new six-digit number is only a third of the original number. Find the original number.

$$\begin{array}{r} 1 \text{ A B C D E} \\ \times \quad \quad \quad 3 \\ \hline \text{A B C D E 1} \end{array}$$

428571



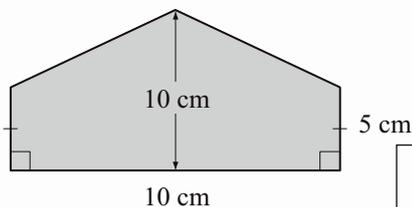
Name:

1. [Long \times ,+] $67 \times 35 =$ 2345
2. [Decimal +,-] $5.7 + 0.739 =$ 6.439
3. [Decimal \times ,+] $1.4 \times 0.7 =$ 0.98
4. [Fraction +,-] $2\frac{4}{11} - \frac{7}{11} =$ $1\frac{8}{11}$
5. [Fraction \times ,+] $\frac{1}{3} \div 1\frac{1}{9} =$ $\frac{3}{10}$
6. [Percentages] Increase \$200 by 15%. \$ 230
7. [Integer +,-] $(+6) - (+3) =$ 3
8. [Integer \times ,+] $(+5) \times (+5) \times (-2) =$ -50
9. [Rates / Ratios] A giraffe can reach speeds of 50 km/h. How much time does it take to cover 500 m at this speed? 36 s
10. [Indices] Simplify $(4y)^2$ $16y^2$
11. [Square Roots / Surds] Between which two consecutive whole numbers does $\sqrt{85}$ lie? 9 and 10
12. [Order of Operations] $(3 - 1)^3 + 2^3 =$ 16
13. [Exploring Number] Which item is cheaper per gram?
A) \$8.50 for 400 g
B) \$21.50 for 1 kg A
14. [Scientific Notation] Which is larger:
 8.4×10^{-5} or 4.8×10^{-3} ? 4.8×10^{-3}
15. [Number Patterns] Complete the pattern:
0.4, 0.8, 1.6, 3.2, 6.4, 12.8
16. [Expressions] The expression $5(y + 5)$ can also be written as:
 $5 + (y + 5)$, $5 \times (y + 5)$ or $5 - (y + 5)$ $5 \times (y + 5)$
17. [Substitution] Given $v = \frac{x}{t}$, find v when $x = 36$ and $t = 6$ 6
18. [Expansion] Expand $-2x(x + 1)$ $-2x^2 - 2x$
19. [Factorisation] Factorise $x(2x + 1) - 2(2x + 1)$ $(2x + 1)(x - 2)$
20. [Equations] Solve for x : $5(x + 1) = 45$ 8
21. [Graphs & Functions] Find the x -intercept for the straight line of equation $5x + 3y = 15$
[Let $y = 0$ in the relation] (3,0)
22. [Units of Measurement / Time] At 1200 hours in Melbourne it is 0300 hours in Rome. What day and time is it in Rome if it is 1900 hours on Wednesday in Melbourne? 1000 hours Wednesday

23. [Perimeter]
A tennis court set up for doubles play has a length of 23.8 metres and a width of 11.0 metres. Calculate the perimeter of a doubles court.

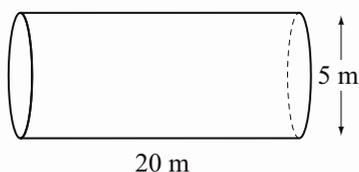
69.6 m

24. [Area]
Find the area of the shape.



75 cm²

25. [Volume]
Using $\pi \approx 3.14$ find the volume of the cylinder.

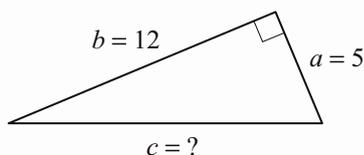


392.5 m³

26. [Surface Area]
Find the total surface area of a plank of wood in the shape of a rectangular prism 15 cm by 400 cm by 2 cm.

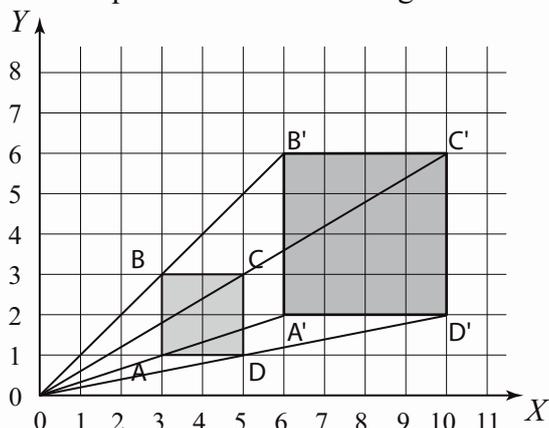
13660 cm²

27. [Pythagoras / Trigonometry]
Using Pythagoras' theorem $a^2 + b^2 = c^2$, find the length of the hypotenuse.



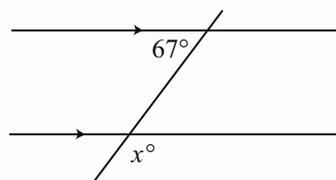
13

28. [Shape / Location]
Determine the scale factor of the enlargement of the square ABCD in the diagram.



2

29. [Angles]
Find the value of x° .



113°

30. [Statistics]
The ages of the teachers of a small primary school are:
40, 35, 28, 40, 52, ~~23~~, 39, 53, 45, 60, 49, 53, 27, 48, 36, 39.

Complete the stem-and-leaf plot to find the median of this data.

stem	leaves
2	3 7 8
3	5 6 9 9
4	0 0 5 8 9
5	2 3 3
6	0

40

31. [Probability]
What is the probability that a person chosen at random from the audience is a boy who prefers rock music? [Complete the two-way table.]

	Boys	Girls	Total
Pop music	14	12	26
Rock music	10	9	19
Total	24	21	45

or $0.\dot{2}$ $\frac{2}{9}$

32. [Problem Solving 1]
Using the main exit only, it takes 1 minute for the audience to be evacuated from the theatre. Using only the small gate, it would take 3 minutes. How long would it take if both exits were opened?

45 s

33. [Problem Solving 2]
Use the digits 1, 3, 5, 7 and 9 (once each) to complete the multiplication so that the answer is as large as possible.

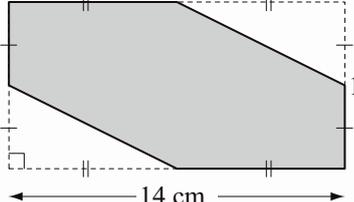
$$\begin{array}{r} 751 \\ \times 93 \\ \hline 2253 \\ 67590 \\ \hline 69843 \end{array}$$

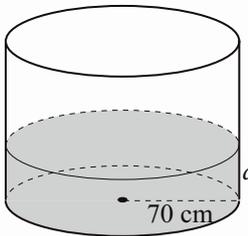


Name:

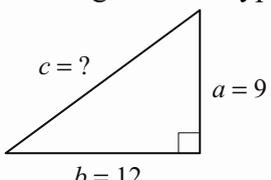
1. [Long \times ,+] $35 \times 22 =$ 770
2. [Decimal +,-] $3.9 + 0.611 =$ 4.511
3. [Decimal \times ,+] $300 \times 0.25 =$ 75
4. [Fraction +,-] $4\frac{3}{7} - \frac{5}{7} =$ $3\frac{5}{7}$
5. [Fraction \times ,+] $1\frac{2}{5} \div \frac{7}{10} =$ 2
6. [Percentages] Increase \$75 by 20%. \$ 90
7. [Integer +,-] $(-5) + (+6) =$ 1
8. [Integer \times ,+] $(+6) \times (-6) \times (-2) =$ 72
9. [Rates / Ratios] Elephants can run 40 km/h. At this speed, how far can they run in 3 minutes? 2 km
10. [Indices] Simplify $(3k^3)^2$ $9k^6$
11. [Square Roots / Surds] Between which two consecutive whole numbers does $\sqrt{14}$ lie? 3 and 4
12. [Order of Operations] $2 \times 8 + 35 \div 7 =$ 21
13. [Exploring Number] Which item is cheaper per gram?
A) \$1.25 for 300 g
B) \$6 for 1.5 kg B
14. [Scientific Notation] Which is larger:
 1.42×10^3 or 1.402×10^3 ? 1.42×10^3
15. [Number Patterns] Complete the pattern:
0.35, 0.7, 1.4, 2.8, 5.6, 11.2
16. [Expressions] The expression $4 \times b \times b \times c \times c \times c \times d$ can also be written as:
 $4bc^2d$, $4b^2c^3d$ or $4b^2cd^2$ $4b^2c^3d$
17. [Substitution] If $P = 2(l + w)$, find P when $l = 6$ and $w = 2$ 16
18. [Expansion] Expand $-2w(w - 5)$ $-2w^2 + 10w$
19. [Factorisation] Factorise $4(x + 2) - 2x(x + 2)$ $2(x + 2)(2 - x)$
20. [Equations] Solve for x :
 $6(x + 2) = 18$ 1
21. [Graphs & Functions] Find the y -intercept for the straight line defined by the equation $4x + 6y = 12$
[Let $x = 0$ in the relation] (0,2)
22. [Units of Measurement / Time] At 1200 hours on Saturday in Brisbane it is 1800 hours on Friday in Vancouver. What day and time is it in Vancouver if it is 2300 hours on Tuesday in Brisbane? 0500 hours on Tuesday

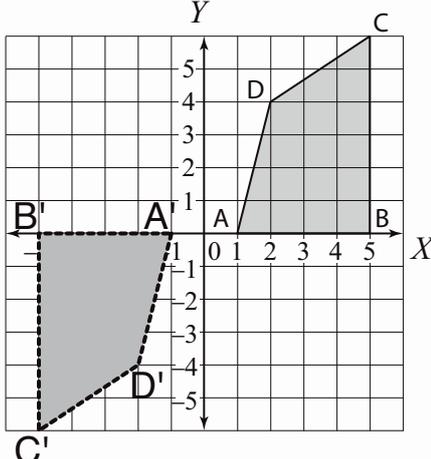
23. [Perimeter]
Tiananmen Square in Beijing, China, is a square with side length of approximately 1.5 km. Find the perimeter of the square. 6 km

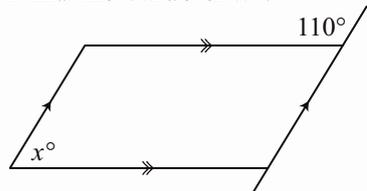
24. [Area]
Find the area of the shaded region.
 105 cm²

25. [Volume]
In this cylindrical water tank there are 308 L of water. Using $\pi \approx \frac{22}{7}$ find the depth of the water in the tank. [Hint: 1 L = 1000 cm³]
 20 cm

26. [Surface Area]
Find the total surface area of a rectangular prism with dimensions 3 cm by 5 cm by 10 cm. 190 cm²

27. [Pythagoras / Trigonometry]
Using Pythagoras' theorem $a^2 + b^2 = c^2$, find the length of the hypotenuse.
 15

28. [Shape / Location]
Redraw the shape shown after a rotation of 180° about the origin.


29. [Angles]
Find the value of x° .
 70°

30. [Statistics]
According to the stem-and-leaf plot, what is the median monthly rainfall for Sydney?
Monthly Average Rainfall (mm) - Sydney

stem	leaves
7	2 7
8	0 3 6
9	4
10	1 4
11	5
12	5 9
13	
14	0

97.5

31. [Probability]
What is the probability that a student chosen at random is aged more than 12 and walks to school? [Complete the two-way table.]

	Walk	Bus/Car	Bicycle	Total
Aged 12 or less	12%	16%	23%	51%
Aged more than 12	17%	14%	18%	49%
Total	29%	30%	41%	100%

17%

32. [Problem Solving 1]
Using the tap it takes Ling 4 minutes to fill his wading pool. Using the neighbour's hose it takes 12 minutes. How long would it take if he used both the tap and the hose? 3 min

33. [Problem Solving 2]
Use the digits 2, 4, 6 and 8 (once each) to complete the multiplication so that the answer is as large as possible.

	8	2
×	6	4
<hr/>		
	3	2
	4	9
		2
		0
<hr/>		
	5	2
		4
		8

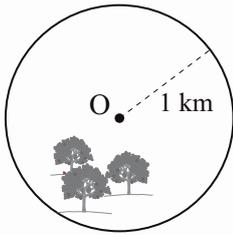
5 2 4 8



Name:

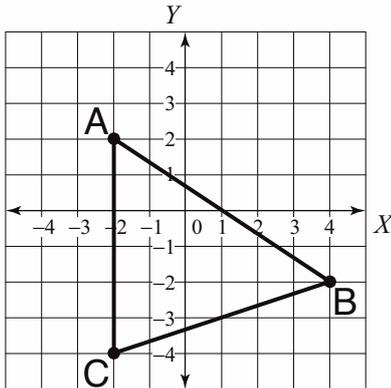
1. [Long \times , \div]
 $924 \div 11 =$ 84
2. [Decimal $+$, $-$]
 $8.72 + 0.49 =$ 9.21
3. [Decimal \times , \div]
 $2.4 \times 0.7 =$ 1.68
4. [Fraction $+$, $-$]
 $\frac{2}{3} + \frac{1}{6} =$ $\frac{5}{6}$
5. [Fraction \times , \div]
 $\frac{5}{2} \times 8 =$ 20
6. [Percentages]
 Of the 60 oranges we bought, 5% were split.
 How many split oranges were there? 3
7. [Integer $+$, $-$]
 $(-5) - (-7) - (+9) =$ -7
8. [Integer \times , \div]
 $(-3) \times (+5) \div (-5) =$ 3
9. [Rates / Ratios]
 An inefficient toilet wastes up to 125 litres of water in a month. How much water is wasted in a year? 1500 L
10. [Indices]
 Evaluate $\frac{1}{3^{-3}}$ 27
11. [Square Roots / Surds]
 Evaluate $3\sqrt{16} - \sqrt{16}$ 8
12. [Order of Operations]
 $6 \times [(2 + 3)^2 - 5]^2 =$ 2400
13. [Exploring Number]
 Fill in with the appropriate symbol ($<$, $>$, $=$)
 $7416 \div 1.2$ $<$ 7416
14. [Scientific Notation]
 Round 0.0048 correct to 3 decimal places. 0.005
15. [Number Patterns]
 Complete the pattern:
 $\frac{1}{12}, \frac{1}{2}, 3, 18,$ 108, 648
16. [Expressions]
 Write the following as an algebraic expression:
 A number that is equal to six less than g
 $g - 6$
17. [Substitution]
 If $z = -2$, find the value of $4z^2 + z$ 14
18. [Expansion]
 Expand and simplify
 $3(x - 1) + 2(x + 2)$ $5x + 1$
19. [Factorisation]
 Factorise $x^2 - 4$ $(x - 2)(x + 2)$
20. [Equations]
 Solve the inequality:
 $\frac{4x - 1}{5} < 3$ $x < 4$
21. [Graphs & Functions]
 Sketch the line defined by the equation $y = -3x$ using the set of coordinate axes below.
22. [Units of Measurement / Time]
 How many millilitres in 0.34 litres? 340 mL

23. [Perimeter]
Using $\pi \approx 3.14$ find the circumference of the circular park.



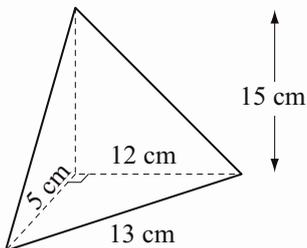
6.28 km

24. [Area]
Plot the points A(-2,2), B(4,-2) and C(-2,-4) and use them to find the area of triangle ABC.



18

25. [Volume]
Using $V = \frac{1}{3} \times \text{base area} \times \text{height}$ find the volume of the triangular pyramid shown.

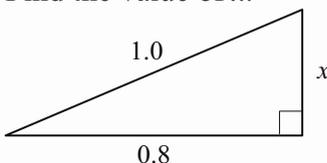


150 cm³

26. [Surface Area]
Using $TSA = 2\pi r(r + h)$ where $\pi \approx 3.14$, find the total surface area of a cylindrical pellet of radius 1 cm and height 4 cm.

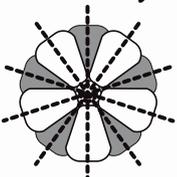
31.4 cm²

27. [Pythagoras / Trigonometry]
Find the value of x .

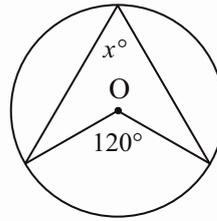


0.6

28. [Shape / Location]
Draw all axes of symmetry and show the centre of symmetry for the shape.



29. [Angles]
Find the value of x° .



60°

30. [Statistics]
How is the variable 'length of whales' best defined?

- A) Ordinal (ranked opinion e.g. favourite song)
B) Nominal (described e.g. car colour)
C) Continuous (measured e.g. weight)
D) Discrete (counted e.g. crowd size)

C

31. [Probability]
A coin and a die are tossed. What is the probability of throwing a tail and a 5?



$\frac{1}{12}$

32. [Problem Solving 1]
An ancient civilization used the following number system:

$\bullet = 1, | = 2, + = 4, \square = 8$

and $\boxplus = 16$. Other numbers were drawn using combinations of these symbols.

So 3 was written $| \bullet$.

Using as few symbols as possible, how would you represent the number 23?

$\boxplus + | \bullet$

33. [Problem Solving 2]
Four students on an excursion came across an old weighing machine and decided to weigh themselves.

"Sorry," said the owner, "that machine is only accurate for weights over 100 kg."

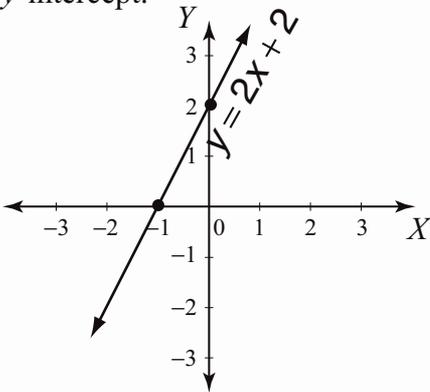
"That's OK," replied one student, "we will hop on two at a time."

The results of the pairings in kilograms were: 105, 107, 110, 110, 113, and 115. What was the mass, in kilograms, of the heaviest student?

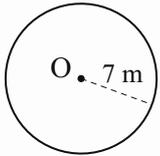
59 kg



Name:

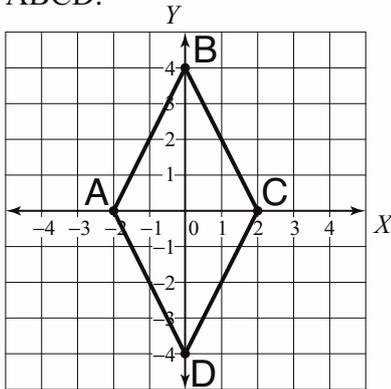
1. [Long \times , \div]
 $528 \div 12 =$ 44
2. [Decimal $+$, $-$]
 $0.225 + 0.075 =$ 0.3
3. [Decimal \times , \div]
 $3.6 \div 0.09 =$ 40
4. [Fraction $+$, $-$]
 $\frac{3}{4} - \frac{1}{12} =$ $\frac{2}{3}$
5. [Fraction \times , \div]
 $\frac{3}{2} \div 9 =$ $\frac{1}{6}$
6. [Percentages]
Of the 40 students in our class, 18 are boys.
What percentage of the class are boys? 45%
7. [Integer $+$, $-$]
 $(+8) + (-5) + (-2) =$ 1
8. [Integer \times , \div]
 $(-8) \times (+10) \div (-4) =$ 20
9. [Rates / Ratios]
Melbournians were asked to limit water use to 155 litres per day per person. At this rate how much water was allowed per person in 200 days? 31 000 L
10. [Indices]
Evaluate 5^{-2} or 0.04 $\frac{1}{25}$
11. [Square Roots / Surds]
Evaluate $3\sqrt{2} \times 5\sqrt{2}$ 30
12. [Order of Operations]
 $[(5 - 3)^3 - 3]^3 =$ 125
13. [Exploring Number]
Fill in with the appropriate symbol ($<$, $>$, $=$)
 570×0.95 $<$ 570
14. [Scientific Notation]
Round 0.019 correct to 2 decimal places. 0.02
15. [Number Patterns]
Complete the pattern:
 $\frac{1}{20}, \frac{1}{2}, 5, 50,$ 500, 5000
16. [Expressions]
Write the following as an algebraic expression:
Ten lots of m 10m
17. [Substitution]
If $h = -5$, find the value of $2h^2 - h$ 55
18. [Expansion]
Expand and simplify
 $(s + 3)(s - 3)$ $s^2 - 9$
19. [Factorisation]
Factorise $x^2 - 25$ $(x - 5)(x + 5)$
20. [Equations]
Solve the inequality:
 $\frac{2x + 6}{2} < 8$ $x < 5$
21. [Graphs & Functions]
Sketch the line defined by the equation $y = 2x + 2$ by marking the x -intercept and the y -intercept.

22. [Units of Measurement / Time]
How many millimetres in 12 metres? 12 000 mm

23. [Perimeter]
Using $\pi \approx \frac{22}{7}$ find the circumference of the circle.



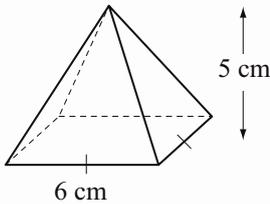
44 m

24. [Area]
Plot the points A(-2,0), B(0,4), C(2,0) and D(0,-4) and use them to find the area of ABCD.



16

25. [Volume]
Using $V = \frac{1}{3} \times \text{base area} \times \text{height}$ find the volume of the square pyramid.

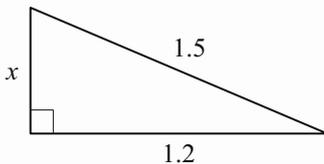


60 cm³

26. [Surface Area]
Using $TSA = 2\pi r(r + h)$ where $\pi \approx 3.14$, find the total surface area of a cylindrical ice hockey puck with a radius of 2 cm and height 3 cm.

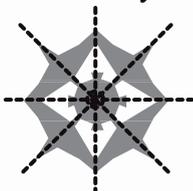
62.8 cm²

27. [Pythagoras / Trigonometry]
Find the value of x .

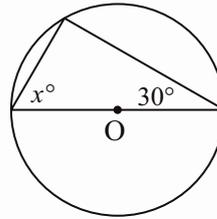


0.9

28. [Shape / Location]
Draw all axes of symmetry and mark the centre of symmetry for the shape.



29. [Angles]
Find the value of x° .



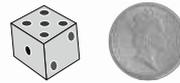
60°

30. [Statistics]
How is the variable 'motel quality' best defined?

- A) Ordinal (ranked opinion e.g. favourite song)
B) Nominal (described e.g. car colour)
C) Continuous (measured e.g. weight)
D) Discrete (counted e.g. crowd size)

A

31. [Probability]
A coin and a die are tossed. Find the probability of getting a head and a number greater than 4.



or 0.16

$\frac{1}{6}$

32. [Problem Solving 1]
An ancient civilization used the following number system:

● = 1, | = 2, + = 4, □ = 8

and ⊕ = 16. Other numbers were drawn using combinations of these symbols.

For example, 19 was ⊕|●.

What is the smallest number that could not be represented without having to repeat any symbol?

32

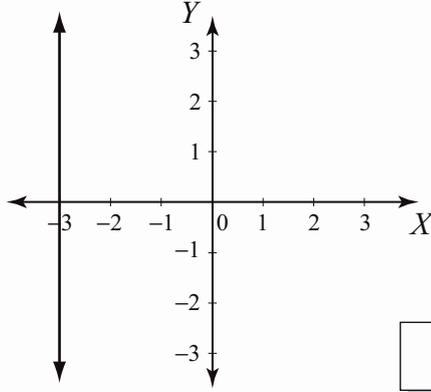
33. [Problem Solving 2]

The houses along our side of the street are numbered in consecutive odd numbers, the even numbers being on the other side of the street. Our house is number 69, but, had the numbering commenced at the other end of the street, our house would have been number 41. How many houses are there on our side of the street?

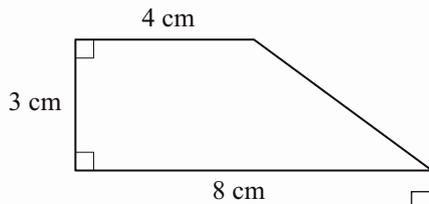
55



Name:

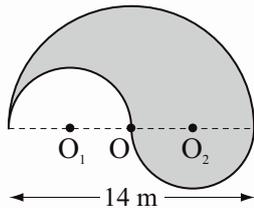
1. [Long \times ,+] $16.9 \times 23 =$ 388.7
2. [Decimal +,-] $5 - 0.03 =$ 4.97
3. [Decimal \times ,+] $3 \div 0.04 =$ 75
4. [Fraction +,-] $1\frac{1}{3} - \frac{1}{6} =$ $1\frac{1}{6}$
5. [Fraction \times ,+] $\frac{5}{9} \times 5 =$ $2\frac{7}{9}$
6. [Percentages] Reduce \$8.00 by 40%. \$4.80
7. [Integer +,-] $(+4) + (-6) + (-18) =$ -20
8. [Integer \times ,+] $\frac{(-24)}{(-4)} =$ 6
9. [Rates / Ratios] Divide \$210 in the ratio 2 : 5 \$60: \$150
10. [Indices] Simplify $\frac{12r^2s}{4r}$ 3rs
11. [Square Roots / Surds] Simplify $\sqrt{500}$ $10\sqrt{5}$
12. [Order of Operations] $(\sqrt{25} + \sqrt{9})^2 =$ 64
13. [Exploring Number] Write $\frac{5}{6}$ as a recurring decimal. $0.8\dot{3}$
14. [Scientific Notation] Write 0.0215 in scientific notation. 2.15×10^{-2}
15. [Number Patterns] Complete the pattern:
3, 3, 6, 9, 15, 24, 39
16. [Expressions] Write the following as an algebraic expression:
A number that is equal to nine less than a third of k $\frac{k}{3} - 9$
17. [Substitution] If $y = 2x + 3$, what value of x will make $y = 3$? 0
18. [Expansion] Expand and simplify $(c + 2)(c - 5)$ $c^2 - 3c - 10$
19. [Factorisation] Factorise and simplify $\frac{12x^2 + 3x}{8x + 2}$ $\frac{3x}{2}$
20. [Equations] Solve for x : $\frac{5(x + 1)}{7} = 5$ 6
21. [Graphs & Functions] Find the equation of the straight line.
 $x = -3$
22. [Units of Measurement / Time] Convert 3 hectares to square metres. $30\,000\text{ m}^2$

23. [Perimeter]
Find the perimeter of the trapezium.
[Hint: Pythagoras' theorem will help.]



20 cm

24. [Area]
Use $\pi \approx \frac{22}{7}$ to find the area of the shape.



77 m²

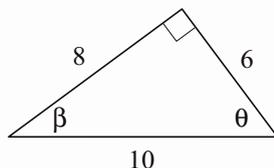
25. [Volume]
A water-wise person places a brick 10 cm by 10 cm by 25 cm in the toilet cistern. How many litres of water will the family save each week if the toilet is used 60 times? [Hint: 1 L = 1000 cm³]

150 L

26. [Surface Area]
The side length of a cube is doubled. By what factor will the surface area increase?

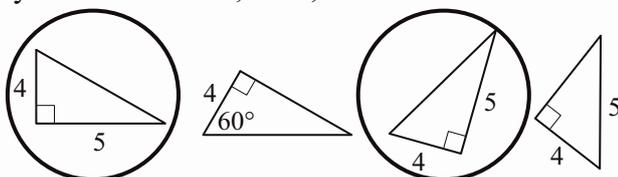
4

27. [Pythagoras / Trigonometry]
For which angle is the cosine ratio 0.8?



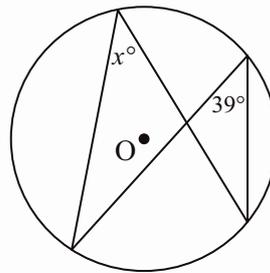
beta

28. [Shape / Location]
Circle the two congruent triangles and give your reason: SSS, SAS, ASA or RHS



SAS

29. [Angles]
Find the value of x° .



39°

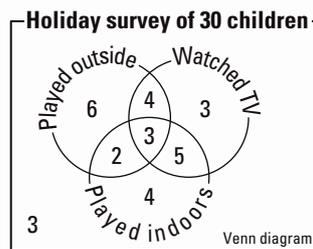
30. [Statistics]
The frequency table shows the number of letters in the first names of all students in a class. Find the median and mode of this data.

Number of letters	3	4	5	6	7	8	9	10
Frequency	4	5	7	6	5	5	0	1

median = 6

mode = 5

31. [Probability]
If a child surveyed during the holiday is chosen at random, what is the probability that the child did not play outside on the day of the survey?



or 0.5

$\frac{1}{2}$

32. [Problem Solving 1]
If $0 < x < 1$, which is the largest?
A) x B) $2x$
C) x^2 D) x^3
E) $x + 1$

E

33. [Problem Solving 2]
This table shows the team standings after 2 rounds of the 2006 F.I.F.A. World Cup. Who did the Netherlands play in its third round robin game? [Each team plays every other team in the group once, and 3 points are awarded for a win, 1 for a draw and none for a lost game.]

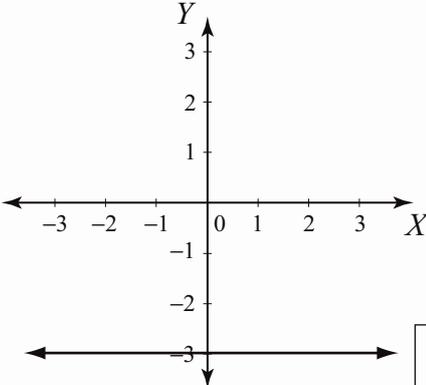
Group C

Team	MP	W	D	L	GF	GA	Pts
	matches played	wins	draws	losses	goals for	goals against	points
Argentina	2	2	0	0	8	1	6
Netherlands	2	2	0	0	3	1	6
Cote d'Ivoire	2	0	0	2	2	4	0
Serbia & Montenegro	2	0	0	2	0	7	0

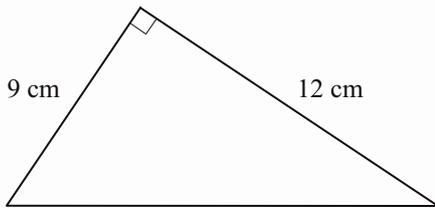
Netherlands: Argentina (0:0)



Name:

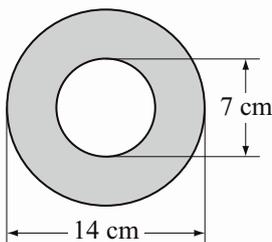
1. [Long \times ,+] $14.8 \times 15 =$ 222
2. [Decimal +,-] $50 - 0.03 =$ 49.97
3. [Decimal \times ,+] $1.7 \times 0.04 =$ 0.068
4. [Fraction +,-] $\frac{4}{7} - \frac{3}{14} =$ $\frac{5}{14}$
5. [Fraction \times ,+] $5 \div \frac{5}{8} =$ 8
6. [Percentages] Reduce \$230 by 20%. \$ 184
7. [Integer +,-] $(-9) - (-7) + (+14) =$ 12
8. [Integer \times ,+] $\frac{(-48)}{6} =$ -8
9. [Rates / Ratios] Share 54 oranges in the ratio 2 : 7 12 : 42
10. [Indices] Simplify $\frac{6x^2y^5}{3x^4y^3}$ $\frac{2y^2}{x^2}$
11. [Square Roots / Surds] Simplify $\sqrt{45}$ $3\sqrt{5}$
12. [Order of Operations] $\sqrt{13^2 - 5^2} =$ 12
13. [Exploring Number] Change $\frac{17}{9}$ into a recurring decimal. 1. $\dot{8}$
14. [Scientific Notation] Write 0.1147 in scientific notation. 1.147×10^{-1}
15. [Number Patterns] Complete the pattern:
1, 2, 3, 5, 8, 13, 21
16. [Expressions] Write the following as an algebraic expression:
A number that is three more than four lots of x $3 + 4x$
17. [Substitution] If $y = x^2 + x - 2$, find the value of y when $x = 0$ -2
18. [Expansion] Expand and simplify $2x(x + 1) + (5 - x)$ $2x^2 + x + 5$
19. [Factorisation] Factorise and simplify $\frac{8x^2 + 4x}{10x + 5}$ $\frac{4x}{5}$
20. [Equations] Solve for x : $\frac{6(x - 2)}{5} = 12$ 12
21. [Graphs & Functions] Find the equation of the straight line.
 $y = -3$
22. [Units of Measurement / Time] Convert 40 cm^2 to mm^2 . 4000 mm^2

23. [Perimeter]
Find the perimeter of the triangle.
[Hint: Pythagoras' theorem will help.]



36 cm

24. [Area]
Use $\pi \approx \frac{22}{7}$ to find the area of the shaded annulus.



115.5 cm²

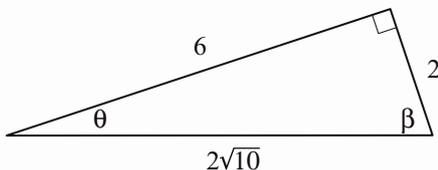
25. [Volume]
Find the volume of milk (in litres) that could be stored in a carton 25 cm by 10 cm by 8 cm.
[Hint: 1 L = 1000 cm³]

2 L

26. [Surface Area]
The surface area of a cube is 24 cm². What is its side length?

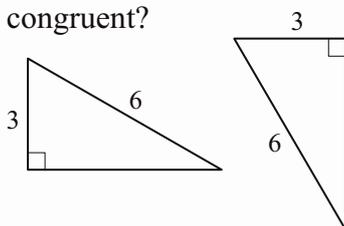
2 cm

27. [Pythagoras / Trigonometry]
For which angle is the tangent ratio $\frac{1}{3}$?



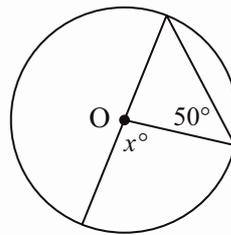
θ

28. [Shape / Location]
Which test (SSS, SAS, ASA, RHS) could be used to show the following triangles are congruent?



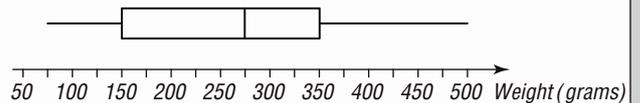
RHS

29. [Angles]
Find the value of x° .



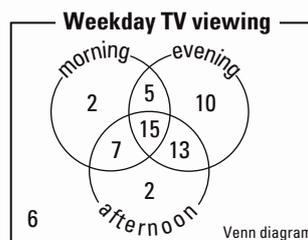
100°

30. [Statistics]
Find the median and range for the weights sampled in this box-and-whisker plot.



median = 275 range = 425

31. [Probability]
What is the probability that a surveyed person chosen at random only watched television in the evening?



or 0.16̇ **$\frac{1}{6}$**

32. [Problem Solving 1]
If $-1 < x < 0$, which of the following is the largest?

- A) -1 B) x
C) $2x$ D) x^3
E) $x - 1$

D

33. [Problem Solving 2]
This table shows the team standings after 2 rounds of the 2006 F.I.F.A. World Cup. Who did Ecuador play in its third round robin game?
[Each team plays every other team in the group once, and 3 points are awarded for a win, 1 for a draw and none for a lost game.]

Group A

Team	MP	W	D	L	GF	GA	Pts
	matches played	wins	draws	losses	goals for	goals against	points
Ecuador	2	2	0	0	5	0	6
Germany	2	2	0	0	5	2	6
Poland	2	0	0	2	0	3	0
Costa Rica	2	0	0	2	2	7	0

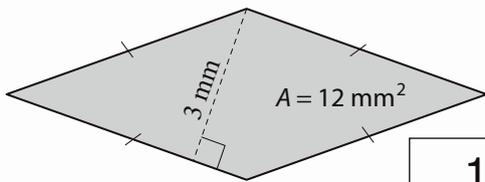
Ecuador: Germany (0:3)



Name:

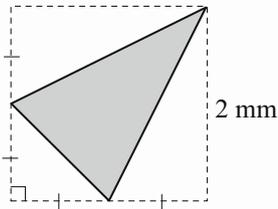
- | | |
|---|---|
| <p>1. [Long \times,\div]
$21.6 \div 5 =$ 4.32</p> <p>2. [Decimal $+$,$-$]
$1.55 - 0.08 + 0.14 =$ 1.61</p> <p>3. [Decimal \times,\div]
$0.8 \times 0.3 =$ 0.24</p> <p>4. [Fraction $+$,$-$]
$\frac{1}{5} + \frac{1}{4} =$ $\frac{9}{20}$</p> <p>5. [Fraction \times,\div]
$1\frac{1}{4} \times \frac{6}{10} =$ $\frac{3}{4}$</p> <p>6. [Percentages]
Find 100%, given that 10% is \$32. \$ 320</p> <p>7. [Integer $+$,$-$]
$-4 + (2 - 3) =$ -5</p> <p>8. [Integer \times,\div]
$(-2x) \times (-7) =$ 14x</p> <p>9. [Rates / Ratios]
Rhonda built a Lego house using white, blue and red blocks in the ratio 3 : 5 : 2. Of the 250 blocks used, how many were red? 50</p> <p>10. [Indices]
Simplify $\frac{h^3}{h^{-2}}$ h⁵</p> <p>11. [Square Roots / Surds]
Evaluate $\frac{3\sqrt{27}}{18\sqrt{3}}$ $\frac{1}{2}$</p> <p>12. [Order of Operations]
$17 \times 29 \times (5 - 5) + 19 =$ 19</p> <p>13. [Exploring Number]
Express $\frac{3}{10}$ of 1 hectare in square metres. 3000 m²</p> | <p>14. [Scientific Notation]
How many significant figures are there in 0.02? 1</p> <p>15. [Number Patterns]
Write the first four terms of the sequence $t_n = 3n$ where $n \geq 1$ 3, 6, 9, 12</p> <p>16. [Expressions]
Simplify:
$(x^2 + x + 3) + (x^2 + 3x - 2)$ 2x² + 4x + 1</p> <p>17. [Substitution]
If $a = 5$, $b = 3$ and $c = 1$, write true or false for the statement:
$2a + b + c = 9$ false</p> <p>18. [Expansion]
Expand and simplify
$(c - 2)^2 + 3c$ c² - c + 4</p> <p>19. [Factorisation]
Factorise
$x^2 + 9x + 20$ (x + 4)(x + 5)</p> <p>20. [Equations]
Solve for x:
$(x - 5)(x - 2) = 0$ 2, 5</p> <p>21. [Graphs & Functions]
Use the rule $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line joining the points E(-1,-1) and F(0,3) 4</p> <p>22. [Units of Measurement / Time]
Change 72 kilometres per hour into metres per second. 20 m/s</p> |
|---|---|

23. [Perimeter]
Find the perimeter of the rhombus.



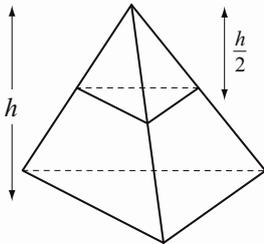
16 mm

24. [Area]
Find the area of the shaded triangle.



1.5 mm²

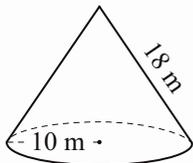
25. [Volume]
For the pyramids shown, find the ratio:
Volume of pyramid with height h
Volume of pyramid with height $\frac{h}{2}$



or 8 : 1

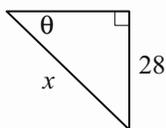
$\frac{8}{1}$

26. [Surface Area]
Use $TSA = \pi r(r + s)$ and $\pi \approx \frac{22}{7}$ to find the total surface area of the cone.



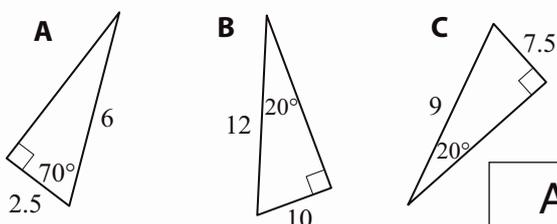
880 m²

27. [Pythagoras / Trigonometry]
Find the value of x , given $\sin \theta = 0.7$



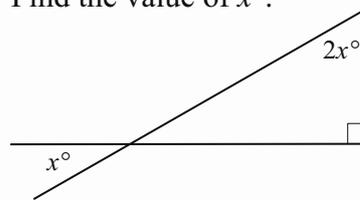
40

28. [Shape / Location]
Two of these triangles are similar. Which is the odd one out?



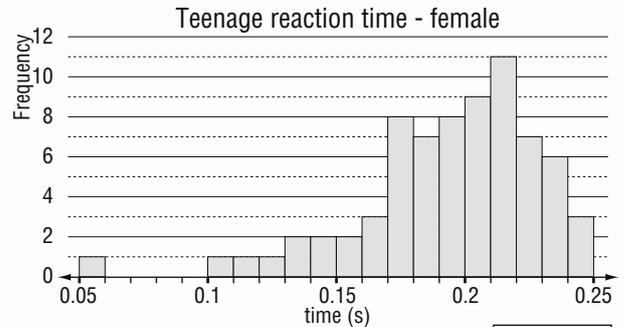
A

29. [Angles]
Find the value of x° .



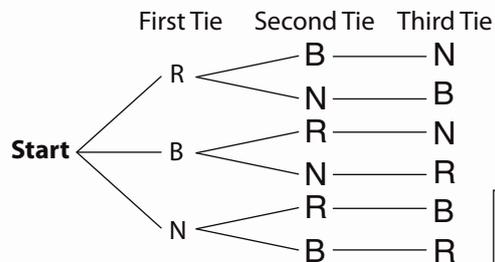
30°

30. [Statistics]
How many teenage females had a reaction time of less than 0.15 seconds?



8

31. [Probability]
A drawer contains 3 coloured ties: one red (R), one black (B) and one navy (N). The ties are picked from the drawer one after the other without replacement. What is the probability that the black tie was picked before the red one? [Complete the tree diagram to help solve the problem.]



or 0.5

$\frac{1}{2}$

32. [Problem Solving 1]
Find positive integers a, b, c and d if:
 $a + a = b,$
 $b + b = c,$
 $c + c = d,$ and
 $d + 15 = 31$

$a = 2 \quad b = 4 \quad c = 8 \quad d = 16$

33. [Problem Solving 2]
The sum of x consecutive numbers is $22x + 2$. Find the maximum possible value for x .

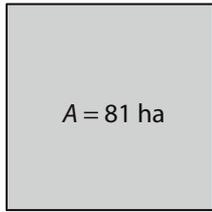
4



Name:

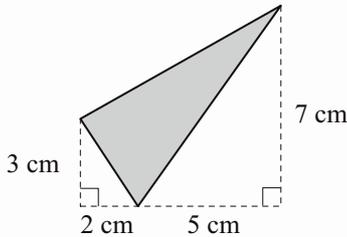
1. [Long \times , \div]
 $29.4 \div 6 =$ 4.9
2. [Decimal $+$, $-$]
 $6.2 - 3.7 + 1.6 =$ 4.1
3. [Decimal \times , \div]
 $60 \div 1.5 =$ 40
4. [Fraction $+$, $-$]
 $\frac{1}{3} - \frac{1}{4} =$ $\frac{1}{12}$
5. [Fraction \times , \div]
 $3\frac{2}{3} \div 9 =$ $\frac{11}{27}$
6. [Percentages]
 Find 100%, given that 50% is \$55. \$ 110
7. [Integer $+$, $-$]
 $7 - (4 - 8) =$ 11
8. [Integer \times , \div]
 $(-6) \times (+4y) =$ -24y
9. [Rates / Ratios]
 The ratio of the pages Yiannis has read, to those he hasn't read from a book of 240 pages is 3 : 5. How many pages has Yiannis read? 90
10. [Indices]
 Simplify $\frac{a^{-3}}{a^{-4}}$ a
11. [Square Roots / Surds]
 Evaluate $\frac{2\sqrt{5} \times 3\sqrt{5}}{4}$ 7.5
12. [Order of Operations]
 $(6 - 6)^7 \div 2012 =$ 0
13. [Exploring Number]
 Express $\frac{5}{6}$ of 1 minute in seconds. 50 s
14. [Scientific Notation]
 How many significant figures are there in 24.05? 4
15. [Number Patterns]
 Write the first four terms of the sequence $t_n = 3n + 1$ where $n \geq 1$ 4, 7, 10, 13
16. [Expressions]
 Simplify:
 $(x + 2y + 3) + (2x + y - 2)$ 3x + 3y + 1
17. [Substitution]
 If $a = 5$, $b = 3$ and $c = 1$, write true or false for the statement:
 $2a - 3b = c$ true
18. [Expansion]
 Expand $(z - 4)^2$ $z^2 - 8z + 16$
19. [Factorisation]
 Factorise $x^2 + 7x + 6$ $(x + 1)(x + 6)$
20. [Equations]
 Solve for x :
 $(x + 6)(x + 2) = 0$ -6, -2
21. [Graphs & Functions]
 Use the rule $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line joining the points P(0, -2) and R(-1, 1) -3
22. [Units of Measurement / Time]
 Convert a speed of 100 metres per second into kilometres per hour. 360 km/h

23. [Perimeter]
Find the perimeter of the square.



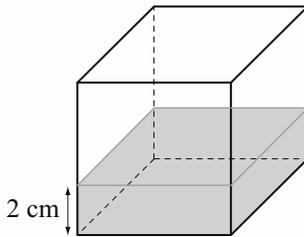
3600 m

24. [Area]
Find the area of the shaded triangle.



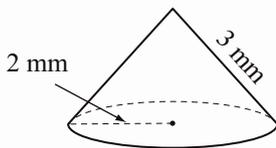
14.5 cm²

25. [Volume]
Find the volume of liquid in the cube, given it is one third full.



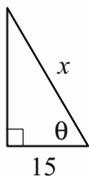
72 cm³

26. [Surface Area]
Use $TSA = \pi r(r + s)$ and $\pi \approx 3.14$ to find the total surface area of the cone.



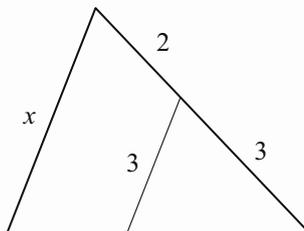
31.4 mm²

27. [Pythagoras / Trigonometry]
Find the value of x , given $\cos \theta = 0.5$



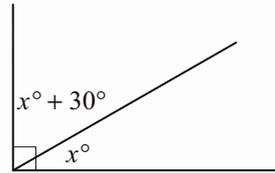
30

28. [Shape / Location]
Find the value of x .
[All measurements are in cm.]



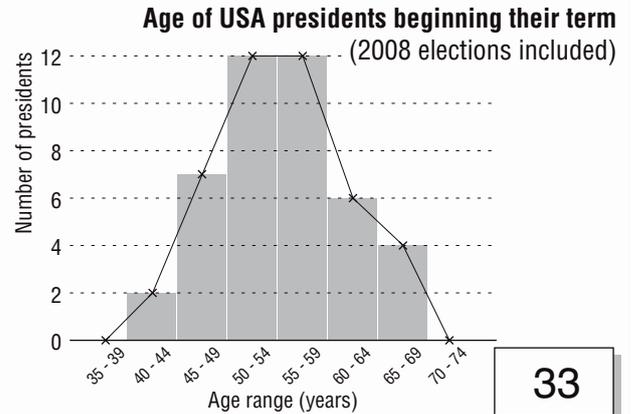
5

29. [Angles]
Find the value of x° .



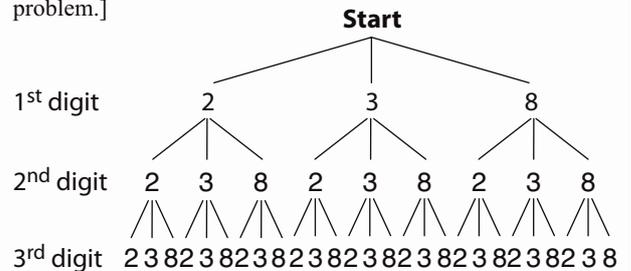
30°

30. [Statistics]
How many presidents began their term in office before the age of 60?



33

31. [Probability]
The numbers 2, 3 and 8 are written on cards. One card is selected at random. The number is recorded, the card is replaced in the deck, and the deck is shuffled. This is repeated a second and third time. Find the probability that the three-digit number formed is greater than 350. [Complete the tree diagram to help solve the problem.]



or 0.4

$\frac{4}{9}$

32. [Problem Solving 1]
Find positive integers a , b and c if:
 $a + a + a = b$,
 $b + a + a = c$ and
 $b + c + a = 18$

$a = 2$ $b = 6$ $c = 10$

33. [Problem Solving 2]
The sum of x consecutive numbers is $10x + 3$. Find the maximum possible value of x .

6

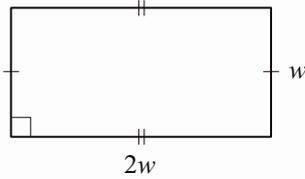


Name:

1. [Long \times ,+] $41.2 \times 17 =$ 700.4
2. [Decimal +,-] $14 - 0.05 + 1.16 =$ 15.11
3. [Decimal \times ,+] $10.8 \div 0.09 =$ 120
4. [Fraction +,-] $\frac{1}{2} - \frac{1}{3} + \frac{1}{6} =$ $\frac{1}{3}$
5. [Fraction \times ,+] $5 \times 5\frac{1}{5} =$ 26
6. [Percentages] If the 10% GST on the price of a TV is \$50, what is the total price? \$ 550
7. [Integer +,-] $(9 - 2) - (2 - 9) =$ 14
8. [Integer \times ,+] $(7 - 5) \times (5 - 7) =$ -4
9. [Rates / Ratios] Find the missing term in the proportion:
 $\frac{x}{5} = \frac{10}{25}$ $x = 2$
10. [Indices] If $5^x = 0.2$, then $x =$ -1
11. [Square Roots / Surds] Simplify $7\sqrt{5} + 3\sqrt{20}$ $13\sqrt{5}$
12. [Order of Operations] $(10001 - 10^4) \times 2010 =$ 2010
13. [Exploring Number] Can you buy 60 litres of LPG at 51.9 cents/L, with \$36? yes
14. [Scientific Notation] Evaluate $(6.3 \times 10^{11}) \div (7 \times 10^{10})$ 9
15. [Number Patterns] Write the first four terms of the sequence $t_n = 22 - 2n$ where $n \geq 1$ 20, 18, 16, 14
16. [Expressions] Using algebraic notation, write three consecutive whole numbers starting with $n + 2$. $n + 2, n + 3, n + 4$
17. [Substitution] If $v = at$ find the speed v , in m/s, when $a = 2 \text{ m/s}^2$ and $t = 15 \text{ s}$. 30 m/s
18. [Expansion] Expand $(p + 3)^2$ $p^2 + 6p + 9$
19. [Factorisation] Factorise and simplify $\frac{x^2 + 5x + 4}{x + 1}$ $x + 4$
20. [Equations] Solve for x :
 $\frac{x}{3} + \frac{x}{5} = 8$ 15
21. [Graphs & Functions] Complete the table:

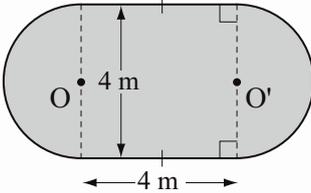
rule	gradient (m)	x -intercept	y -intercept (c)
$y = x - 4$	1	(4,0)	(0,-4)
$y = 2x - 4$	2	(2,0)	(0,-4)
22. [Units of Measurement / Time] How many tonnes are there in $n \text{ kg}$? $\frac{n}{1000}$ tonnes

23. [Perimeter]
Write a formula for the perimeter P of the rectangle.



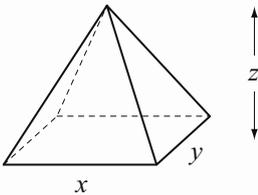
$$P = 6w$$

24. [Area]
Use $\pi \approx 3.14$ to find the area of the shape.



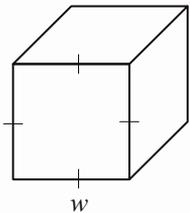
$$28.56 \text{ m}^2$$

25. [Volume]
Using $V = \frac{1}{3} \times \text{base area} \times \text{height}$, write a formula for the volume V of the rectangular pyramid.



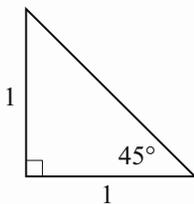
$$V = \frac{xyz}{3}$$

26. [Surface Area]
Write a formula for the total surface area (TSA) of the cube.



$$TSA = 6w^2$$

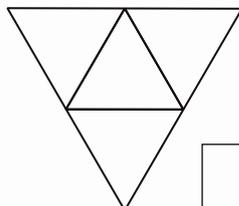
27. [Pythagoras / Trigonometry]
Find the length of the hypotenuse of the isosceles triangle. [Express your answer in surd form.]



$$\sqrt{2}$$

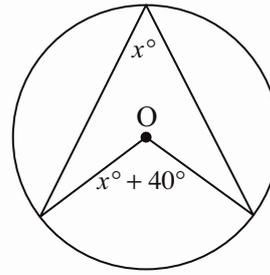
28. [Shape / Location]
What shape can this net be used to make?

- A) cube
- B) square pyramid
- C) triangular prism
- D) rectangular prism
- E) tetrahedron



E

29. [Angles]
Find the value of x° .



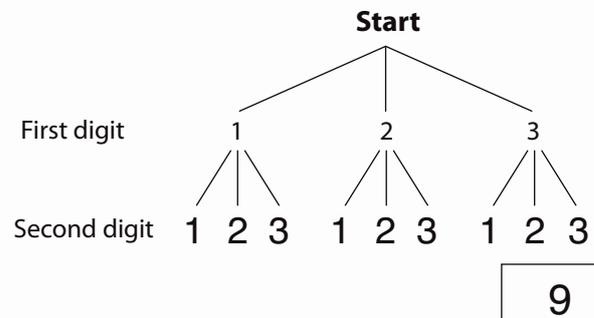
$$40^\circ$$

30. [Statistics]
Calculate the mean and range for the data displayed in the frequency table.

Score	1	2	3	4	5	6
Frequency	7	6	2	2	1	2

$$\text{mean} = 2.5 \quad \text{range} = 5$$

31. [Probability]
How many different two-digit numbers can be made from the digits 1, 2 and 3 if the digits can be used more than once?
[Complete the tree diagram to help solve the problem.]



32. [Problem Solving 1]
Pierre de Fermat, a 17th century French lawyer, stated that any whole number can be written as the sum of four, or fewer, square numbers. For example: $15 = 3^2 + 2^2 + 1^2 + 1^2$
Write 44 as the sum of four, or fewer, square numbers.

$$6^2 + 2^2 + 2^2$$

33. [Problem Solving 2]
What is the last digit in the expansion of 8^{2012} ?

$$6$$

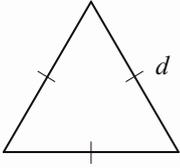


Name:

1. [Long $\times, +$]
 $14.9 \times 45 =$ 670.5
2. [Decimal $+, -$]
 $8 - 0.2 + 1.53 =$ 9.33
3. [Decimal $\times, +$]
 $3 \div 0.03 =$ 100
4. [Fraction $+, -$]
 $\frac{1}{2} + \frac{2}{3} - \frac{1}{6} =$ 1
5. [Fraction $\times, +$]
 $8 \div 1\frac{2}{8} =$ $6\frac{2}{5}$
6. [Percentages]
If the 10% GST on the price of a vase is \$4, what is the total price of the vase? \$ 44
7. [Integer $+, -$]
 $(3 - 8) - (1 - 9) =$ 3
8. [Integer $\times, +$]
 $(4 - 9) \times (4 - 9) =$ 25
9. [Rates / Ratios]
Find the missing term in the proportion:
 $\frac{6}{15} = \frac{x}{25}$ $x = 10$
10. [Indices]
If $10^k = 0.001$, then $k =$ -3
11. [Square Roots / Surds]
Simplify $6 + 3\sqrt{2} - 5 + \sqrt{8}$ $1 + 5\sqrt{2}$
12. [Order of Operations]
 $(108 \times 66 \div 9)^0 + 12 =$ 13
13. [Exploring Number]
A fabric costs \$6.30 per metre. How many whole metres can you buy for \$62? 9 m
14. [Scientific Notation]
Evaluate $(1.2 \times 10^7) \div (2 \times 10^3)$ 6000
15. [Number Patterns]
Write the first four terms of the sequence $t_n = 3(n + 2)$ where $n \geq 1$ 9, 12, 15, 18
16. [Expressions]
Using algebraic notation, write three consecutive whole numbers starting with $2n$. $2n, 2n + 1, 2n + 2$
17. [Substitution]
Given $F = ma$ find the force F , in Newtons, when $m = 50$ kg and $a = 9.8$ m/s²
[Note: 1 Newton = 1 kgm/s²] 490 N
18. [Expansion]
Expand and simplify $(2n - 1)(n + 4)$ $2n^2 + 7n - 4$
19. [Factorisation]
Factorise and simplify $\frac{x^2 - 5x + 6}{x - 3}$ $x - 2$
20. [Equations]
Solve for x :
 $\frac{x}{6} - \frac{x}{2} = 3$ -9
21. [Graphs & Functions]
Complete the table:

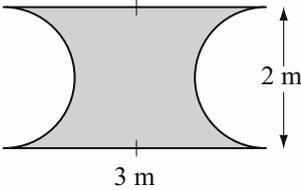
rule	gradient (m)	x -intercept	y -intercept (c)
$y = 2x$	2	(0,0)	(0,0)
$y = 2x - 1$	2	($\frac{1}{2}$, 0)	(0, -1)
22. [Units of Measurement / Time]
How many metres are there in x centimetres? $\frac{x}{100}$ m

23. [Perimeter]
Write a formula for the perimeter P of the triangle.



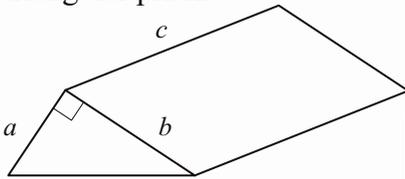
$$P = 3d$$

24. [Area]
Find the area of the shaded region.
(Use $\pi \approx 3.14$)



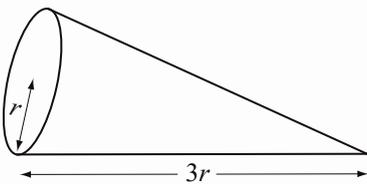
$$2.86 \text{ m}^2$$

25. [Volume]
Write a formula for the volume V of the triangular prism.



$$V = \frac{abc}{2}$$

26. [Surface Area]
Write a simple formula for the total surface area of the cone in terms of the symbols given. [Note: Leave your answer as a multiple of π .]



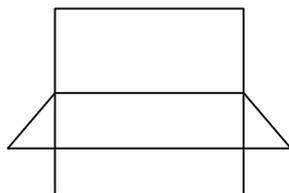
$$TSA = 4\pi r^2$$

27. [Pythagoras / Trigonometry]
A triangle has sides of lengths 33 mm, 44 mm and 55 mm. Is it a right-angled triangle?

yes

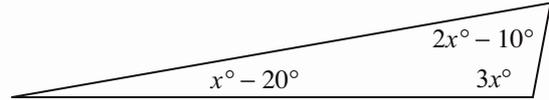
28. [Shape / Location]
What shape can this net be used to make?

- A) cube
- B) square pyramid
- C) triangular prism
- D) rectangular prism
- E) none of the above



C

29. [Angles]
Find the value of the smallest angle in the triangle. [Triangle not drawn to scale.]



15°

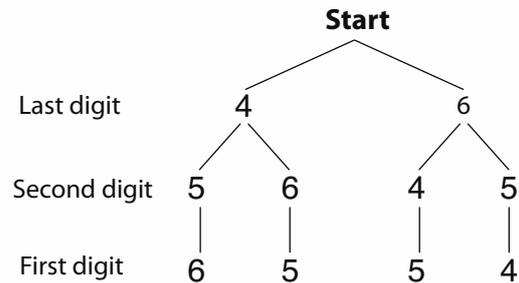
30. [Statistics]
Calculate the mean and range for the data displayed in the frequency table.

Score	1	2	3	4	5
Frequency	3	2	1	4	2

mean = 3

range = 4

31. [Probability]
How many even three-digit numbers can be made using the digits 4, 5 and 6 once each?
[Complete the tree diagram to help solve the problem.]



4

32. [Problem Solving 1]
Pierre de Fermat, a 17th century French lawyer, stated that any whole number can be written as the sum of four, or fewer, square numbers. For example: $15 = 3^2 + 2^2 + 1^2 + 1^2$
Write 47 as the sum of four, or fewer, square numbers.

$$6^2 + 3^2 + 1^2 + 1^2$$

33. [Problem Solving 2]
What is the last digit in the expansion of 7^{77} ?

7

MATHS MATE



Teacher Resource



Teacher's Guide to the Use of Maths Mate
pages i - viii



Student Pad Answers
pages 3 - 72



Student Pad Short Answers
pages 1 - 8



Problem Solving Hints & Solutions
pages 1 - 16



Test Masters
pages 1 - 32



Test Answers
pages 1 - 32



Record Keeping Sheets
pages 1 - 10

MATHS MATE



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

MATHS MATE



Name:

Class:

Teacher:

Worksheet Results

Term 2

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

MATHS MATE



Name:

Class:

Teacher:

Worksheet Results

Term 3

Sheet 1

Sheet 2

Sheet 3

Sheet 4

Sheet 5

Sheet 6

Sheet 7

Sheet 8

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

MATHS MATE



Name:

Class:

Teacher:

Worksheet Results

Term 4

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Sheet 7
Sheet 8

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

MATHS MATE



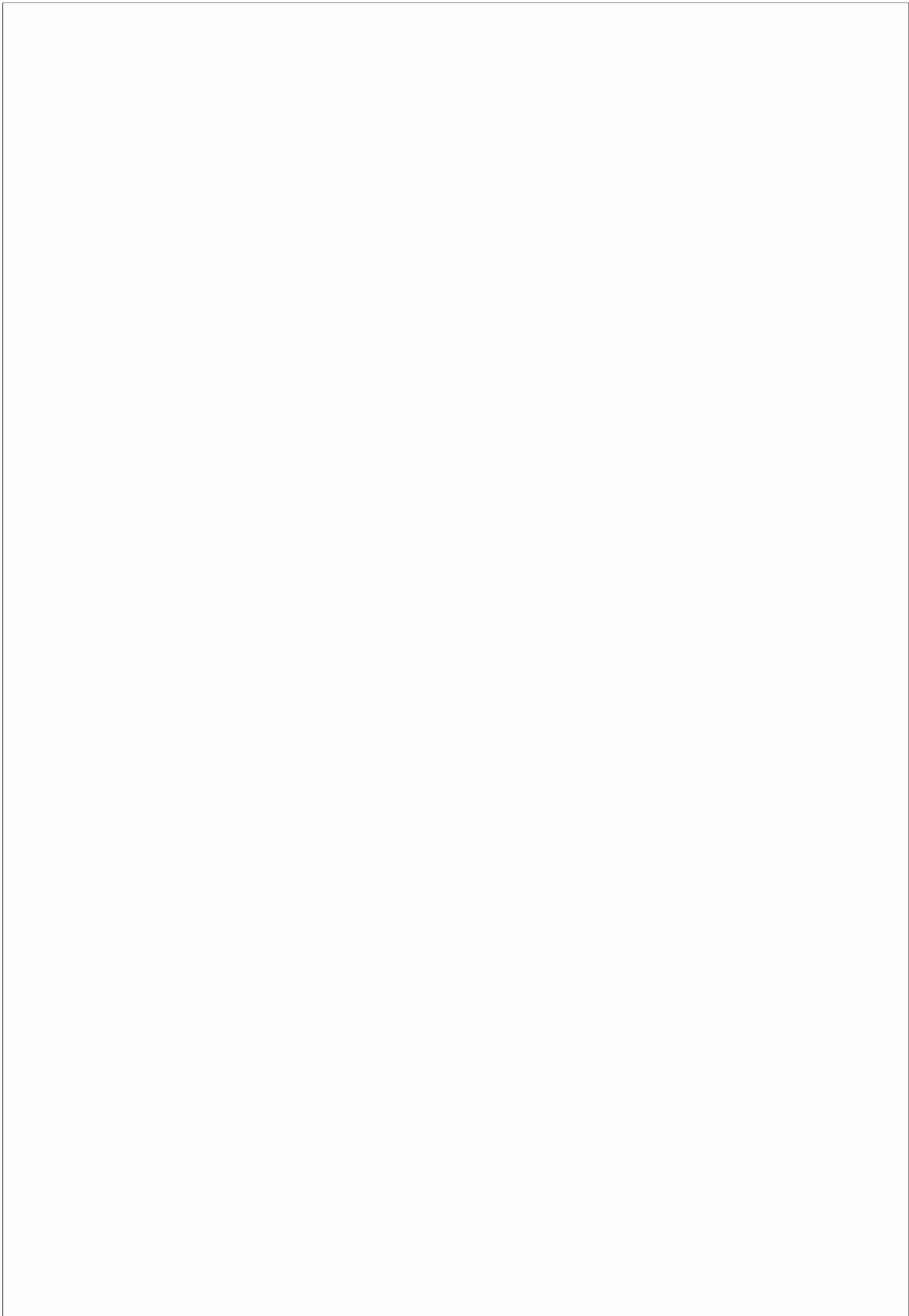
Name:

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Test Results

		Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
NUMBER	1. [Long \times, \div]	1	1	1	1	1	1	1	1
	2. [Decimal $+, -$]	2	2	2	2	2	2	2	2
	3. [Decimal \times, \div]	3	3	3	3	3	3	3	3
	4. [Fraction $+, -$]	4	4	4	4	4	4	4	4
	5. [Fraction \times, \div]	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 \times, \div]	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									





Class:

Teacher:

Worksheet Number	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
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✓ - Signed by parent L - Work handed in late x - Not signed by parent



Class:

Teacher:

Worksheet Number	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8
1								
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✓ - Signed by parent

L - Work handed in late

✗ - Not signed by parent



Class:

Teacher:

Worksheet Number	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
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✓ - Signed by parent L - Work handed in late x - Not signed by parent



Class:

Teacher:

Worksheet Number	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8
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✓ - Signed by parent

L - Work handed in late

✗ - Not signed by parent