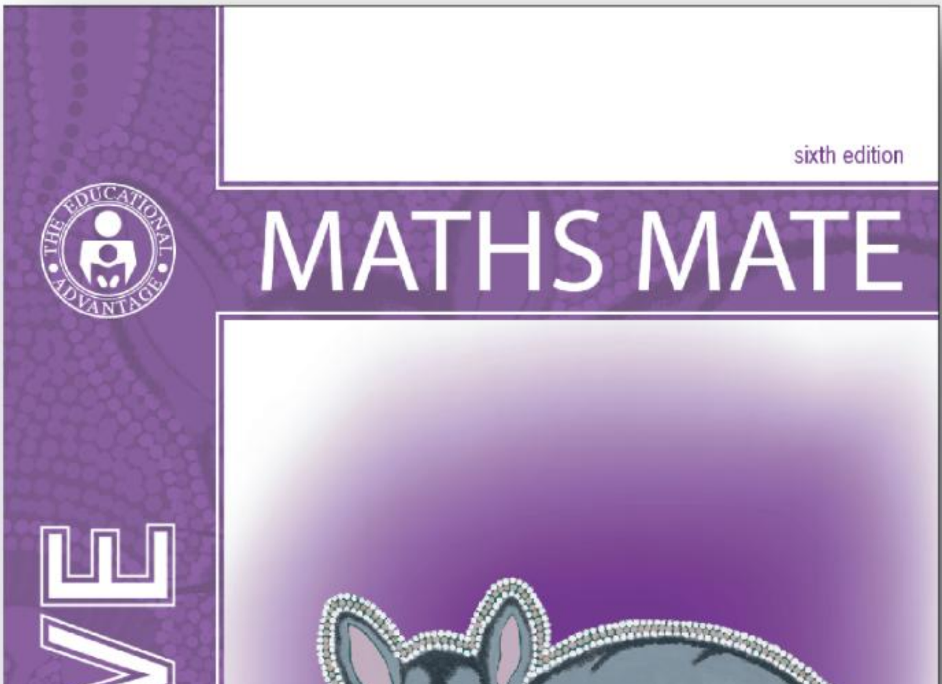
TEACHER RESOURCES

MATHS MATE



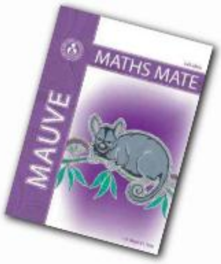
J. B. Wright & I. Tutos

sixth edition

MATHS MATE

MAUVE

Teacher Resource Mauve
(Maths Mate year 9)



- 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

For your free Skill Builder Mauve/Lime contact us:

info@mathsmate.net

J. B. Wright & I. Tutos

MATHS MATE

MAUVE

Teacher Resource

This Teacher Resource PDF
comes with a limited

Lifetime Update Guarantee.

Each time a new edition of the
Maths Mate Program is released,
an upgrade for your
Teacher Resource PDF is available
FREE* of charge
when you contact us direct.

This ensures that each teacher can have the latest edition without your school having to incur any further costs. We have chosen to do this to demonstrate the strength of our belief that access to a Teacher Resource PDF is important in the smooth running and success of the programme.

* The free Teacher Resource PDF is limited to schools that continue to purchase at least 25 student workbooks.

MATHS MATE

Teacher Resources - 6th Edition

ISBN 978 1 925114 70 6

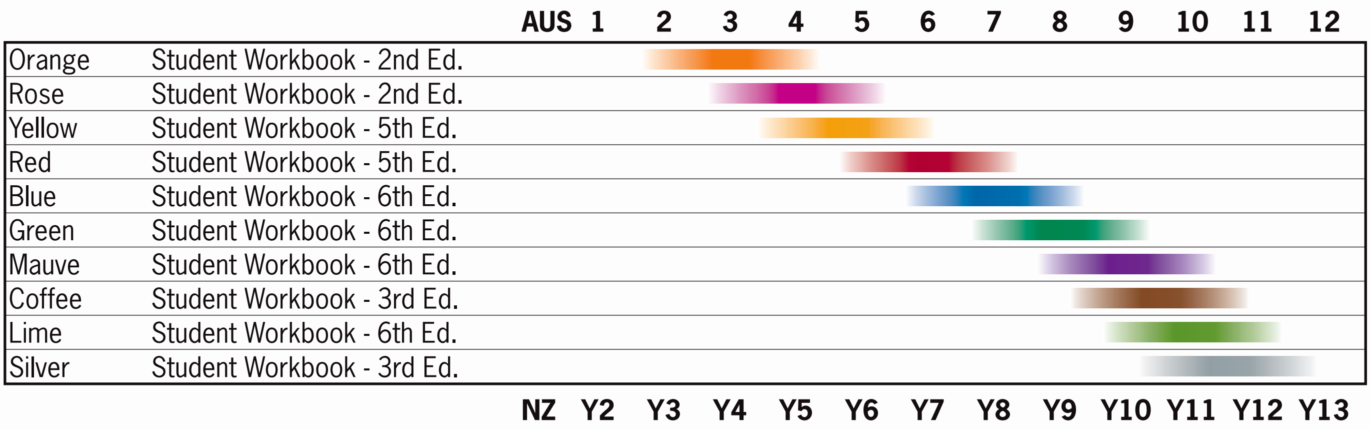
J. B. Wright & I. Tutos

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



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Phone: 647 929 4063
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Maths Mate Mauve cover painting
Ringtailed Possum - 2003
Acrylic on canvas 60 × 50 cm
by Australian artist Susan Betts - Kokata, Mirning and Wirangu.

'Ringtailed Possum' 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, and the potential use of *Skill Builders*, as an inservice exercise prior to the start of the school year. 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

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 and the diagnostic benefits of those results for identification of appropriate *Skill Builders*.

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. Introduce the availability of *Skill Builders*. 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.

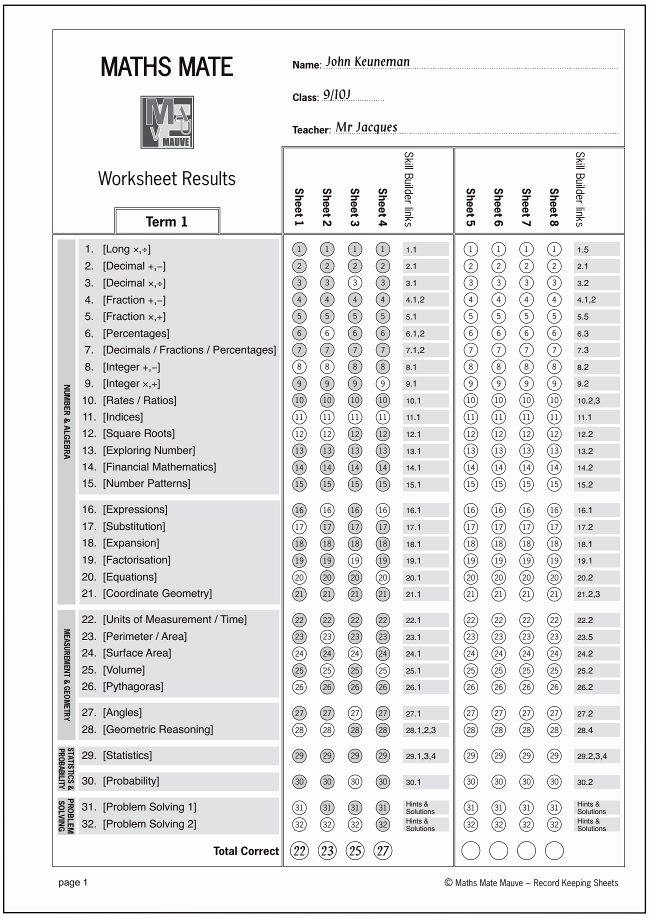
A hard copy of this profile sheet is best kept by the class teacher and handed back to the students every week for them to update during the correction process. Extra copies can be made for those students who would like to have a copy of their own to show their parents (see PDF ~ Record Keeping Sheets,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

WEEK - TO - WEEK:

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 circles 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 circles 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.



MATHS MATE

MAUVE

Worksheet Results

Term 1

Name: John Keuneman

Class: 9/10J

Teacher: Mr Jacques

		Sheet 1	Sheet 2	Sheet 3	Sheet 4	Skill Builder links	Sheet 5	Sheet 6	Sheet 7	Sheet 8	Skill Builder links
NUMBER & ALGEBRA	1. [Long ×,÷]	1	1	1	1	1.1	1	1	1	1	1.5
	2. [Decimal +,–]	2	2	2	2	2.1	2	2	2	2	2.1
	3. [Decimal ×,÷]	3	3	3	3	3.1	3	3	3	3	3.2
	4. [Fraction +,–]	4	4	4	4	4.1,2	4	4	4	4	4.1,2
	5. [Fraction ×,÷]	5	5	5	5	5.1	5	5	5	5	5.5
	6. [Percentages]	6	6	6	6	6.1,2	6	6	6	6	6.3
	7. [Decimals / Fractions / Percentages]	7	7	7	7	7.1,2	7	7	7	7	7.3
	8. [Integer +,–]	8	8	8	8	8.1	8	8	8	8	8.2
	9. [Integer ×,÷]	9	9	9	9	9.1	9	9	9	9	9.2
	10. [Rates / Ratios]	10	10	10	10	10.1	10	10	10	10	10.2,3
	11. [Indices]	11	11	11	11	11.1	11	11	11	11	11.1
	12. [Square Roots]	12	12	12	12	12.1	12	12	12	12	12.2
	13. [Exploring Number]	13	13	13	13	13.1	13	13	13	13	13.2
	14. [Financial Mathematics]	14	14	14	14	14.1	14	14	14	14	14.2
	15. [Number Patterns]	15	15	15	15	15.1	15	15	15	15	15.2
	16. [Expressions]	16	16	16	16	16.1	16	16	16	16	16.1
	17. [Substitution]	17	17	17	17	17.1	17	17	17	17	17.2
	18. [Expansion]	18	18	18	18	18.1	18	18	18	18	18.1
	19. [Factorisation]	19	19	19	19	19.1	19	19	19	19	19.1
	20. [Equations]	20	20	20	20	20.1	20	20	20	20	20.2
	21. [Coordinate Geometry]	21	21	21	21	21.1	21	21	21	21	21.2,3
MEASUREMENT & GEOMETRY	22. [Units of Measurement / Time]	22	22	22	22	22.1	22	22	22	22	22.2
	23. [Perimeter / Area]	23	23	23	23	23.1	23	23	23	23	23.5
	24. [Surface Area]	24	24	24	24	24.1	24	24	24	24	24.2
	25. [Volume]	25	25	25	25	25.1	25	25	25	25	25.2
	26. [Pythagoras]	26	26	26	26	26.1	26	26	26	26	26.2
	27. [Angles]	27	27	27	27	27.1	27	27	27	27	27.2
	28. [Geometric Reasoning]	28	28	28	28	28.1,2,3	28	28	28	28	28.4
STATISTICS & PROBABILITY	29. [Statistics]	29	29	29	29	29.1,3,4	29	29	29	29	29.2,3,4
	30. [Probability]	30	30	30	30	30.1	30	30	30	30	30.2
PROBLEM SOLVING	31. [Problem Solving 1]	31	31	31	31	Hints & Solutions	31	31	31	31	Hints & Solutions
	32. [Problem Solving 2]	32	32	32	32	Hints & Solutions	32	32	32	32	Hints & Solutions
	Total Correct	22	23	25	27						

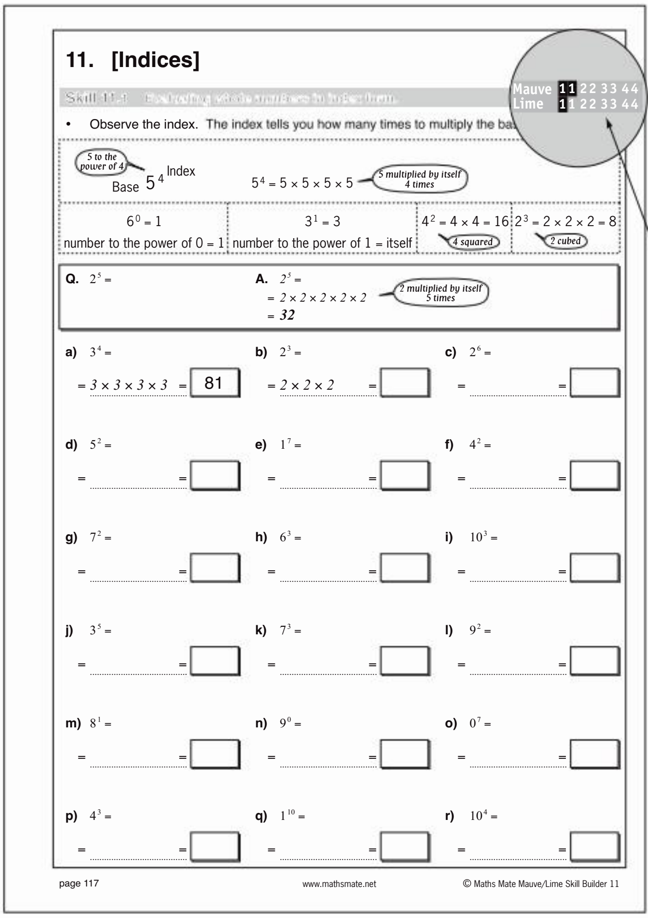
page 1 © Maths Mate Mauve ~ Record Keeping Sheets

Fig. 1 - Sample *Worksheet Results* sheet

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 14). 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 and select a relevant *Skill Builder* sheet if appropriate. *Skill Builder* links are listed beside each set of four worksheets (see Fig. 1). Students should work through the *Skill Builders* in order. Where possible the skills are arranged in increasing degree of difficulty. Be aware that some skills may require the knowledge of previous skills. Generally when a student has several areas of weakness, he or she should work on the lowest numbered question first. For example, students struggling with Q5 and Q7 will need to build skills required for Q5 before they can improve Q7.



11. [Indices]

Mauve 11 22 33 44
Lime 11 22 33 44

Skill 11.1 Evaluating whole numbers in index form

- Observe the index. The index tells you how many times to multiply the ba

5 to the power of 4

Base 5^4 Index

$5^4 = 5 \times 5 \times 5 \times 5$ 5 multiplied by itself 4 times

$6^0 = 1$ number to the power of 0 = 1 | $3^1 = 3$ number to the power of 1 = itself | $4^2 = 4 \times 4 = 16$ 4 squared | $2^3 = 2 \times 2 \times 2 = 8$ 2 cubed

Q. $2^5 =$

A. $2^5 =$
$= 2 \times 2 \times 2 \times 2 \times 2$ 2 multiplied by itself 5 times
$= 32$

a) $3^4 =$ $= 3 \times 3 \times 3 \times 3 =$ 81 **b)** $2^3 =$ $= 2 \times 2 \times 2 =$ **c)** $2^6 =$

d) $5^2 =$ **e)** $1^7 =$ **f)** $4^2 =$

g) $7^2 =$ **h)** $6^3 =$ **i)** $10^3 =$

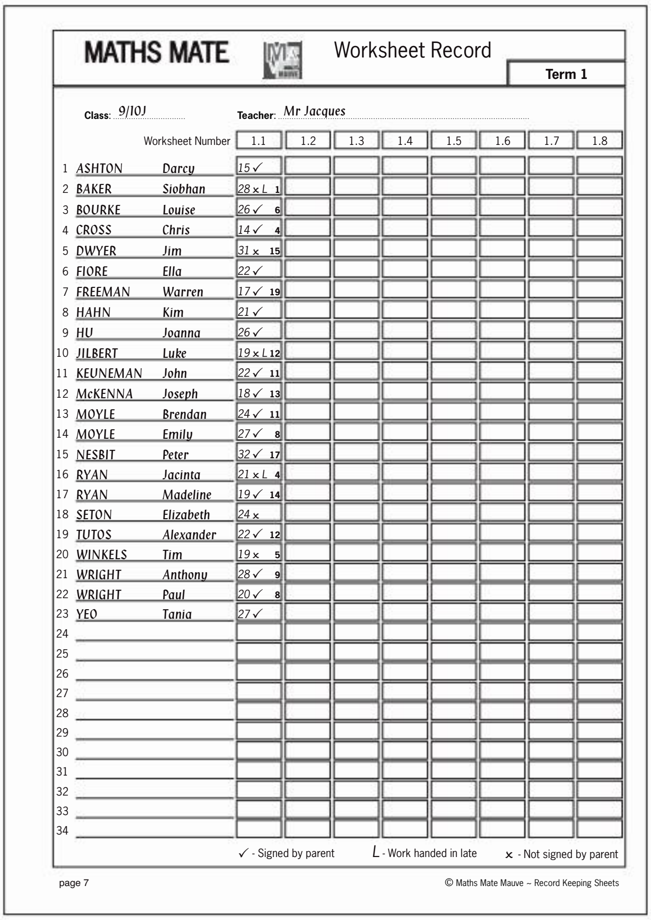
j) $3^5 =$ **k)** $7^3 =$ **l)** $9^2 =$

m) $8^1 =$ **n)** $9^0 =$ **o)** $0^7 =$

p) $4^3 =$ **q)** $1^{10} =$ **r)** $10^4 =$

page 117 www.mathsmate.net © Maths Mate Mauve/Lime Skill Builder 11

Fig. 2 - Sample *Skill Builder* sheet



MATHS MATE Worksheet Record

Term 1

Class: 9/10J Teacher: Mr Jacques

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

page 7 © Maths Mate Mauve ~ Record Keeping Sheets

Fig. 3 - Sample *Worksheet Record* sheet

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 Mauve (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. Generally too, the *Skill Builders* can be linked to each set of four similar questions. These links are identified, not only on the *Worksheet Results* sheet but also on the grid at the title of each *Skill Builder* (see Fig. 2). Both references should be helpful for the allocation of *Skill Builders* to students.

Collect the students' Maths Mate worksheets and attached working, the *Worksheet Results* sheets and any completed *Skill Builders*.

Enter Maths Mate results onto your *Worksheet Record*, see Fig. 3 (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. Finally, a record of any *Skill Builder* completed or reward given to the student for good or improving work might be noted.

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

***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 extensively target through instruction and practice, all skills within the related Maths Mate Program except the problem solving questions. The *Skill Builders* also contain a *Glossary* of important facts and reference material that will provide instant help when students experience difficulties. Parents could be reminded of their access to this facility.

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. Mauve~Test 3A and Mauve~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 a *Skill Builder* 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 9/10 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 Q32 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.

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: ....

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.

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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

MAUVE

Teacher Resource

MATHS MATE
Term 1 - Sheet 1

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷]
$63 \times 10 =$ **630**

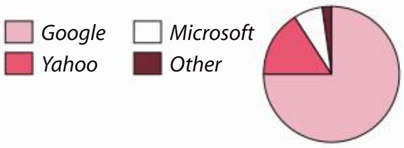
2. [Decimal +,–]
$2.5 + 3.4 =$ **5.9**

3. [Decimal ×,÷]
$0.6 \times 3 =$ **1.8**

4. [Fraction +,–]
$\frac{1}{5} + \frac{3}{5} =$ $\frac{4}{5}$

5. [Fraction ×,÷]
$3 \times \frac{1}{5} =$ $\frac{3}{5}$

6. [Percentages]
What percentage of web searches are conducted using Google?



75%

7. [Decimals / Fractions / Percentages] *
Place in ascending order:
0.125, 0.025, 0.215, 0.052

0.025, 0.052, 0.125, 0.215

8. [Integer +,–]
$(+5) + (+3) =$ **8**

9. [Integer ×,÷]
$(-5) \times (+5) =$ **–25**

10. [Rates / Ratios]
3000 books sold in 10 days =

300 books per day

11. [Indices]
$10^2 =$ **100**

12. [Square Roots]
$\sqrt{16} =$ **4**

13. [Exploring Number] *
$8 \times 3 - 3 \times 5 =$ **9**

14. [Financial Mathematics] *
Kyle saves $20 per fortnight for a year. How much does Kyle save?

$ **520**

15. [Number Patterns]
What is the value of the missing term in the pattern?

position	1	2	3	4	5
term	2	9	16	23	?

30

16. [Expressions]
Write as an expression:
The total of n and 16

$n + 16$

17. [Substitution] *
If $m = 0$, find the value of $m + 15$ **15**

18. [Expansion]
Expand $5(n - 1)$ $5n - 5$

19. [Factorisation]
Factorise $5x - 15$ $5(x - 3)$

20. [Equations] *
Solve for x: $x + 7 = 10$ **3**

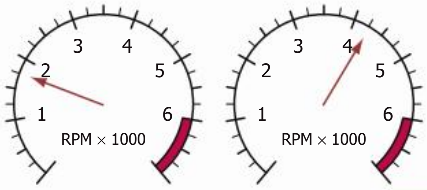
21. [Coordinate Geometry]
Complete the table of values for the linear rule $y = x - 5$

x	$y = x - 5$	y	(x, y)
–3	$y = -3 - 5$	–8	(–3 , –8)
–1	$y = -1 - 5$	–6	(–1 , –6)
1	$y = 1 - 5$	–4	(1 , –4)
3	$y = 3 - 5$	–2	(3 , –2)
5	$y = 5 - 5$	0	(5 , 0)

QUOTE OF THE WEEK: The more you say the less people remember. Francis Fenelon

22. [Units of Measurement / Time] ✻

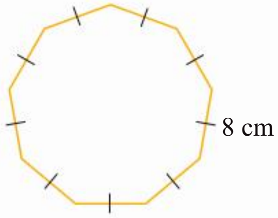
What is the difference in revolutions per minute (RPM) between the two vehicles?



2500 RPM

23. [Perimeter / Area] ✻

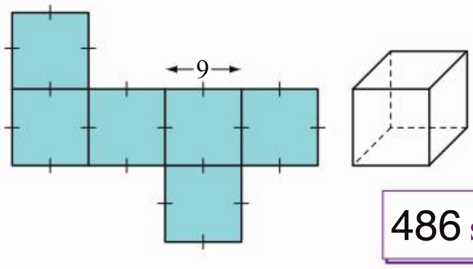
Find the perimeter of the nonagon.



72 cm

24. [Surface Area] ✻

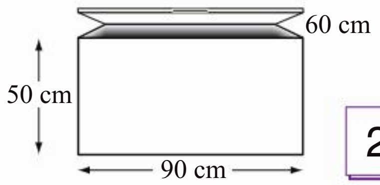
Find the total surface area of the cube by finding the area of its net.



486 sq. units

25. [Volume] ✻

This freezer is a rectangular prism. What is the volume of the freezer?



270 000 cm^3

26. [Pythagoras]

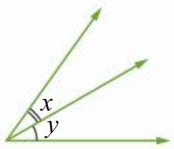
Find the positive solution for c:
$c^2 = 100$

10

27. [Angles]

Which would describe the pair of angles marked x and y in this diagram?

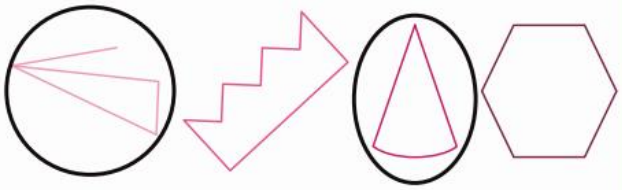
A) obtuse
B) adjacent
C) complementary



B

28. [Geometric Reasoning]

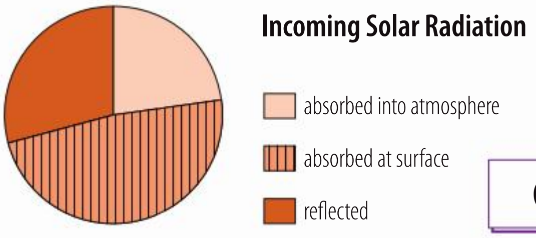
Circle the shapes that are **not** polygons.



29. [Statistics]

Of the total incoming solar radiation which fraction is closest to the amount of radiation absorbed into the atmosphere?

A) $\frac{1}{6}$ B) $\frac{1}{5}$ C) $\frac{1}{4}$ D) $\frac{1}{3}$



C

30. [Probability]

Which letter A to E describes the probability of this event?

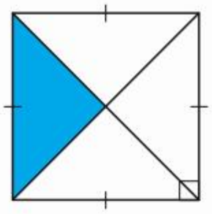
'An even number turns up when a standard die is rolled.'

Impossible ←	Unlikely	Equally likely	Likely	→ Certain
0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1
A	**B**	**C**	**D**	**E**

C

31. [Problem Solving 1] ✻

The shaded region has an area of 16 cm^2.
What is the perimeter of the square?



32 cm

32. [Problem Solving 2] ✻

Each letter stands for a different digit. What number does ABC represent?

$$\begin{array}{r} A\ A \\ B\ B \\ +\quad C\ C \\ \hline A\ B\ C \end{array}$$

198

MATHS MATE
Term 1 - Sheet 2

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$97 \times 20 =$ **1940**

2. [Decimal +,–]

$0.03 + 0.04 =$ **0.07**

3. [Decimal ×,÷] *

$3.5 \times 7 =$ **24.5**

4. [Fraction +,–]

$\frac{7}{9} - \frac{5}{9} =$ $\frac{2}{9}$

5. [Fraction ×,÷] *

$\frac{4}{9} \times 4 =$ $1\frac{7}{9}$

6. [Percentages] *

Of the slopes at Thredbo 16% are classified Beginner, 67% Intermediate and the rest Advanced. What percentage of slopes are Advanced? **17%**

7. [Decimals / Fractions / Percentages] *

Place in descending order:

0.209, 0.092, 0.029, 0.902

0.902, 0.209, 0.092, 0.029

8. [Integer +,–]

$(+7) + (-2) =$ **5**

9. [Integer ×,÷]

$(+2) \times (+8) =$ **16**

10. [Rates / Ratios]

24 minutes for 6 songs =

4 minutes per song

11. [Indices]

$2^4 =$ **16**

12. [Square Roots]

$\sqrt{36} =$ **6**

13. [Exploring Number] *

$6 + 8 \div 4 \times 3 =$ **12**

14. [Financial Mathematics] *

How much can I save in a year if I earn $200 per week and my weekly expenses are as shown?

Expense	Cost
Junk food	$25
Entertainment	$40
Clothes	$30
Other	$25

$ **4160**

15. [Number Patterns]

What is the value of the missing term in the pattern?

position	1	2	3	4	5	6
term	3	12	48	192	768	?

3072

16. [Expressions]

Write as an expression:

A number that is equal to thirty times x

$30x$

or $30 \times x$

17. [Substitution] *

If $k = 0$, find the value of $20 - k$ **20**

18. [Expansion]

Expand $3(p + 6)$ **$3p + 18$**

19. [Factorisation]

Factorise $6m - 2$ **$2(3m - 1)$**

20. [Equations] *

Solve for x: $x - 5 = 3$ **8**

21. [Coordinate Geometry]a

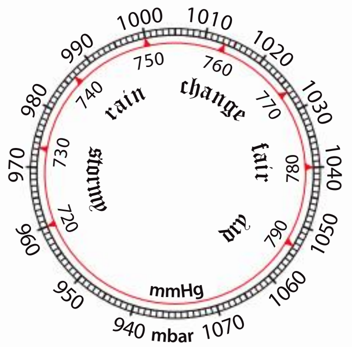
Complete the table of values for the linear rule $y = 2x - 3$

x	$y = 2x - 3$	y	(x, y)
0	$y = 2 \times 0 - 3$	–3	(0 , –3)
0.5	$y = 2 \times 0.5 - 3$	–2	(0.5 , –2)
1	$y = 2 \times 1 - 3$	–1	(1 , –1)
1.5	$y = 2 \times 1.5 - 3$	0	(1.5 , 0)
2	$y = 2 \times 2 - 3$	1	(2 , 1)

QUOTE OF THE WEEK: Adopt a teenager while they still know everything.

22. [Units of Measurement / Time] *

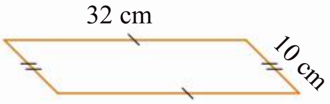
How many millimetres of mercury (mmHg) equal 1020 millibars (mbar) of pressure?



765 mmHg

23. [Perimeter / Area] *

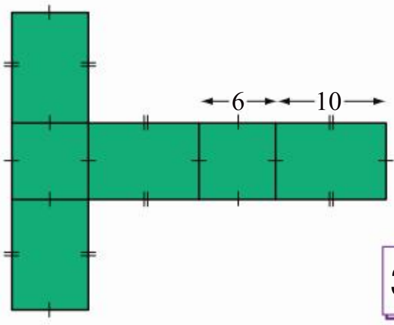
Find the perimeter of the parallelogram.

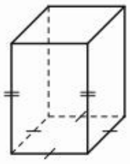


84 cm

24. [Surface Area] *

Find the total surface area of the square prism by finding the area of its net.

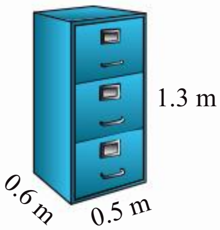




312 sq. units

25. [Volume] *

Find the volume of the rectangular prism.



0.39 m^3

26. [Pythagoras]

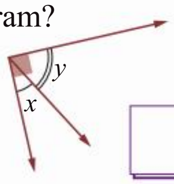
Find the positive solution for b:
$b^2 = 225$

15

27. [Angles]

Which would describe the pair of angles marked x and y in this diagram?

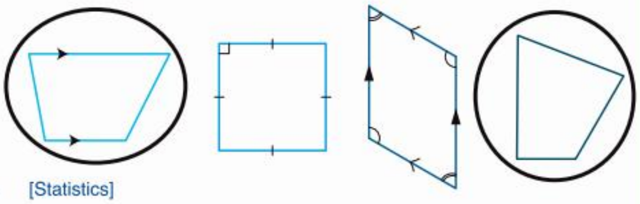
A) vertically opposite
B) reflex
C) complementary



C

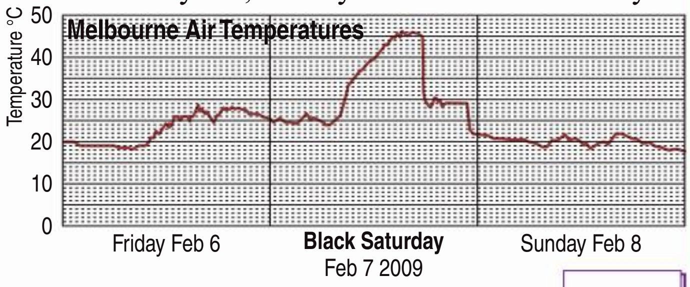
28. [Geometric Reasoning]

Circle the shapes that are **not** parallelograms.



29. [Statistics]

What was the maximum temperature on Friday February 6th, the day before Black Saturday?



29°C

30. [Probability]

Which letter A to G describes the probability of this event?

'A month beginning with an M will follow if this month begins with a J.'

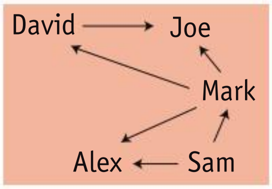
Impossible ← Unlikely — Equally likely — Likely → Certain

0	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$	1
A	**B**	**C**	**D**	**E**	**F**	**G**

A

31. [Problem Solving 1] *

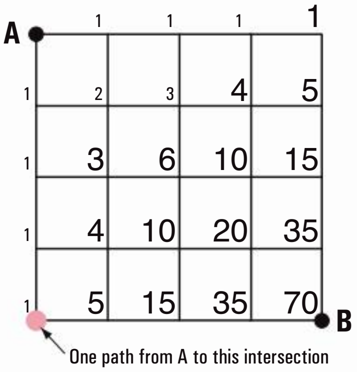
If David ⟶ Joe means 'David is taller than Joe', who is the tallest?



Sam

32. [Problem Solving 2] *

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.]



70

MATHS MATE

Term 1 - Sheet 3

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$78 \times 30 =$ **2340**

2. [Decimal +,−]

$4.78 + 6.92 =$ **11.7**

3. [Decimal ×,÷] *

$14.78 \times 4 =$ **59.12**

4. [Fraction +,−]

$\frac{4}{11} + \frac{4}{11} =$ $\frac{8}{11}$

5. [Fraction ×,÷] *

$2 \times \frac{1}{6} =$ $\frac{1}{3}$

6. [Percentages] *

The energy in cashew nuts comes from fats, carbohydrates and proteins. If 16% comes from carbohydrates and 9% from proteins, how much energy is supplied by fats? **75%**

7. [Decimals / Fractions / Percentages] *

Place in ascending order:

$\frac{3}{5}, \frac{7}{10}, \frac{57}{100}$ — $\frac{57}{100}, \frac{3}{5}, \frac{7}{10}$

8. [Integer +,−]

$(-8) + (-1) =$ **−9**

9. [Integer ×,÷]

$(+4) \times (-7) =$ **−28**

10. [Rates / Ratios] *

A 5-pack of T-shirts cost $25.95. What is the price per T-shirt? [Give the answer correct to 2 decimal places.]

$ 5.19

11. [Indices]

$3^3 =$ **27**

12. [Square Roots]

$\sqrt{144} =$ **12**

13. [Exploring Number] *

$4 \times (5 - 2) \times 5 =$ **60**

14. [Financial Mathematics] *

Circus tickets cost $8 per student if bought at the gate. The online price is $5 each. What is the online saving for a class of 25 students?

$ 75

15. [Number Patterns]

What is the value of the missing term in the pattern?

position	1	2	3	4	5	6
term	18	13	8	3	−2	?

−7

16. [Expressions]

Write as an expression:

m decreased by 200 — $m - 200$

17. [Substitution] *

If $s = 0$, find the value of $5s$ **0**

18. [Expansion]

Expand $9(x - 2)$ — $9x - 18$

19. [Factorisation]

Factorise $12p + 24m$ — $12(p + 2m)$

20. [Equations] *

Solve for x: $12 + x = 3$ — **−9**

21. [Coordinate Geometry]

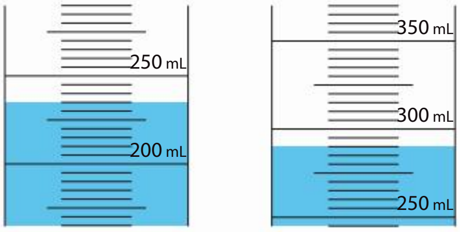
Complete the table of values for the linear rule $y = -x + 4$

x	$y = -x + 4$	y	(x, y)
−4	$y = -(-4) + 4$	8	(−4 , 8)
−2	$y = -(-2) + 4$	6	(−2 , 6)
0	$y = 0 + 4$	4	(0 , 4)
2	$y = -2 + 4$	2	(2 , 2)
4	$y = -4 + 4$	0	(4 , 0)

QUOTE OF THE WEEK: Do not wish to be anything but what you are, and try to be that perfectly. St. Francis De Sales

22. [Units of Measurement / Time] *

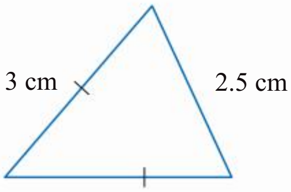
How much more water is in the second cylinder?



55 mL

23. [Perimeter / Area] *

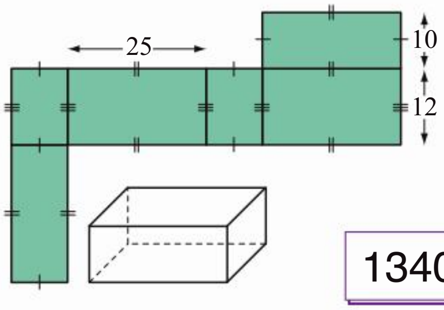
Find the perimeter of the isosceles triangle.



8.5 cm

24. [Surface Area] *

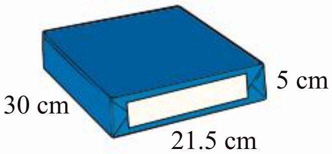
Find the total surface area of the rectangular prism by finding the area of its net.



1340 sq. units

25. [Volume] *

Find the volume of the ream of paper.



3225 cm^3

26. [Pythagoras] *

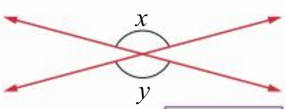
Find the positive solution for c:
$c^2 = 5^2 + 12^2$

13

27. [Angles]

Which would describe the pair of angles marked x and y in this diagram?

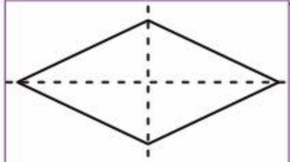
A) vertically opposite
B) supplementary
C) acute



A

28. [Geometric Reasoning]

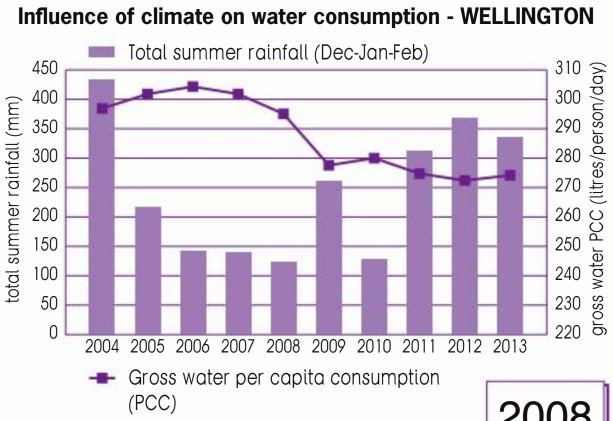
Draw and name the quadrilateral which has diagonals that are different in length and has two axes of symmetry.



rhombus

29. [Statistics]

Which year registered the lowest summer rainfall in Wellington?

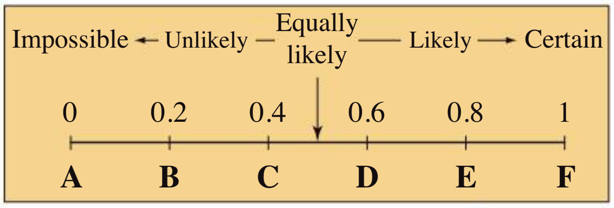


2008

30. [Probability]

Which letter A to F best describes the probability of this event?

'Heads or tails will show uppermost when a coin is tossed.'



F

31. [Problem Solving 1] *

Use the digits 1, 2, 3 and 4 (once each) to complete this multiplication so that the answer is as large as possible.

```
      4 1
   ×  3 2
   ------
      8 2
  1 2 3 0
  -------
  1 3 1 2
```

32. [Problem Solving 2] *

The four digits 6, 7, 8 and 9 can be arranged to form 24 different four-digit numbers. If these numbers are arranged from smallest to largest, which number is in the seventeenth position?

8967

MATHS MATE

Term 1 - Sheet 4

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷]
$320 \times 100 =$ **32 000**

2. [Decimal +,–]
$3.96 + 0.07 =$ **4.03**

3. [Decimal ×,÷] *
$1.039 \times 8 =$ **8.312**

4. [Fraction +,–]
$\frac{11}{15} - \frac{7}{15} =$ $\frac{4}{15}$

5. [Fraction ×,÷] *
$\frac{7}{10} \times 20 =$ **14**

6. [Percentages] *
Solder is made up of 28% zinc, 15% tin and the rest copper. What percentage is copper?
57%

7. [Decimals / Fractions / Percentages] *
Place in descending order:
$\frac{3}{10}, \frac{7}{20}, \frac{27}{100}$
$\frac{7}{20}, \frac{3}{10}, \frac{27}{100}$

8. [Integer +,–]
$(-4) + (+7) =$ **3**

9. [Integer ×,÷]
$(-9) \times (-4) =$ **36**

10. [Rates / Ratios] *
A 4 kg bag of capsicums is sold for $11.00. What is the cost per kilogram?
$ **2.75** /kg

11. [Indices]
$4^3 =$ **64**

12. [Square Roots]
$\sqrt{1600} =$ **40**

13. [Exploring Number] *
$(6 + 13) - (8 + 4) =$ **7**

14. [Financial Mathematics] *
Ian's car insurance direct debit is $48.60 per month. How much does he save if he pays the up-front annual amount of $490?
$ **93.20**

15. [Number Patterns]
What is the value of the missing term in the pattern?

position	1	2	3	4	5	6
term	–1	2	–4	8	–16	?

32

16. [Expressions]
Write as an expression:
The product of –6 and a
$-6a$
or $-6 \times a$

17. [Substitution] *
If $d = 0$, find the value of $\frac{d}{12}$ **0**

18. [Expansion]
Expand $4(a + 5)$ $4a + 20$

19. [Factorisation]
Factorise $3a - 18b$ $3(a - 6b)$

20. [Equations] *
Solve for x: $9 - x = 4$ **5**

21. [Coordinate Geometry]
Complete the table of values for the linear rule $y = -3x - 6$

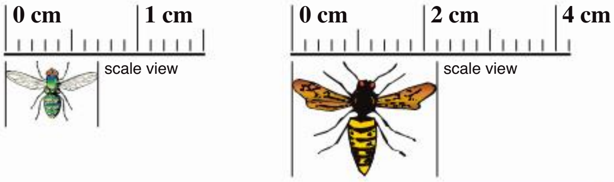
x	$y = -3x - 6$	y	(x , y)
–4	$y = -3 \times (-4) - 6$	6	(–4 , 6)
–2	$y = -3 \times (-2) - 6$	0	(–2 , 0)
0	$y = -3 \times 0 - 6$	–6	(0 , –6)
2	$y = -3 \times 2 - 6$	–12	(2 , –12)
4	$y = -3 \times 4 - 6$	–18	(4 , –18)

QUOTE OF THE WEEK: The man who confesses his ignorance shows it once; he who tries to conceal it shows it many times. Japanese Proverb.

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

22. [Units of Measurement / Time] *

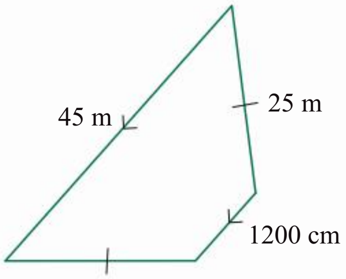
By how many millimetres is the wingspan of the wasp bigger than the fly?



15 mm

23. [Perimeter / Area] *

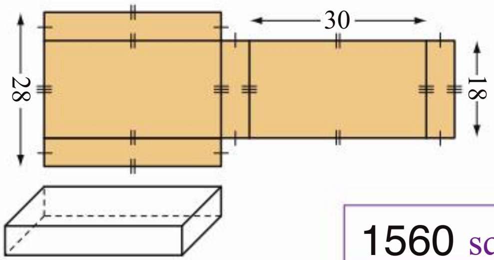
Find the perimeter of the trapezium in metres.



107 m

24. [Surface Area] *

Find the total surface area of the rectangular prism by finding the area of its net.



1560 sq. units

25. [Volume] *

Each ice cube has a side length of 2 cm. What is the volume of ice in this tray?

96 cm^3

26. [Pythagoras] *

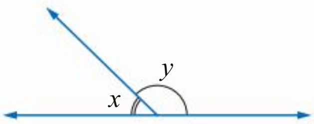
Find the positive solution for a:
$a^2 = 20^2 - 16^2$

12

27. [Angles]

Which would describe the pair of angles marked x and y in this diagram?

A) straight
B) supplementary
C) right

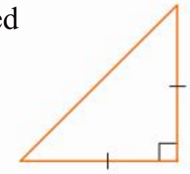


B

28. [Geometric Reasoning]

Which two options describe this triangle?

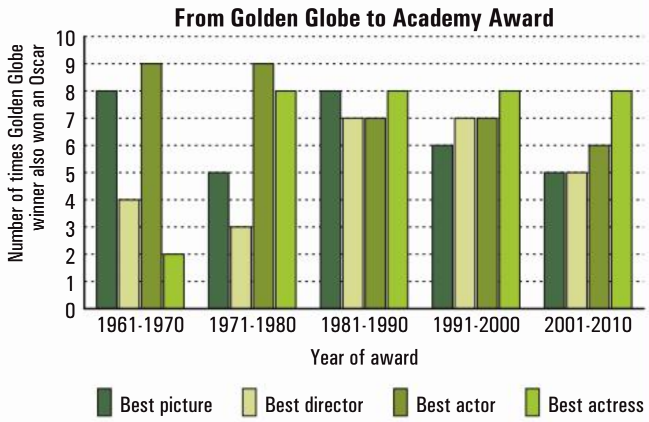
A) right-angled
B) isosceles
C) equilateral



A and B

29. [Statistics]

From 1961 to 2010 how many times did a Golden Globe best actress winner miss out on an Oscar for the same movie?

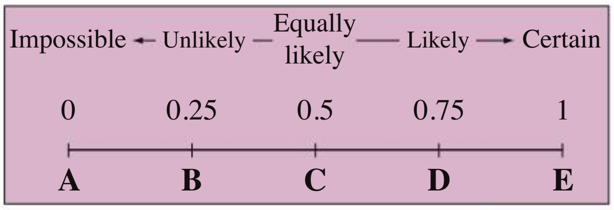


16

30. [Probability]

Which letter A to E describes the probability of this event?

'One of your 5 tickets in a 20-ticket lottery will win.'



B

31. [Problem Solving 1] *

A number of students are standing in a circle. They are evenly spaced and the sixth student is directly opposite the fifteenth student. How many students are there altogether?

18

32. [Problem Solving 2] *

Complete the addition table.

+	12	5	6	7
3	15	8	9	10
16	28	21	22	23
8	20	13	14	15
7	19	12	13	14

MATHS MATE
Term 1 - Sheet 5

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷]
$19\,000 \div 10 =$ **1900**

2. [Decimal +,–] *
$47.78 + 6 =$ **53.78**

3. [Decimal ×,÷]
$3.24 \times 10 =$ **32.4**

4. [Fraction +,–] *
$\frac{9}{11} + \frac{3}{11} =$ $1\frac{1}{11}$

5. [Fraction ×,÷] *
$\frac{3}{5} \div \frac{4}{3} =$ $\frac{9}{20}$

6. [Percentages] *
60% of \$800 = **\$ 480**

7. [Decimals / Fractions / Percentages] *
Complete the equivalent fractions:
$\frac{2}{3} = \frac{16}{24}$

8. [Integer +,–]
$(+9) - (+5) =$ **4**

9. [Integer ×,÷]
$(+24) \div (+12) =$ **2**

10. [Rates / Ratios] *
Simplify 2 days : 2 weeks **1 : 7**

11. [Indices]
$1^{10} =$ **1**

12. [Square Roots]
$\sqrt{\frac{1}{9}} =$ $\frac{1}{3}$

13. [Exploring Number] *
$(3 \times 4)^2 =$ **144**

14. [Financial Mathematics] *
A dinner costs \$89.75. Your share of the bill is 20%. Estimate to the nearest dollar, the size of your share.
\$ 18

15. [Number Patterns]
Complete the pattern:
2 , 4 , 8 , 14 , 22 , **32** , **44**

16. [Expressions]
In a right-angled triangle, one acute angle is x degrees. Write an expression in terms of x for the size of the other acute angle.
$90 - x$

17. [Substitution] *
If $x = 2$, find the value of $x + 10$ **12**

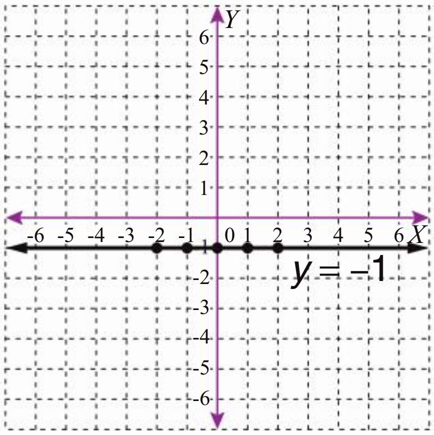
18. [Expansion]
Expand $2(2d + 3)$ $4d + 6$

19. [Factorisation]
Factorise $6y - 10$ $2(3y - 5)$

20. [Equations] *
Solve for x: $\frac{x}{2} = 5$ **10**

21. [Coordinate Geometry]
Graph the line of equation $y = -1$ by first completing this table of values.
[Label the line with the rule.]

x	–2	–1	0	1	2
y	–1	–1	–1	–1	–1



QUOTE OF THE WEEK: When you think you've seen the light at the end of the tunnel, take care. It's probably a train coming from the opposite direction. Rossiter

22. [Units of Measurement / Time]

The most appropriate unit for measuring the capacity of a water tank is:

A) square centimetres
B) cubic millimetres
C) litres
D) millilitres

C

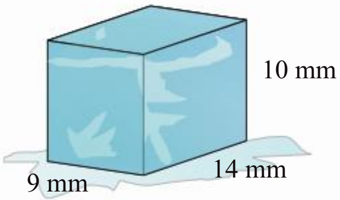
23. [Perimeter / Area] *

The rectangular screen of a high-definition television set is 71 cm wide and 40 cm high. What is its area?

2840 cm^2

24. [Surface Area] *

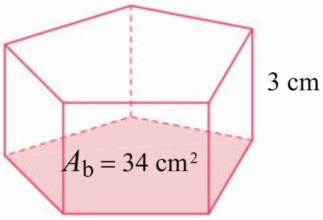
Find the total surface area of the ice block.



712 mm^2

25. [Volume] *

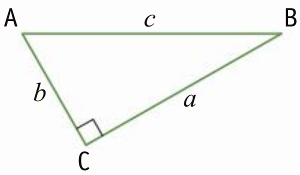
Using $V =$ Area of base $(A_b) \times$ height (h), find the volume of the pentagonal prism.



102 cm^3

26. [Pythagoras]

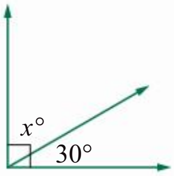
Which letter marks the hypotenuse in this right-angled triangle?



c

27. [Angles] *

Find the value of $x°$.



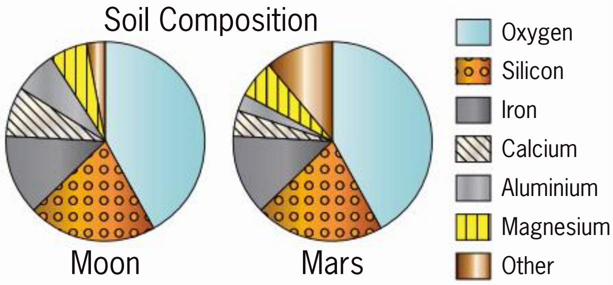
60°

28. [Geometric Reasoning]

Circle the shapes that do not have rotational symmetry.

29. [Statistics]

Which two elements are twice as common on the moon as they are on Mars?



calcium & aluminium

30. [Probability] *

A standard die is rolled. What is the probability of rolling a number greater than 4?
[Give your answer as a fraction in simplest form.]

$\frac{1}{3}$

31. [Problem Solving 1] *

Complete the sixth line of Pascal's triangle.

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

32. [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 spots.]

Guess	Cows	Bulls
2 4 5	2	–
3 5 4	2	–
4 2 3	2	–

532

MATHS MATE

Term 1 - Sheet 6

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷]
$24\,800 \div 100 =$ **248**

2. [Decimal +,−] *
$19.362 + 6.638 =$ **26**

3. [Decimal ×,÷]
$100 \times 0.2 =$ **20**

4. [Fraction +,−] *
$\frac{17}{5} - \frac{9}{5} =$ $1\frac{3}{5}$

5. [Fraction ×,÷] *
$\frac{1}{2} \div \frac{2}{7} =$ $1\frac{3}{4}$

6. [Percentages] *
20% of \$700 = **\$ 140**

7. [Decimals / Fractions / Percentages] *
Complete the equivalent fractions: $\frac{3}{5} = \frac{15}{25}$

8. [Integer +,−]
$(-6) - (-3) =$ **−3**

9. [Integer ×,÷]
$(-4) \div (+4) =$ **−1**

10. [Rates / Ratios] *
The average length of the largest mammal is 25 m and of the largest fish, 10 m. Find the ratio of largest mammal to largest fish lengths. **5 : 2**

11. [Indices]
$4^0 =$ **1**

12. [Square Roots]
$\sqrt{\frac{81}{100}} =$ $\frac{9}{10}$

13. [Exploring Number] *
$(4 + 2 \times 6)^2 =$ **256**

14. [Financial Mathematics] *
The new jeans cost \$109.95. Mum contributes 20% of the cost. Estimate to the nearest dolllar, how much you need to save. **\$ 88**

15. [Number Patterns]
Complete the pattern:
1 , 2 , 5 , 10 , 17 , **26** , **37**

16. [Expressions]
Out of z people in the audience, half were parents. How many parents were there in the audience? [Express your answer in terms of z.]
$\frac{z}{2}$ or $z \div 2$

17. [Substitution] *
If $y = 8$, find the value of $13 - y$ **5**

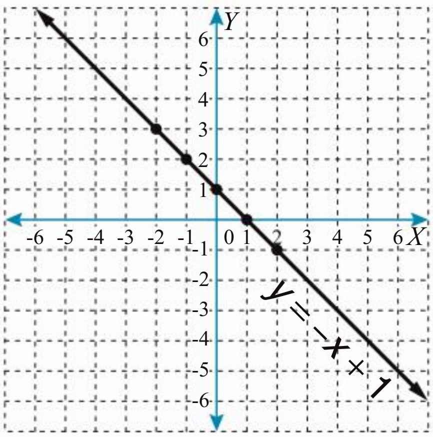
18. [Expansion]
Expand $3(2b - 5)$ **$6b - 15$**

19. [Factorisation]
Factorise $10r + 25$ **$5(2r + 5)$**

20. [Equations] *
Solve for x: $2x = 8$ **4**

21. [Coordinate Geometry] *
Graph the line of equation $y = -x + 1$ by first completing this table of values.
[Label the line with the rule.]

x	−2	−1	0	1	2
y	3	2	1	0	−1
(x,y)	(−2,3)	(−1, 2)	(0 , 1)	(1 , 0)	(2 , −1)



QUOTE OF THE WEEK: Great people have one thing in common - they lack conformity. P. K. Shaw

22. [Units of Measurement / Time]

The most appropriate unit for measuring the area of Disneyland is:

A) square centimetres
B) hectares
C) kilometres
D) cubic metres

B

23. [Perimeter / Area] *

The rectangular floor of the Sistine Chapel is 41 m long and 13.4 m wide. What is its area?

549.4 m^2

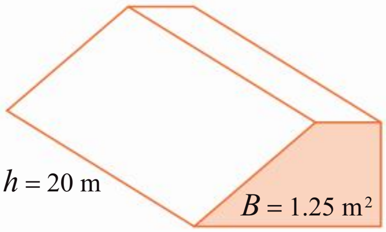
24. [Surface Area] *

Billie wants to make a CD box, open at the top. The box needs a base 13 cm by 200 cm and is to be 15 cm high. How much wood should Billie buy?

8990 cm^2

25. [Volume] *

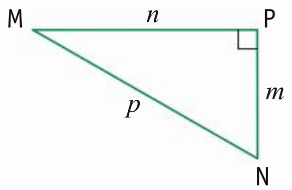
Using $V = Bh$ find the volume of the prism.



25 m^3

26. [Pythagoras]

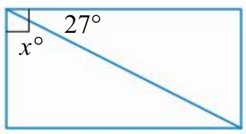
Which letter marks the side opposite to angle M in this right-angled triangle?



m

27. [Angles] *

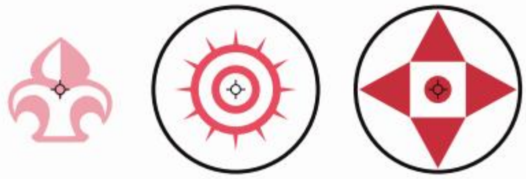
Find the value of $x°$.



63°

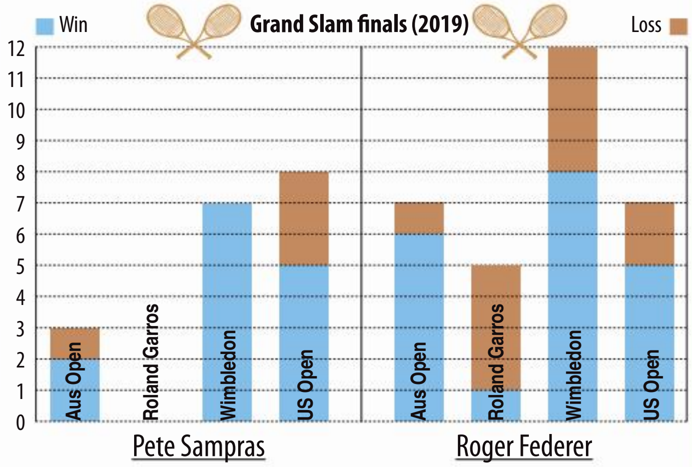
28. [Geometric Reasoning]

Circle the shapes that have rotational symmetry.



29. [Statistics]

In which Grand Slam tournament has Roger Federer lost a third of his finals played?



Wimbledon

30. [Probability] *

A standard die is rolled. What is the probability of rolling a multiple of 3?
[Give your answer as a fraction in simplest form.]

$\frac{1}{3}$

31. [Problem Solving 1] *

An archaeologist found some ancient numbers written as follows:

 for 19

 for 15

and  for 5.

What did  equal?

22

32. [Problem Solving 2] *

Each half of a domino piece is either blank or has a number of 1, 2, 3, 4, 5 or 6 dots on it. If a domino set ranges from a double blank to a double 6 and has no repeats, how many domino pieces are there in the set?

28

MATHS MATE

Term 1 - Sheet 7

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷]
39 330 ÷ 1000 = **39.33**

2. [Decimal +,−] *
17.073 + 5 = **22.073**

3. [Decimal ×,÷]
8.07 × 1000 = **8070**

4. [Fraction +,−] *
$\frac{8}{17} + \frac{10}{17} =$ $1\frac{1}{17}$

5. [Fraction ×,÷] *
$\frac{2}{5} \div \frac{5}{6} =$ $\frac{12}{25}$

6. [Percentages] *
25% of \$5.00 = **\$ 1.25**

7. [Decimals / Fractions / Percentages] *
Complete the equivalent fractions:
$\frac{\boxed{3}}{10} = \frac{15}{\boxed{50}} = \frac{30}{100}$

8. [Integer +,−]
(+4) − (−5) = **9**

9. [Integer ×,÷]
(+18) ÷ (−3) = **−6**

10. [Rates / Ratios] *
A rectangular prism is 24 cm high, 15 cm long and 6 cm wide. Find the ratio of height to length to width for the prism.
8 : 5 : 2

11. [Indices]
$5^1 =$ **5**

12. [Square Roots] *
$\sqrt{12\frac{1}{4}} =$ $3\frac{1}{2}$

13. [Exploring Number] *
$(1 + 7)^2 \div 2 =$ **32**

14. [Financial Mathematics] *
Bed Run compost worms cost \$24.99 for 500 worms. There are 1000 worms in 250 g of the compost. Estimate to the nearest dollar, the cost of 500 g of *Bed Run* compost.
\$ 100

15. [Number Patterns]
Complete the pattern:
41 , 40 , 38 , 35 , 31 , **26** , **20**

16. [Expressions]
Mia planted 5 rows of tomato plants with *t* plants in each row and had 8 plants left over. How many plants did Mia begin with before she started to plant?
[Express your answer in terms of *t*.]
$5t + 8$

17. [Substitution] *
If $z = 3$, find the value of $8z$ **24**

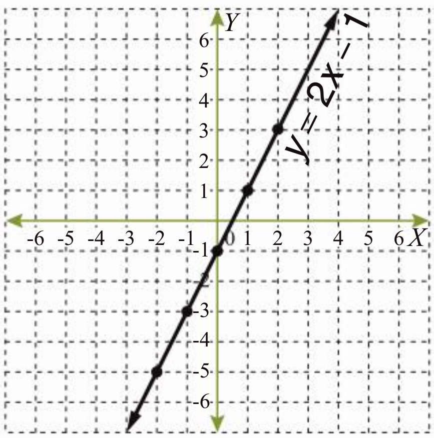
18. [Expansion]
Expand $10(4 - 3a)$ $40 - 30a$

19. [Factorisation]
Factorise $12x - 8y$ $4(3x - 2y)$

20. [Equations] *
Solve for x: $3x = 18$ **6**

21. [Coordinate Geometry] *
Graph the line of equation $y = 2x - 1$ by first completing this table of values.
[Label the line with the rule.]

x	−2	−1	0	1	2
y	−5	−3	−1	1	3
(x,y)	(−2,−5)	(−1,−3)	(0,−1)	(1,1)	(2,3)



QUOTE OF THE WEEK: Frankness is a virtue, but too much frankness is rudeness. Gotschal

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

22. [Units of Measurement / Time]

The most appropriate unit for measuring the weight of a piano is:

A) calories
B) kilograms
C) grams
D) grams per cubic centimetre

B

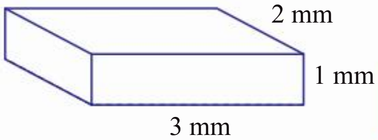
23. [Perimeter / Area] *

The rectangular top of a table tennis table is approximately 270 cm long and 150 cm wide. What is its area?

40 500 cm^2

24. [Surface Area] *

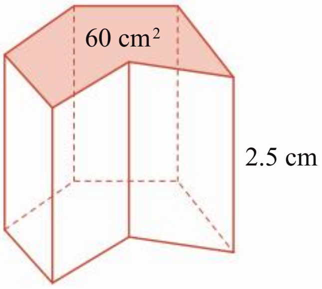
The total surface area of the rectangular prism is 22 mm^2. What is the total surface area if all the dimensions are doubled?



88 mm^2

25. [Volume] *

Find the volume of the prism.

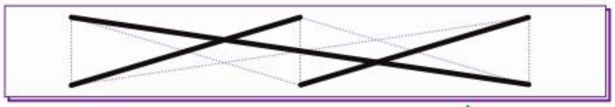


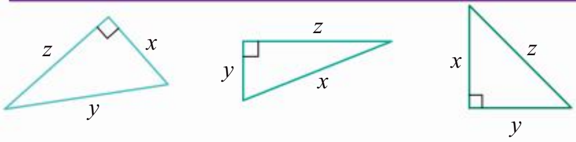
150 cm^3

26. [Pythagoras]

Connect the following Pythagoras' relationships to their corresponding triangle:

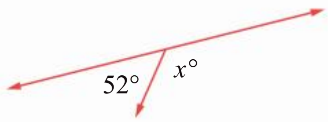
$x^2 = z^2 - y^2$ $\quad$ $y^2 = x^2 + z^2$ $\quad$ $z^2 = x^2 - y^2$





27. [Angles] *

Find the value of $x°$.



128°

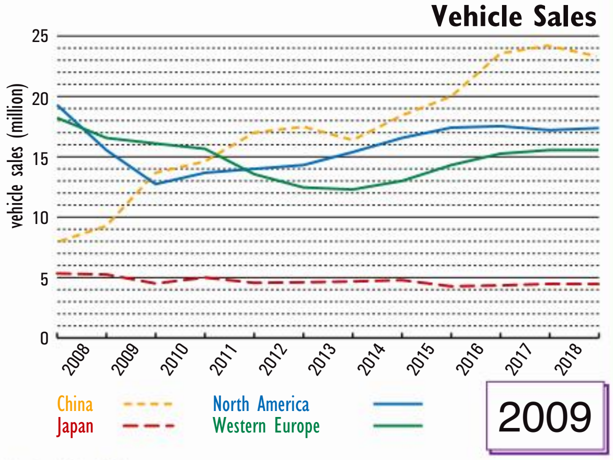
28. [Geometric Reasoning]

This shape has rotational symmetry. How many times during a full turn (360°) does the image of the shape exactly cover the original figure (order of rotational symmetry)?

4

29. [Statistics]

In which year did China overtake North America in vehicle sales?



2009

30. [Probability] *

A 52-card deck of playing cards is shuffled, and one card is dealt from the top of the deck. What is the probability that it is a red 10?

$\frac{1}{26}$

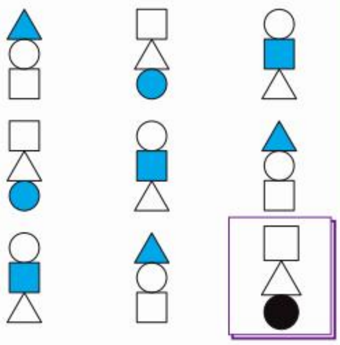
31. [Problem Solving 1] *

A frog was trying to leap out of a well that was 10 metres deep. In the first minute the frog leapt up 2 metres. In the second minute it slipped down 1 metre. This pattern of leaping 2 metres one minute and falling 1 metre the next, was continued. How long did the frog take to reach the top of the well?

17 min

32. [Problem Solving 2] *

Complete the missing figure in the pattern:



MATHS MATE
Term 1 - Sheet 8

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷]
$2080 \div 100 =$ **20.8**

2. [Decimal +,–] *
$10.047 + 6.787 =$ **16.834**

3. [Decimal ×,÷]
$0.003 \times 100 =$ **0.3**

4. [Fraction +,–] *
$\frac{16}{7} - \frac{1}{7} =$ $2\frac{1}{7}$

5. [Fraction ×,÷] *
$\frac{4}{5} \div \frac{1}{4} =$ $3\frac{1}{5}$

6. [Percentages] *
4% of \$10.00 = **\$ 0.40**

7. [Decimals / Fractions / Percentages] *
Complete the equivalent fractions:
$\frac{3}{\boxed{4}} = \frac{15}{20} = \frac{\boxed{75}}{100}$

8. [Integer +,–]
$(-5) - (+2) =$ **–7**

9. [Integer ×,÷]
$(-8) \div (-1) =$ **8**

10. [Rates / Ratios] *
At the 2016 Rio de Janeiro Olympics, France won 10 gold medals, 18 silver medals and 14 bronze medals. Find the ratio of gold to silver to bronze medals.
5 : 9 : 7

11. [Indices]
$0^4 =$ **0**

12. [Square Roots] *
$\sqrt{2\frac{7}{9}} =$ $1\frac{2}{3}$

13. [Exploring Number] *
$8 + (10 - 7)^2 =$ **17**

14. [Financial Mathematics] *
Myra pays \$79.95 for an old bike, cleans it up and sells it for 15% more. Estimate to the nearest dollar, Myra's profit.
\$ 12

15. [Number Patterns]
Complete the pattern:
62 , 60 , 56 , 50 , 42 , **32** , **20**

16. [Expressions]
Gino sold 10 boxes of m mangoes each and 3 boxes of p peaches each. How many pieces of fruit did he sell altogether? [Express your answer in terms of m and p.]
$10m + 3p$

17. [Substitution] *
If $t = 5$, find the value of $\frac{30}{t}$ **6**

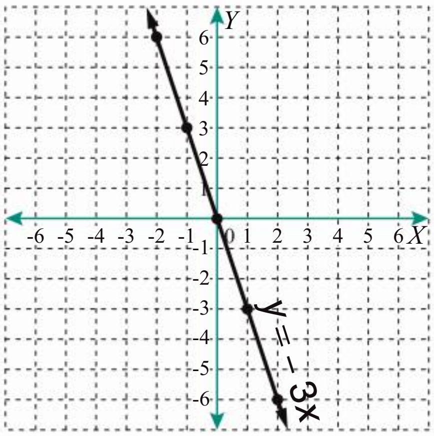
18. [Expansion]
Expand $7(4y - 3)$ $28y - 21$

19. [Factorisation]
Factorise $15a + 6b$ $3(5a + 2b)$

20. [Equations] *
Solve for x: $\frac{x}{4} = 3$ **12**

21. [Coordinate Geometry] *
Graph the line of equation $y = -3x$ by first completing this table of values.
[Label the line with the rule.]

x	–2	–1	0	1	2
y	6	3	0	–3	–6



QUOTE OF THE WEEK: Some people walk in the rain, others get wet. Roger Miller

22. [Units of Measurement / Time]

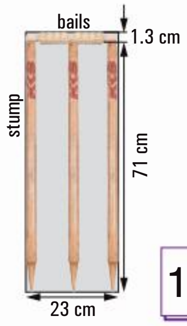
The most appropriate unit for measuring the volume of oil in a tanker is:

A) cubic metres
B) cubic millimetres
C) millilitres
D) metres

A

23. [Perimeter / Area] *

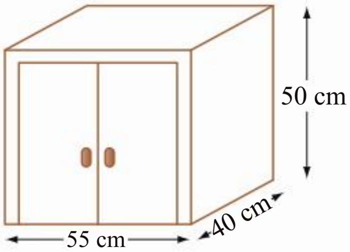
Cricket stumps stand 71 cm above the ground. The bails protrude 1.3 cm above this. The wicket (3 stumps) is 23 cm in width. What is the rectangular area of the wicket?



1662.9 cm^2

24. [Surface Area] *

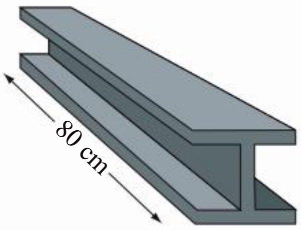
If Nino plans to paint only the top, front and left and right sides of his cabinet, what is the surface area that will be painted?



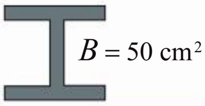
8950 cm^2

25. [Volume] *

Find the volume of steel required to make the beam.



Area of cross section

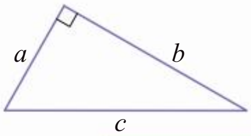


4000 cm^3

26. [Pythagoras]

Which statements are true for the triangle below?

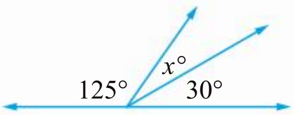
A) $a^2 + c^2 = b^2$
B) $c^2 = a^2 + b^2$
C) $b^2 = c^2 - a^2$



B and C

27. [Angles] *

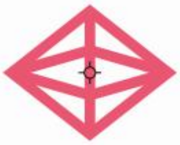
Find the value of $x°$.



25°

28. [Geometric Reasoning]

This shape has rotational symmetry. How many times during a full turn (360°) does the image of the shape exactly cover the original figure (order of rotational symmetry)?

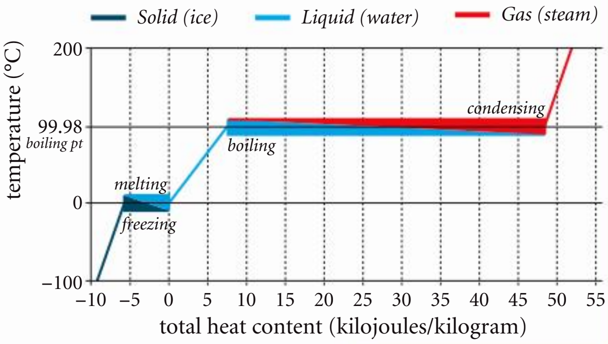


2

29. [Statistics]

If water has a total heat content of 5 kilojoules/kilogram, which phase is it in?

Phase changes of water



liquid

30. [Probability] *

A 52-card deck of playing cards is shuffled, and one card is dealt from the top of the deck. What is the probability that it is a black court card (J, Q or K)? [Give your answer as a fraction in simplest form.]

$\frac{3}{26}$

31. [Problem Solving 1] *

Each of my sons has as many brothers as sisters, but each of my daughters has only half as many sisters as brothers. How many children do I have?

7

32. [Problem Solving 2]

Place all the digits 1 to 5 in each row and column, so that they are not repeated in any of the rows, columns, diagonals and shaded squares. The numbers outside the big square represent the products of the four digits in each shaded square.

60 24

3	1	5	2	4
4	5	2	3	1
2	4	1	5	3
1	2	3	4	5
5	3	4	1	2

30 40

MATHS MATE

Term 2 - Sheet 1

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *
$16 \times 17 =$ **272**

2. [Decimal +,−] *
$6.3 - 0.7 =$ **5.6**

3. [Decimal ×,÷]
$17.26 \times 0.1 =$ **1.726**

4. [Fraction +,−] *
$\frac{1}{6} + \frac{2}{6} =$ $\frac{1}{2}$

5. [Fraction ×,÷]
$\frac{1}{3} \times \frac{1}{4} =$ $\frac{1}{12}$

6. [Percentages] *
10% of 350 = **35**

7. [Decimals / Fractions / Percentages] *
Write 0.75 as a percentage. **75%**

8. [Integer +,−]
$(-5) + (+7) =$ **2**

9. [Integer ×,÷]
$(+6) \times (+6) =$ **36**

10. [Rates / Ratios] *
Ocean water represents 70% of the earth's surface. Find the ratio of water to earth's surface. **7 : 10**

11. [Indices]
$\left(\frac{1}{2}\right)^3 =$ $\frac{1}{8}$

12. [Square Roots]
$\sqrt{0.09} =$ **0.3**

13. [Exploring Number]
Round 0.85 to 1 decimal place. **0.9**

14. [Financial Mathematics] *
Before adding a GST of 10%, a magazine costs \$6.40. Find the total cost of the magazine including GST.
[Round your answer to the nearest 5 cents.] **\$ 7.05**

15. [Number Patterns]
Complete the pattern:
$-15, -12, -9, -6, -3,$ **0** , **3**

16. [Expressions]
Simplify $x \times 2$ $2x$

17. [Substitution] *
If $a = 3$ and $b = 6$,
find the value of $4a - 2b$ **0**

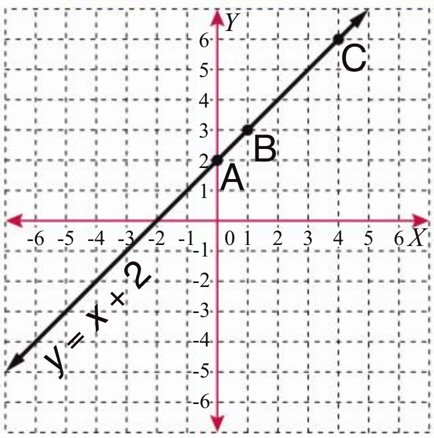
18. [Expansion]
Expand $c(c + 4)$ $c^2 + 4c$

19. [Factorisation]
Factorise $mn + m$ $m(n + 1)$

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

21. [Coordinate Geometry] *
Complete the missing coordinates given that A, B and C lie on the line defined by the rule $y = x + 2$. Plot the points and draw the line.

A(0, **2**), B(**1** ,3), C(**4** ,6)



QUOTE OF THE WEEK: My way of joking is to tell the truth. It's the funniest joke in the world. George Bernard Shaw

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

22. [Units of Measurement / Time]

Choose the most reasonable temperature for paper to self ignite.

A) 100°C
B) 23°C
C) 233°C

C

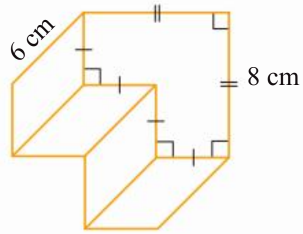
23. [Perimeter / Area] *

Find the perimeter of a rhombus with a side length of 11 centimetres.

44 cm

24. [Surface Area] *

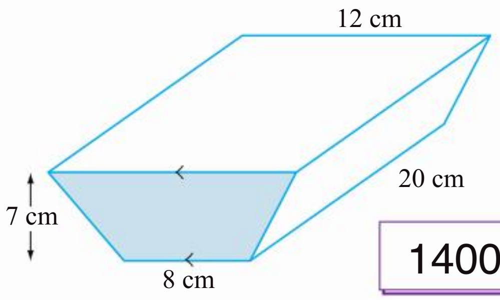
Find the total surface area of the prism.



288 cm^2

25. [Volume] *

Find the volume of the prism.



1400 cm^3

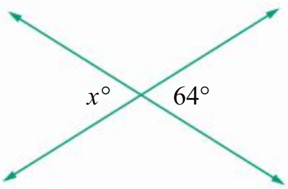
26. [Pythagoras] *

Find the positive solution for b:
$30^2 + b^2 = 50^2$

40

27. [Angles]

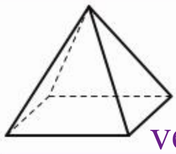
Find the value of $x°$.



64°

28. [Geometric Reasoning]

Sketch a square pyramid. How many vertices does a square pyramid have?



vertices = 5

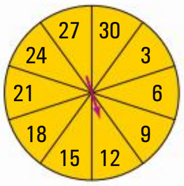
29. [Statistics] *

Find the median and range of this set of data:
3, 3, 4, 4, 5, 5, 6, 6, 7

median = 5   range = 4

30. [Probability] *

This spinner is spun once. What is the probability of spinning a multiple of 4?
[Give your answer as a fraction in simplest form.]



$\frac{1}{5}$

31. [Problem Solving 1] *

"Could you change $2 for me for the parking meter?" inquired the young woman.
"Sure," I replied, knowing I had more than $2 in change in my pocket. In actual fact however, although I did have more than $2 in change, I could not give the woman exactly $2. What is the largest amount of change I could have in my pocket without being able to give change for $2 exactly?

$ 2.35

32. [Problem Solving 2] *

The lines of a multiplication table are shown jumbled below. Which times table is it?

B	× H	=	GD
B	× G	=	FC
B	× F	=	B
B	× J	=	IJ
B	× E	=	JI
B	× I	=	HE
B	× B	=	CF
B	× C	=	DG
B	× D	=	EH

9

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

Term 2 - Sheet 2

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *
$24 \times 13 =$ **312**

2. [Decimal +,−] *
$3.04 - 2.38 =$ **0.66**

3. [Decimal ×,÷]
$0.1 \times 0.65 =$ **0.065**

4. [Fraction +,−] *
$\frac{7}{8} - \frac{1}{8} =$ $\frac{3}{4}$

5. [Fraction ×,÷]
$\frac{2}{5} \times \frac{2}{3} =$ $\frac{4}{15}$

6. [Percentages] *
15% of 40 = **6**

7. [Decimals / Fractions / Percentages] *
Write 0.3 as a percentage. **30%**

8. [Integer +,−]
$(-3) + (-2) =$ **−5**

9. [Integer ×,÷]
$(-4) \times (+12) =$ **−48**

10. [Rates / Ratios] *
Normally, 55% of our blood's volume is made up of plasma. Find the ratio of plasma to the rest of the blood components. **11 : 9**

11. [Indices]
$\left(\frac{2}{3}\right)^2 =$ $\frac{4}{9}$

12. [Square Roots]
$\sqrt{0.81} =$ **0.9**

13. [Exploring Number]
Round 8.473 to 2 decimal places. **8.47**

14. [Financial Mathematics] *
The cost of a car service was $770 including GST. If the GST is 10%, how much GST was included in the cost? **$ 70**

15. [Number Patterns]
Complete the pattern:
$-13, -9, -5, -1, 3,$ **7** , **11**

16. [Expressions]
Simplify $b \times a$ ab

17. [Substitution] *
If $a = 12$ and $b = 2$,
find the value of $\frac{3ab}{8}$ **9**

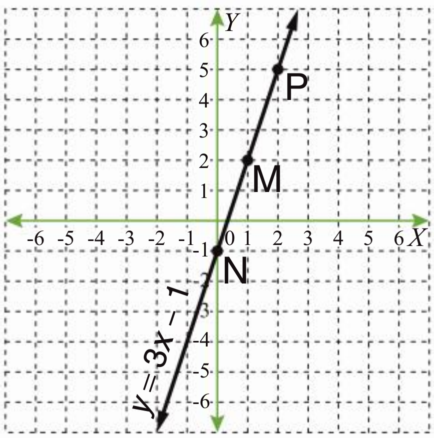
18. [Expansion]
Expand $e(e - 5)$ $e^2 - 5e$

19. [Factorisation]
Factorise $3p + 15pq$ $3p(1 + 5q)$

20. [Equations] *
Solve for x: $\frac{x}{3} - 2 = 4$ **18**

21. [Coordinate Geometry] *
Complete the missing coordinates given that M, N and P lie on the line defined by the rule $y = 3x - 1$. Plot the points and draw the line.

M(**1** ,2), N(0, **−1**), P(2, **5**)



QUOTE OF THE WEEK: Hurry! I never hurry. I have no time to hurry. Igor Stravinsky: Attrib.

22. [Units of Measurement / Time]

Choose the most reasonable volume for the air in a four-man, hot air balloon.

A) 2500 m^3
B) 2.5 m^3
C) 25 000 m^3

A

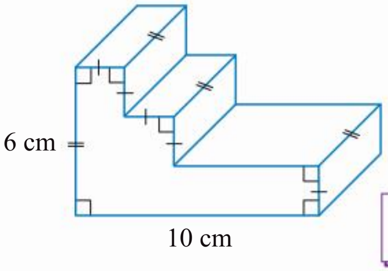
23. [Perimeter / Area] *

Central Park in New York City is rectangular in shape, 4 km in length and 0.8 km wide. How far would a run around Central Park be?

9.6 km

24. [Surface Area] *

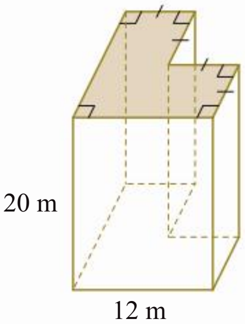
Find the total surface area of the prism.



256 cm^2

25. [Volume] *

Find the volume of the prism.



2160 m^3

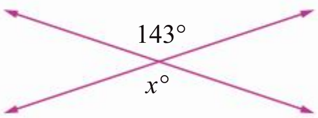
26. [Pythagoras] *

Find the positive solution for a:
$a^2 + 12^2 = 13^2$

5

27. [Angles]

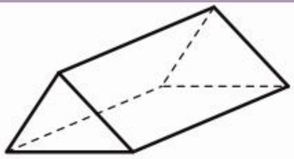
Find the value of $x°$.



143°

28. [Geometric Reasoning]

Sketch and name the three-dimensional shape that has five faces, two of which are triangles.



triangular prism

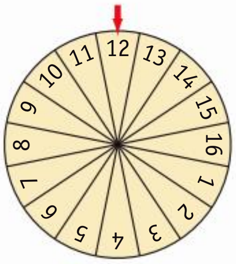
29. [Statistics] *

Find the mode and median of this set of data:
17, 15, 16, 16, 14, 15, 17, 15, 18, 14, 16, 15

mode = 15 median = 15.5

30. [Probability] *

This spinner is spun once. What is the probability of spinning a number greater than 11? [Give your answer as a fraction in simplest form.]



$\frac{5}{16}$

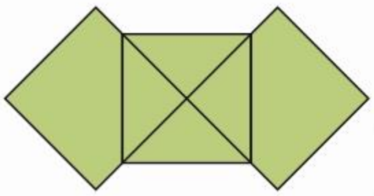
31. [Problem Solving 1] *

The average of six numbers is 8.5. A further two numbers are added and the average is still 8.5. What is the sum of these two numbers?

17

32. [Problem Solving 2] *

Three squares, each with side length of 12 cm, are arranged as shown below. What is the area of the resulting shape?



360 cm^2

MATHS MATE

Term 2 - Sheet 3

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$39 \times 21 =$ **819**

2. [Decimal +,−] *

$23.49 - 5.06 =$ **18.43**

3. [Decimal ×,÷]

$0.01 \times 45.63 =$ **0.4563**

4. [Fraction +,−] *

$\frac{7}{8} + \frac{3}{8} =$ $1\frac{1}{4}$

5. [Fraction ×,÷]

$\frac{3}{4} \times \frac{1}{5} =$ $\frac{3}{20}$

6. [Percentages] *

75% of 64 = **48**

7. [Decimals / Fractions / Percentages] *

Write 80% as a decimal. **0.8**

8. [Integer +,−]

$(+4) + (-6) =$ -2

9. [Integer ×,÷]

$(+9) \times (-2) =$ -18

10. [Rates / Ratios] *

A linen/cotton jumper is 52% linen. What is the ratio of linen to cotton? **13 : 12**

11. [Indices]

$\left(\frac{1}{10}\right)^4 =$ $\frac{1}{10\,000}$

12. [Square Roots]

$\sqrt{2.25} =$ **1.5**

13. [Exploring Number]

Write the rational approximation of π correct to two decimal places, where $\pi \approx 3.14159265$

[Note: π is the ratio of a circle's circumference to its diameter.] **3.14**

14. [Financial Mathematics] *

Stan pays a 10% deposit to put a pool table on lay-by. If the pool table costs $1590, how much does he have left to pay? $ **1431**

15. [Number Patterns]

Complete the pattern:

$7, 4, 1, -2, -5,$ $-8, -11$

16. [Expressions]

Simplify $d \times 4 \times c$ $4cd$

17. [Substitution] *

If $m = 4$ and $n = 5$,

find the value of $\frac{4m + n}{3}$ **7**

18. [Expansion]

Expand $g(2 - h)$ $2g - gh$

19. [Factorisation]

Factorise $3st + 6tu$ $3t(s + 2u)$

20. [Equations] *

Solve for x: $5 + 4x = 3$ $-\frac{1}{2}$

21. [Coordinate Geometry] *

Which line does the point (1,4) lie on?

A) $y = -4x$

B) $y = x + 3$

C) $y = x - 4$

B

QUOTE OF THE WEEK: The man who cannot believe in himself cannot believe in anything else. Roy L. Smith

22. [Units of Measurement / Time]

FIFA require soccer balls to have a weight of 430 ± 20 g. What is the minimum acceptable weight?

410 g

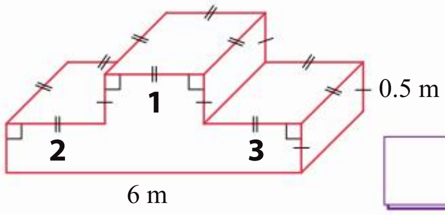
23. [Perimeter / Area] *

What is the perimeter in centimetres of a regular octagon with sides measuring 17 mm?

13.6 cm

24. [Surface Area] *

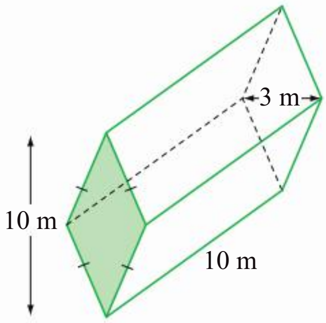
Find the total surface area of the podium.



36 m^2

25. [Volume] *

Find the volume of the prism.



150 m^3

26. [Pythagoras] *

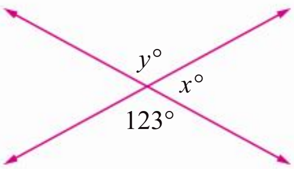
Find the positive solution for c:

$8^2 + 15^2 = c^2$

17

27. [Angles] *

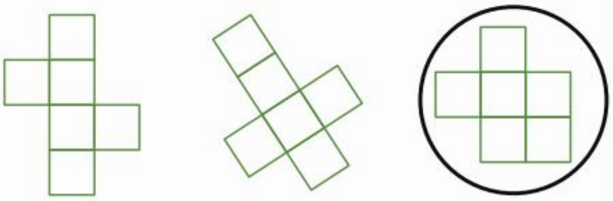
Find the values of $x°$ and $y°$.



$x° = 57°$ $y° = 123°$

28. [Geometric Reasoning]

Circle the net that **cannot** be folded to make a model of a cube.



29. [Statistics] *

Find the median and mode of this set of data:

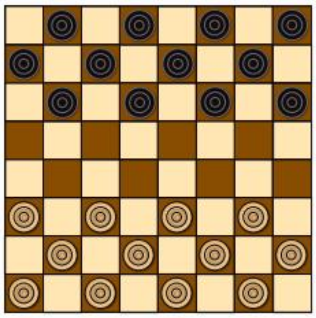
3.5, 4.2, 3.6, 3.4, 4, 4.2, 4.1, 3.9, 3.3, 4.2, 3.8

median = 3.9 mode = 4.2

30. [Probability] *

A fly lands on a square of the draught board. What is the probability that the fly lands on a square containing a black draught?

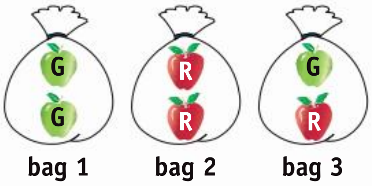
[Give your answer as a fraction in simplest form.]



$\frac{3}{16}$

31. [Problem Solving 1] *

Each of these bags contains two apples. One bag contains two green apples, another two red apples and the third one green and one red apple. All three bags are mislabelled. You may look at only one apple from any one of the bags. Which bag should you select from to be sure you can determine the content of all three bags?



bag 3

32. [Problem Solving 2] *

A palindrome is a number that reads the same forwards and backwards, such as 22 or 39 793. How many palindromes are there between 10 and 400?

39

MATHS MATE
Term 2 - Sheet 4

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$45 \times 18 =$ **810**

2. [Decimal +,−] *

$1.048 - 0.099 =$ **0.949**

3. [Decimal ×,÷]

$8.09 \times 0.01 =$ **0.0809**

4. [Fraction +,−] *

$\frac{13}{12} - \frac{1}{12} =$ **1**

5. [Fraction ×,÷]

$\frac{1}{2} \times \frac{3}{8} =$ $\frac{3}{16}$

6. [Percentages] *

60% of 90 = **54**

7. [Decimals / Fractions / Percentages] *

Write 5% as a decimal. **0.05**

8. [Integer +,−]

$(-9) + (+8) =$ **−1**

9. [Integer ×,÷]

$(-7) \times (-8) =$ **56**

10. [Rates / Ratios] *

Of the 100 g of ice cream, 25 g are sugars. Find the ratio of sugar to other ice cream components. **1 : 3**

11. [Indices]

$\left(\frac{3}{5}\right)^3 =$ $\frac{27}{125}$

12. [Square Roots]

$\sqrt{1.21} =$ **1.1**

13. [Exploring Number]

$\sqrt{3} \approx 1.73205081$

Write the rational approximation of $\sqrt{3}$ correct to three decimal places. **1.732**

14. [Financial Mathematics] *

Kiara buys a textbook online for $55. If shipping and handling are an additional 30% of the price, how much will she pay altogether? **$ 71.50**

15. [Number Patterns]

Complete the pattern:

12 , 8 , 4 , 0 , −4 , **−8 , −12**

16. [Expressions]

Simplify $5 \times m \div 3$ $\frac{5m}{3}$

17. [Substitution] *

If $m = 10$ and $n = 1$, find the value of $\frac{m}{5} - n$ **1**

18. [Expansion]

Expand $l(3 + m)$ $3l + lm$

19. [Factorisation]

Factorise $4xy - 6yz$ $2y(2x - 3z)$

20. [Equations] *

Solve for x: $4 - \frac{x}{4} = 5$ **−4**

21. [Coordinate Geometry] *

Which of these points lie on the line defined by the rule $y = 3x + 2$?

A(2,3)
B(0,2)
C(2,8)

B and C

QUOTE OF THE WEEK: You can only find truth with logic if you have already found truth without it. G. K. Chesterton

22. [Units of Measurement / Time]

Find the maximum accepted height for a basketball ring which must be positioned 3050 ± 6 mm above the floor.

3056 mm

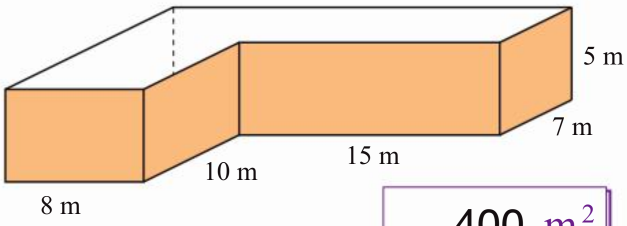
23. [Perimeter / Area] *

What is the perimeter in metres of an isosceles triangle with congruent sides measuring 230 cm and the other side measuring 2.9 m?

7.5 m

24. [Surface Area] *

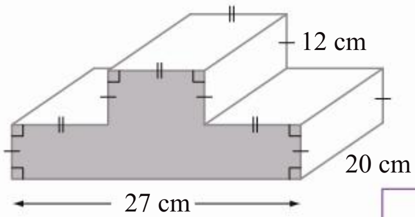
Kate's house exterior needs painting. Disregarding windows and doors, find the surface area of the walls.



400 m^2

25. [Volume] *

Find the volume of the podium.



8640 cm^3

26. [Pythagoras] *

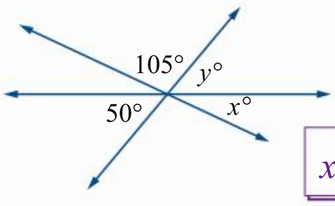
Find the positive solution for a:

$a^2 + 7^2 = 25^2$

24

27. [Angles] *

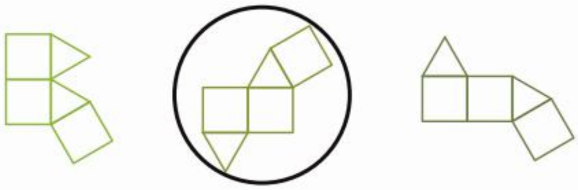
Find the values of $x°$ and $y°$.



$x° = 25°$ $y° = 50°$

28. [Geometric Reasoning]

Circle the net that **can** be folded to make a model of a triangular prism.



29. [Statistics] *

Calculate the mode and mean of this set of data:

9, 10, 12, 11, 14, 11, 12, 8, 12

mode = 12 mean = 11

30. [Probability] *

A fly lands onto a square of the chess board. What is the probability that the fly lands on a square containing a pawn (♙ or ♟)?

[Give your answer as a fraction in simplest form.]

$\frac{1}{4}$

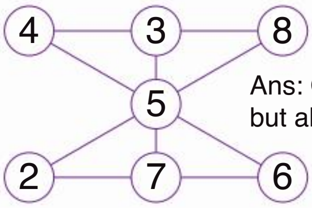
31. [Problem Solving 1] *

A pattern of triangles is made from toothpicks as shown below. If there are 87 toothpicks used, how many triangles have been formed?

43

32. [Problem Solving 2] *

Fill in the numbers 2 to 8 so that the sum on each straight line is 15.



Ans: Other solutions possible but all have 5 in the centre.

MATHS MATE

Term 2 - Sheet 5

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *
$8050 \div 50 =$ **161**

2. [Decimal +,−] *
$11.08 + 2.4 =$ **13.48**

3. [Decimal ×,÷]
$0.5 \times 0.9 =$ **0.45**

4. [Fraction +,−]
$1\frac{3}{5} + 3\frac{1}{5} =$ **$4\frac{4}{5}$**

5. [Fraction ×,÷] *
$\frac{1}{2} \div \frac{1}{4} =$ **2**

6. [Percentages] *
Of the 12.4 million species of organisms in the world today, 64% (almost two thirds) are insects. Estimate to the nearest million the number of insect species. **8 million**

7. [Decimals / Fractions / Percentages] *
Write 0.5 as a fraction in simplest form. **$\frac{1}{2}$**

8. [Integer +,−]
$(+2) - (+6) =$ **−4**

9. [Integer ×,÷]
$(+25) \div (+5) =$ **5**

10. [Rates / Ratios] *
A certain jet ski on the market will reach about 105 kilometres per hour in ideal conditions. At this speed, what distance can it cover in 2 hours? **210** km

11. [Indices] *
Evaluate $2^4 \times 2^2$ **64**

12. [Square Roots] *
$2\sqrt{16} =$ **8**

13. [Exploring Number]
3.4×10^7 is the scientific notation for:
A) 3.40000000
B) 34 000 000
C) 340 000 000
B

14. [Financial Mathematics] *
Kim pays $28 000 for a painting and sells it for 30% more. Calculate the profit. $ **8400**

15. [Number Patterns]
Complete the pattern:
$\frac{3}{2}$, 3 , 6 , 12 , 24 , **48** , **96**

16. [Expressions]
Choose the like terms:
$2z$, 4 , $3z$ **$2z$, $3z$**

17. [Substitution] *
If $y = x - 11$, find y when $x = 11$ **0**

18. [Expansion]
Expand $3i(i + 3)$ **$3i^2 + 9i$**

19. [Factorisation] *
Factorise and evaluate
$99 \times 10 - 99 \times 9$ **99**

20. [Equations] *
Solve for x: $4(x + 3) = 12$ **0**

21. [Coordinate Geometry] *
Find the x-intercept of the line defined by the equation $y = x - 4$ **(4,0)**

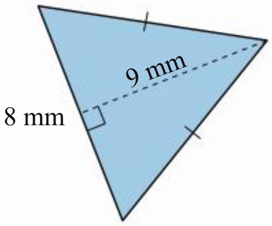
22. [Units of Measurement / Time] *
How many minutes from 5:45 pm until 1:20 am the next day? **455 min**

QUOTE OF THE WEEK: Plan to be spontaneous tomorrow!

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

23. [Perimeter / Area] *

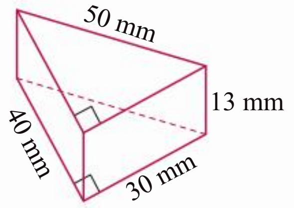
Find the area of the isosceles triangle.



36 mm^2

24. [Surface Area] *

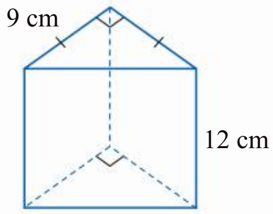
Find the total surface area of the triangular prism.



2760 mm^2

25. [Volume] *

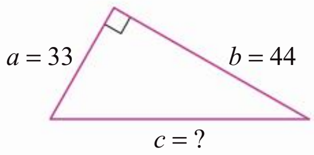
Find the volume of the triangular prism.



486 cm^3

26. [Pythagoras] *

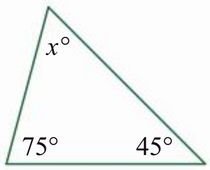
For this triangle use Pythagoras' theorem $a^2 + b^2 = c^2$. Find the length of the hypotenuse.



55

27. [Angles] *

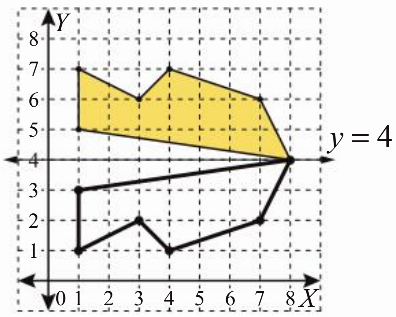
Find the value of $x°$.



60°

28. [Geometric Reasoning]

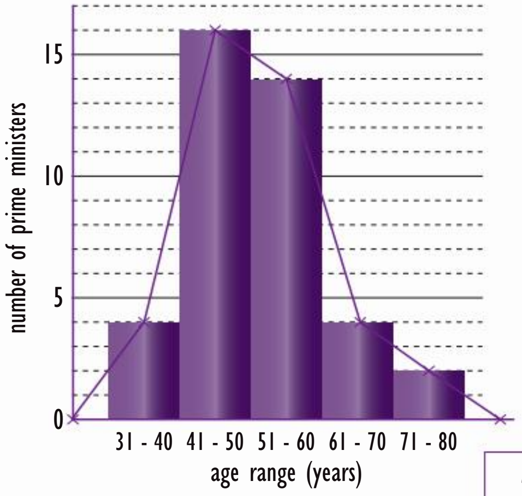
Draw the reflection of the shape in the line of equation $y = 4$.



29. [Statistics]

How many New Zealand Prime Ministers began their term in office at or before the age of 50?

Age of New Zealand Prime Ministers beginning their term in office (2019)



20

30. [Probability] *

A money bag has twenty 1-dollar coins and thirty 2-dollar coins. A coin is randomly selected from the bag. What is the probability of selecting a 2-dollar coin? [Give your answer as a fraction in simplest form.]

$\frac{3}{5}$

31. [Problem Solving 1] *

Fill in the cross number puzzle using the following numbers:

2 digits: 65, 67

3 digits: 581, 849

5 digits: 34 483, 34 653, 37 772, 31 832

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

32. [Problem Solving 2] *

The last digit of a six-digit number is 2. If the 2 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.

$$\begin{array}{r} 2\ A\ B\ C\ D\ E \\ \times \qquad\qquad\quad 3 \\ \hline A\ B\ C\ D\ E\ 2 \end{array}$$

857 142

MATHS MATE

Term 2 - Sheet 6

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$7470 \div 30 =$ **249**

2. [Decimal +,–] *

$9.003 + 5.7 =$ **14.703**

3. [Decimal ×,÷]

$0.2 \times 0.3 =$ **0.06**

4. [Fraction +,–] *

$5\frac{7}{9} - 3\frac{4}{9} =$ $2\frac{1}{3}$

5. [Fraction ×,÷] *

$\frac{2}{3} \div \frac{5}{6} =$ $\frac{4}{5}$

6. [Percentages] *

Hugh slept for 10% of the one and a half hour flight from Auckland to Christchurch. How many minutes did Hugh spend napping?

9 minutes

7. [Decimals / Fractions / Percentages] *

Write 0.06 as a fraction in simplest form. $\frac{3}{50}$

8. [Integer +,–]

$(-7) - (-1) =$ **–6**

9. [Integer ×,÷]

$(-22) \div (-11) =$ **2**

10. [Rates / Ratios] *

The Peregrine Falcon is the fastest animal on earth. It can dive 2700 m in 30 seconds. What is its average speed?

90 m/s

11. [Indices] *

Evaluate 3×3^2 **27**

12. [Square Roots] *

$3\sqrt{36} =$ **18**

13. [Exploring Number]

1.82×10^{-6} is the scientific notation for:

A) 0.000182
B) 1.82000000
C) 0.00000182

C

14. [Financial Mathematics] *

Ahmed sells a house for $148 000 and earns 3% commission. How much is Ahmed's commission?

$ **4440**

15. [Number Patterns]

Complete the pattern:

$\frac{1}{16}, \frac{1}{4}, 1, 4, 16,$ **64** , **256**

16. [Expressions]

Choose the like terms:

$x^2, 5x^2, 5x$ $x^2, 5x^2$

17. [Substitution] *

If $y = 8 - x$, find y when $x = 8$ **0**

18. [Expansion]

Expand $5x(3 - x)$ $15x - 5x^2$

19. [Factorisation] *

Factorise and evaluate

$123 \times 50 - 123 \times 49$ **123**

20. [Equations] *

Solve for x: $2(x - 4) = 6$ **7**

21. [Coordinate Geometry] *

Find the y-intercept of the line defined by the equation $4x - y = 3$

(0,–3)

22. [Units of Measurement / Time] *

Express in seconds:

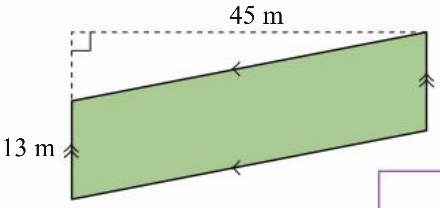
3 minutes and 35 seconds = **215 s**

QUOTE OF THE WEEK: The crime is not to avoid failure. The crime is not to give triumph a chance. Huw Wheldon

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

23. [Perimeter / Area] *

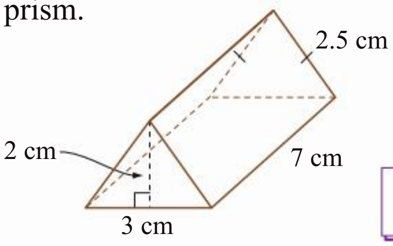
Find the area of the parallelogram.



585 m^2

24. [Surface Area] *

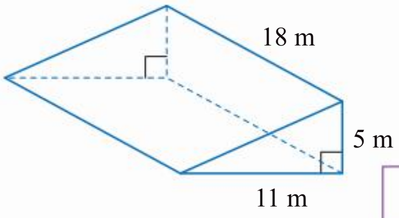
Find the total surface area of the triangular prism.



62 cm^2

25. [Volume] *

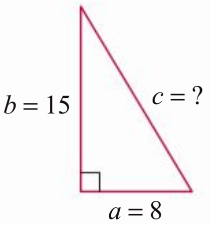
Find the volume of the triangular prism.



495 m^3

26. [Pythagoras] *

For this triangle use Pythagoras' theorem $a^2 + b^2 = c^2$. Find the length of the hypotenuse.



17

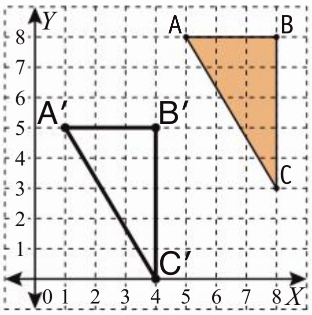
27. [Angles] *

Find the value of $x°$.

107°

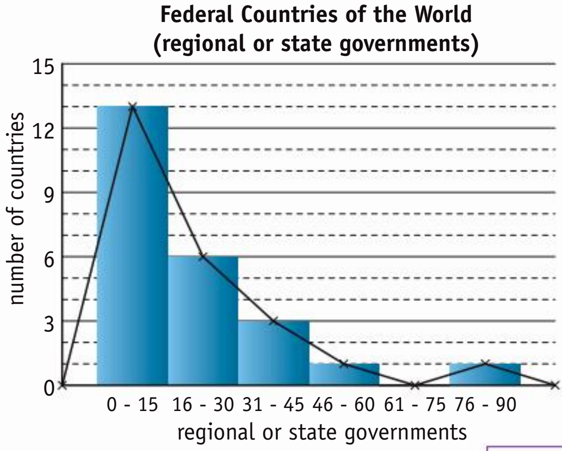
28. [Geometric Reasoning]

Redraw the triangle ABC after translating it −4 units horizontally and −3 units vertically.



29. [Statistics]

How many federal countries are there in the world?



24

30. [Probability] *

In Lotto, 45 balls numbered from 1 to 45 are mixed, and one ball at a time is selected at random. For the first ball find the probability that it is a number greater than 30. [Give your answer as a fraction in simplest form.]

$\frac{1}{3}$

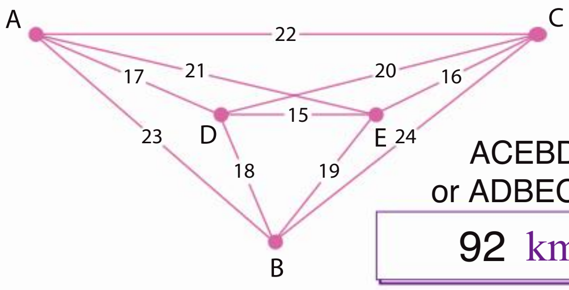
31. [Problem Solving 1] *

I reduced a diagram on my computer using a scale factor of 80% (i.e. the linear dimensions of the diagram were reduced so they became 80% of the original dimensions). What scale factor is required to return the diagram to its original size?

125%

32. [Problem Solving 2] *

The network below displays five cities (A, B, C, D and E) and their distances in kilometres from each other. Find the distance of the shortest route possible that begins at city A, visits the other four cities and returns to city A.



ACEBDA or ADBECA

92 km

MATHS MATE

Term 2 - Sheet 7

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$32\,200 \div 20 =$ **1610**

2. [Decimal +,–] *

$0.06 + 1.205 =$ **1.265**

3. [Decimal ×,÷] *

$19.4 \times 0.06 =$ **1.164**

4. [Fraction +,–] *

$4\frac{3}{7} + 2\frac{4}{7} =$ **7**

5. [Fraction ×,÷] *

$\frac{5}{8} \div \frac{5}{6} =$ $\frac{3}{4}$

6. [Percentages] *

Australia is approximately 7 500 000 km^2 in area. Sand dunes cover 40% of this. How much of Australia is covered by sand dunes?

3 000 000 km^2

7. [Decimals / Fractions / Percentages] *

Write $\frac{13}{20}$ as a decimal. **0.65**

8. [Integer +,–]

$(+4) - (-3) =$ **7**

9. [Integer ×,÷]

$(-24) \div (+3) =$ **–8**

10. [Rates / Ratios] *

The Eurostar train takes around 20 minutes to cross the Euro Tunnel, which is 52 km long. What is the train's average speed through the tunnel?

156 km/h

11. [Indices] *

Evaluate $5^2 \times 5^2$ **625**

12. [Square Roots] *

$5\sqrt{64} =$ **40**

13. [Exploring Number]

48 000 000 000 written in scientific notation is:

A) 4.8×10^{10} B) 4.8×10^{9} C) 48×10^{8}

A

14. [Financial Mathematics] *

Bryce pays \$240 000 for a property and sells it for 15% less. Calculate the loss.

\$ 36 000

15. [Number Patterns]

Complete the pattern:

4 , 20 , 100 , 500 , **2500 , 12 500**

16. [Expressions]

Choose the like terms:

$4a$, ab , $4ba$

ab, $4ba$

17. [Substitution] *

If $y = 6x + 1$, find y when $x = 9$ **55**

18. [Expansion]

Expand $4m(5 + 3n)$ **$20m + 12mn$**

19. [Factorisation] *

Factorise and evaluate

$25 \times 6 + 25 \times 4$ **250**

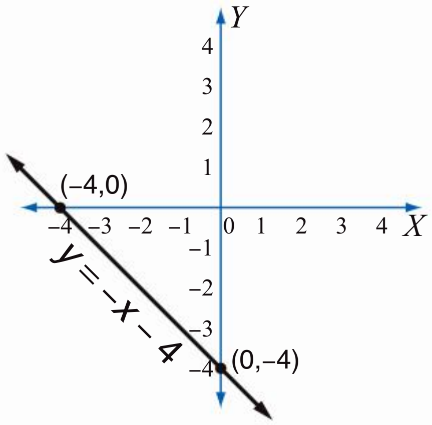
20. [Equations] *

Solve for x: $3(5 + x) = 9$ **–2**

21. [Coordinate Geometry] *

Sketch the line of equation $y = -x - 4$ by marking the x-intercept and the y-intercept.

[Label the graph with the rule.]



QUOTE OF THE WEEK: The mind is likened to a household drainage system; keep filling it with rubbish and it will seize on you. P. K. Shaw

22. [Units of Measurement / Time] ✻

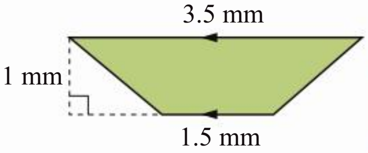
How much longer is P1 than P2?

School - Bell times									
8:35 9:25	9:25 10:10	10:10 10:45	10:45 11:15	11:15 12:00	12:00 12:45	12:45 1:40	1:40 2.30	2:30 3:15	3:15 4:45
P1	P2	Assembly or meetings	Recess	P3	P4	Lunch	P5 & roll	P6	Sport

5 min

23. [Perimeter / Area] ✻

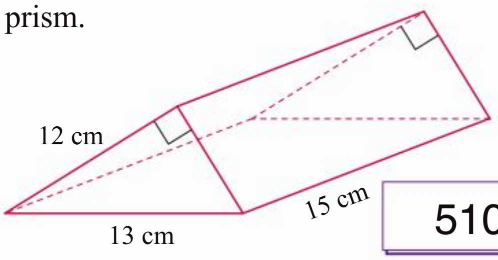
Find the area of the trapezium.



$2.5\ \text{mm}^2$

24. [Surface Area] ✻

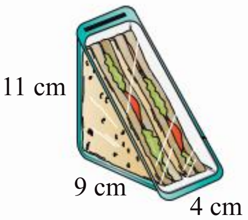
Find the total surface area of the triangular prism.



$510\ \text{cm}^2$

25. [Volume] ✻

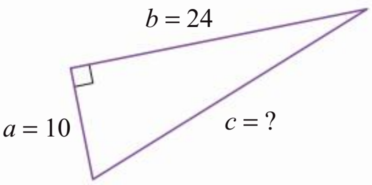
Find the volume of the triangular prism shaped package that contains the sandwich.



$198\ \text{cm}^3$

26. [Pythagoras] ✻

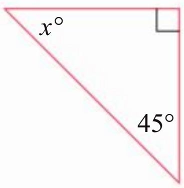
For this triangle use Pythagoras' theorem $c^2 = a^2 + b^2$. Find the length of the hypotenuse.



26

27. [Angles] ✻

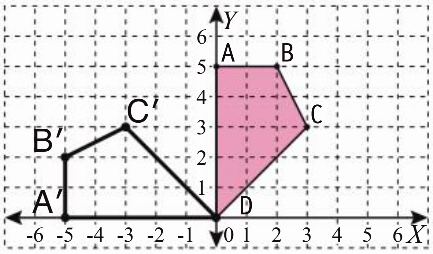
Find the value of $x°$.



45°

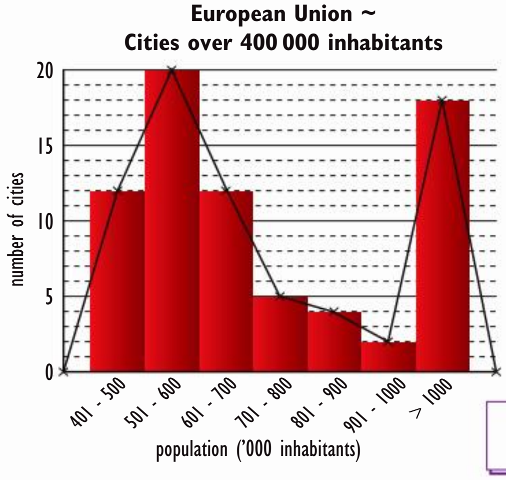
28. [Geometric Reasoning]

Redraw the quadrilateral ABCD after rotating it 90° anticlockwise about the origin of the Cartesian plane.



29. [Statistics]

How many European Union cities have a population of more than 800 000 people?



24

30. [Probability] ✻

Based on the car dealership figures, find the probability that a buyer, chosen at random, purchased a Hyundai. [Give your answer as a fraction in simplest form.]

CAR MODEL	SALES
Ford	90
Holden	140
Mitsubishi	55
Toyota	160
Hyundai	20
Nissan	15

$\frac{1}{24}$

31. [Problem Solving 1] ✻

Lisa had 60 lollies to share. She gave each of her friends the same number of lollies and had 5 left over for herself. If Lisa had fewer lollies than any of her friends, how many friends did Lisa share her lollies with?

5

32. [Problem Solving 2] ✻

Mia has these three number cards. She uses all three cards to make different 3-digit numbers. What is the mean of all the different numbers Mia can make in this way?

333

MATHS MATE

Term 2 - Sheet 8

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

13 680 ÷ 40 = **342**

2. [Decimal +,–] *

2.34 + 23.4 = **25.74**

3. [Decimal ×,÷] *

3.762 × 0.2 = **0.7524**

4. [Fraction +,–] *

$3\frac{7}{12} - 1\frac{5}{12} =$ $2\frac{1}{6}$

5. [Fraction ×,÷] *

$\frac{3}{7} \div \frac{6}{7} =$ $\frac{1}{2}$

6. [Percentages] *

In 1930 in the USA there were 3900 million movie goers. By 1970 this figure fell by 75%. How many million people went to the movies in the USA in 1970?

975

7. [Decimals / Fractions / Percentages] *

Russia holds a quarter of the world's natural gas resources. Write this as a decimal.

0.25

8. [Integer +,–]

(–5) – (–4) = **–1**

9. [Integer ×,÷]

(+28) ÷ (–4) = **–7**

10. [Rates / Ratios] *

The maximum cruise speed of the Airbus A380 is around 1000 km/h. At this speed, how long will it take an Airbus A380 to travel 12 000 km?

12 h

11. [Indices] *

Evaluate 10×10^3

10 000

12. [Square Roots] *

$4\sqrt{49} =$ **28**

13. [Exploring Number]

0.0000000019 written in scientific notation is:

A) 0.19×10^{-10}
B) 1.9×10^{-9}
C) 19×10^{-7}

B

14. [Financial Mathematics] *

Sara sells a car for \$175 000 and earns 4% commission. What is Sara's commission?

\$ **7000**

15. [Number Patterns]

Complete the pattern:

–2 , 4 , –8 , 16 , –32 , **64** , **–128**

16. [Expressions]

Choose the like terms:

2 , $2m$, $-2m$, m^2

$2m$, $-2m$

17. [Substitution] *

If $y = \frac{15}{x} - 7$, find y when $x = 1$

8

18. [Expansion]

Expand $3q(r - 2q)$

$3qr - 6q^2$

19. [Factorisation] *

Factorise and evaluate

$50 \times 11 + 50 \times 9$

1000

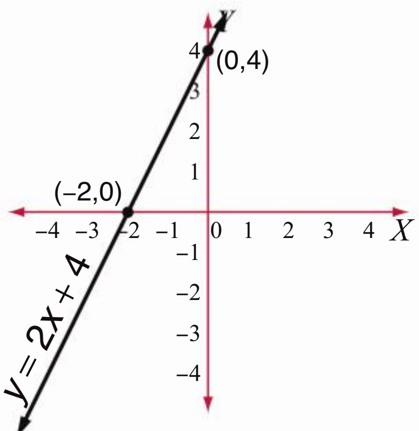
20. [Equations] *

Solve for x: $5(1 - x) = 20$

–3

21. [Coordinate Geometry] *

Sketch the line of equation $y = 2x + 4$ by marking the x-intercept and the y-intercept.
[Label the graph with the rule.]



QUOTE OF THE WEEK: What we vividly imagine, ardently desire, enthusiastically act upon, must inevitably come to pass. Colin P. Sisson

22. [Units of Measurement / Time] ✻

Los Angeles time is 18 hours behind Sydney time. If the timetable contains local times only, how long does the afternoon flight QF11 from Sydney to Los Angeles take?

[Hint: Convert the Sydney departure time to Los Angeles time.]

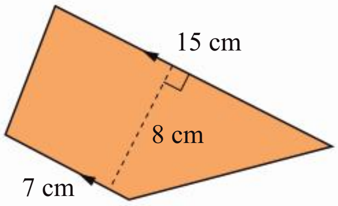
Flights Out: Sydney to Vancouver (Canada) - **Wednesday 10 July 2019**

From		To		Flight	Duration
09:35	Sydney	06:20	Los Angeles	QF11	18h 40m
08:30	Los Angeles	**11:15**	Vancouver	WS1701	
14:10	Sydney	09:55	Los Angeles	QF11	20h 30m
13:55	Los Angeles	**16:40**	Vancouver	QF3777	

13 h 45 min

23. [Perimeter / Area] ✻

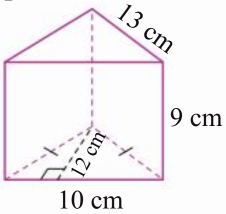
Find the area of the trapezium.



88 cm^2

24. [Surface Area] ✻

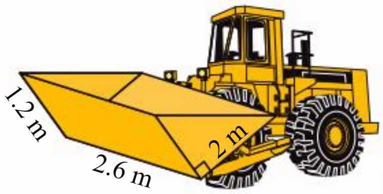
Find the total surface area of the triangular prism.



444 cm^2

25. [Volume] ✻

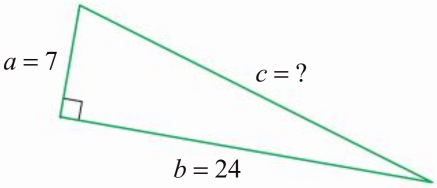
If the scoop on this front end loader is a triangular prism, find its capacity.



3.12 m^3

26. [Pythagoras] ✻

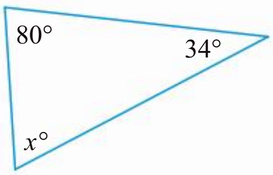
For this triangle use Pythagoras' theorem $c^2 = a^2 + b^2$. Find the length of the hypotenuse.



25

27. [Angles] ✻

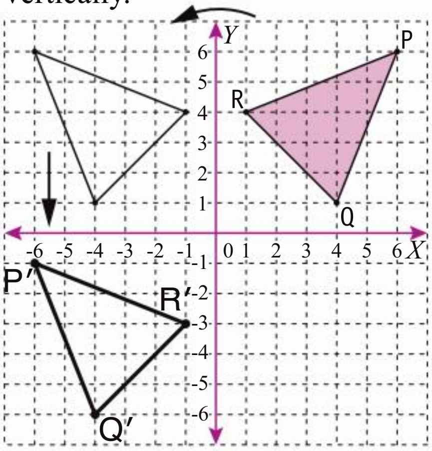
Find the value of $x°$.



66°

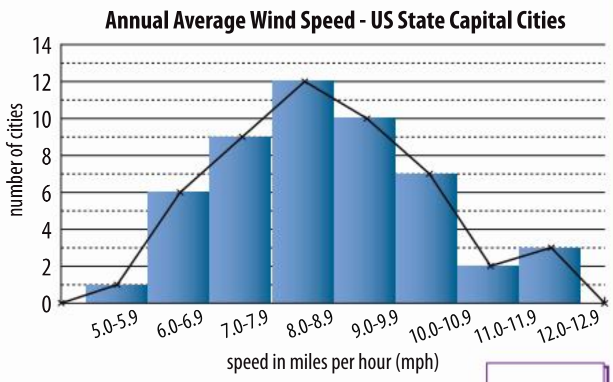
28. [Geometric Reasoning]

Redraw the triangle PQR after reflecting it in the y-axis and then translating it −7 units vertically.



29. [Statistics]

How many state capital cities have an annual average wind speed of greater than 8.9 mph?



22

30. [Probability] ✻

All thirty students in Maria's class speak English. Six of these students speak Chinese, another two Japanese and another four Russian. What is the probability that a student selected at random speaks two languages?

[Give your answer as a fraction in simplest form.]

$\frac{2}{5}$

31. [Problem Solving 1] ✻

Carol's odometer reads 032719 km, with all digits being different. How many kilometres must she travel before the digits are all different again?

22 km

32. [Problem Solving 2] ✻

Harry, Annie and Mitch decided to paint the living room. Harry could paint the room by himself in 3 hours. Annie could do it in 4 hours and Mitch would take 6 hours on his own. If they all work together and don't get in each other's way, how long will the job take?

or 1 h 20 min $1\frac{1}{3}$ h

MATHS MATE

Term 3 - Sheet 1

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$426 \times 15 =$ **6390**

2. [Decimal +,–] *

$13.4 - 2.08 =$ **11.32**

3. [Decimal ×,÷] *

$73.8 \div 3 =$ **24.6**

4. [Fraction +,–]

$4 - \frac{1}{3} =$ $3\frac{2}{3}$

5. [Fraction ×,÷] *

$\frac{2}{3} \times \frac{3}{5} =$ $\frac{2}{5}$

6. [Percentages] *

2.5% of $500 =$ **12.5**

7. [Decimals / Fractions / Percentages] *

Write 12% as a fraction in simplest form. $\frac{3}{25}$

8. [Integer +,–]

$(-11) + (+16) =$ **5**

9. [Integer ×,÷]

$(+2) \times (-100) =$ **–200**

10. [Rates / Ratios] *

20 : 30 is in proportion with 5 : 6
True or false? **false**

11. [Indices]

Simplify $x^2 \times x^3$ x^5

12. [Square Roots]

$\sqrt{4} \times \sqrt{4} =$ **4**

13. [Exploring Number] *

$(14 - 5) \div (6 - 9) =$ **–3**

14. [Financial Mathematics] *

James works a basic week of 40 hours and his hourly rate of pay is \$19.50. Calculate his weekly wage before tax. **\$780**

15. [Number Patterns]

Complete the pattern:
100 000 , 10 000 , 1000 , 100 , **10** , **1**

16. [Expressions]

Simplify $4a - a$ $3a$

17. [Substitution] *

Use $S = \frac{n(n+1)}{2}$ to find the sum S of the first n whole numbers when $n = 100$ **5050**

18. [Expansion]

Expand $-4(f - 3)$ $-4f + 12$

19. [Factorisation]

Factorise $x^2 + 4x$ $x(x + 4)$

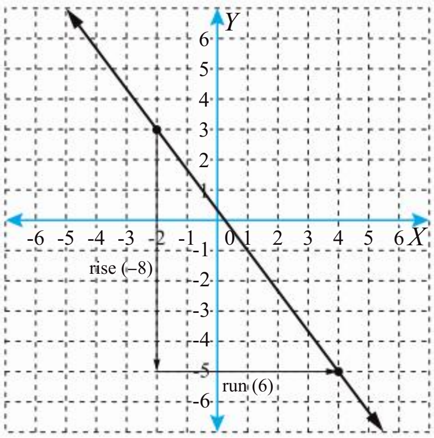
20. [Equations] *

Solve for x: $9x = x + 8$ **1**

21. [Coordinate Geometry] *

Find the gradient of the line passing through the points (–2,3) and (4,–5).

[Use the formula: gradient $= \frac{\text{rise}}{\text{run}}$]



$-\frac{4}{3}$

QUOTE OF THE WEEK: To be without something you want is an indispensable part of happiness. Bertrand Russell: Attrib.

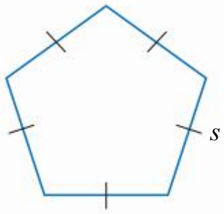
22. [Units of Measurement / Time] *

Convert 250 millimetres to centimetres.

25 cm

23. [Perimeter / Area] *

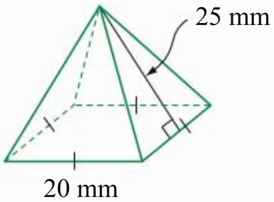
Write a formula for the perimeter P of the shape.



$P = 5s$

24. [Surface Area] *

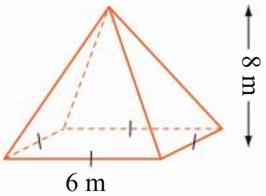
Find the total surface area of the regular square pyramid.



1400 mm^2

25. [Volume] *

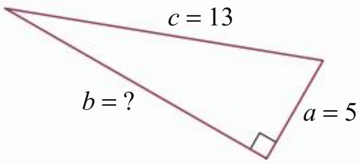
Using $V = \frac{1}{3} \times$ area of base $(B) \times$ height (h), find the volume of the square pyramid.



96 m^3

26. [Pythagoras] *

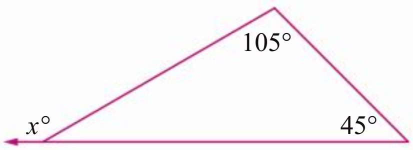
For this triangle use Pythagoras' theorem $a^2 + b^2 = c^2$. Find the length of the side labelled b.



12

27. [Angles] *

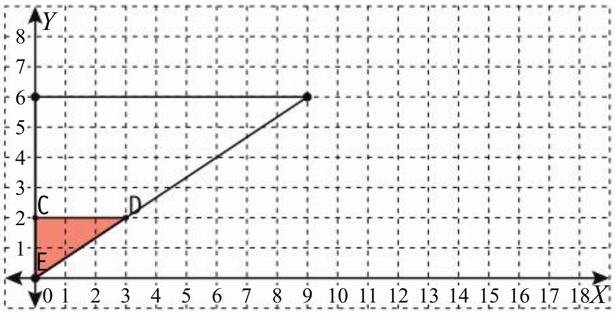
Find the value of $x°$.



150°

28. [Geometric Reasoning]

Find the scale factor of enlargement applied to triangle CDE to produce the larger triangle.



3

29. [Statistics]

Complete the stem-and-leaf plot for the set of data showing the number of medals won by Australia at each of the summer Olympics between 1956 and 2016:

35, 22, 18, 17, 17, ~~5~~, 9, 24, 14, 27, 41, 58, 49, 46, 35, 29

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

Key
4 | 2 = 42

30. [Probability] *

If the probability of winning the netball game is 0.7, what is the probability of not winning the game?

0.3

31. [Problem Solving 1] *

How much time is saved by driving 10 km at 120 km/h instead of 100 km/h?
[Is it worth the risk?]

1 min

32. [Problem Solving 2] *

A grandfather clock strikes at regular intervals. It strikes the number of hours on the hour, twice for every half hour and once for each of the remaining quarter hours. How many times does the clock strike in 24 hours?

252

MATHS MATE

Term 3 - Sheet 2

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$235 \times 17 =$ **3995**

2. [Decimal +,–] *

$1.8 - 0.96 =$ **0.84**

3. [Decimal ×,÷] *

$23.15 \div 5 =$ **4.63**

4. [Fraction +,–]

$2 - \frac{4}{7} =$ $1\frac{3}{7}$

5. [Fraction ×,÷] *

$\frac{1}{6} \times \frac{3}{10} =$ $\frac{1}{20}$

6. [Percentages] *

$33\frac{1}{3}\%$ of $120 =$ **40**

7. [Decimals / Fractions / Percentages] *

Write 80% as a fraction in simplest form.

$\frac{4}{5}$

8. [Integer +,–]

$(+4) + (-12) =$ **–8**

9. [Integer ×,÷]

$(-300) \times (2) =$ **–600**

10. [Rates / Ratios] *

1 : 3 is in proportion with 3 : 12
True or false?

false

11. [Indices]

Simplify $m \times m^2$ m^3

12. [Square Roots]

$\sqrt{16} \times \sqrt{16} =$ **16**

13. [Exploring Number] *

$(-7 - 5) \times (1 - 5) =$ **48**

14. [Financial Mathematics] *

Carey's annual salary is \$67 600 before tax.
How much is his weekly salary before tax?

\$1300

15. [Number Patterns]

Complete the pattern:

256 , 128 , 64 , 32 , 16 , **8** , **4**

16. [Expressions]

Simplify $5k - 2k + k$ $4k$

17. [Substitution] *

Use $V = \frac{lwh}{3}$ to find the volume V of a rectangular pyramid when $l = 4$, $w = 5$ and $h = 6$

40

18. [Expansion]

Expand $-(5 - 4j)$ $-5 + 4j$

19. [Factorisation]

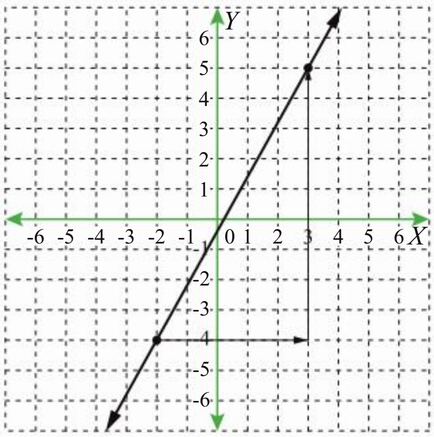
Factorise $u^2 - 3u$ $u(u - 3)$

20. [Equations] *

Solve for x: $4x - 12 = 2x$ **6**

21. [Coordinate Geometry] *

Find the gradient of the line passing through the points (–2,–4) and (3,5).



$\frac{9}{5}$

QUOTE OF THE WEEK: The difference between pedestrians and motorists is that the former usually apologise when they bump into one another. P. K. Shaw

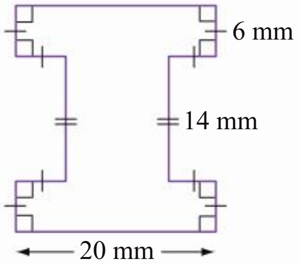
22. [Units of Measurement / Time] *

The Kokoda Trail is 90 km in length. Is the Kokoda Trail <, = or > 9000 m?

>

23. [Perimeter / Area] *

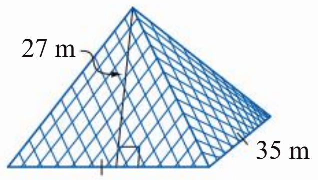
Find the perimeter of the shape.



116 mm

24. [Surface Area] *

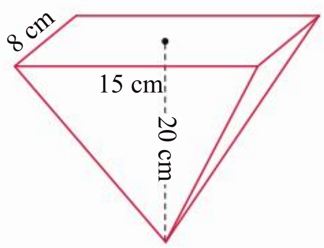
Find the glassed surface area of the regular square Pyramide du Louvre. [N.B. The base is not included.]



1890 m^2

25. [Volume] *

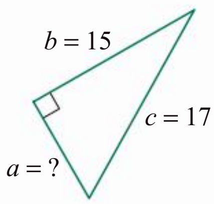
Using $V = \dfrac{Bh}{3}$ find the volume of the rectangular pyramid.



800 cm^3

26. [Pythagoras] *

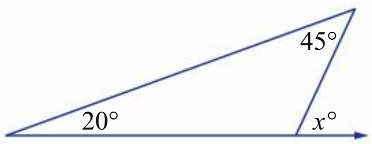
For this triangle use Pythagoras' theorem $a^2 + b^2 = c^2$. Find the length of the side labelled a.



8

27. [Angles]

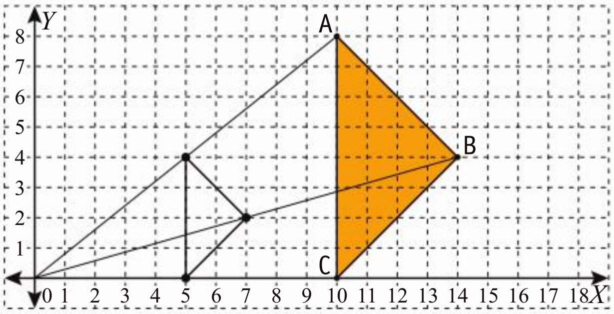
Find the value of $x°$.



65°

28. [Geometric Reasoning]

Find the scale factor of reduction applied to triangle ABC to produce the smaller triangle.



$\dfrac{1}{2}$

29. [Statistics] *

Find the median of this set of data.

STEM	LEAF
10	0 5 9
11	4 6 6 8
12	0

Key
12 | 4 = 124

115

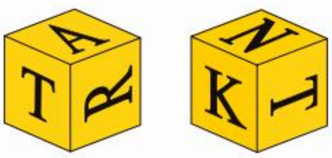
30. [Probability] *

If the probability of winning a prize in a raffle is 0.025, what is the probability of not winning a prize?

0.975

31. [Problem Solving 1] *

Two identical dice are shown. Which letter is on the face opposite the A?



K

32. [Problem Solving 2] *

Arrange the numbers 1 to 12 into six pairs so that the sum of each pair is a prime number, and all six prime numbers are different.

or (1,4) (2,5) (3,8) (6,7) (9,10) (11,12)

(2,3) (1,6) (4,7) (5,8) (9,10) (11,12)

MATHS MATE
Term 3 - Sheet 3

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *
$392 \times 24 =$ **9408**

2. [Decimal +,–] *
$0.095 - 0.03 =$ **0.065**

3. [Decimal ×,÷] *
$100.12 \div 4 =$ **25.03**

4. [Fraction +,–]
$5 - \frac{7}{10} =$ **$4\frac{3}{10}$**

5. [Fraction ×,÷] *
$\frac{3}{11} \times \frac{2}{9} =$ **$\frac{2}{33}$**

6. [Percentages] *
1% of $80 =$ **0.8**

7. [Decimals / Fractions / Percentages] *
Write $\frac{31}{50}$ as a percentage. **62%**

8. [Integer +,–]
$(-5) + (+14) =$ **9**

9. [Integer ×,÷]
$(-200) \times (-40) =$ **8000**

10. [Rates / Ratios] *
Complete the missing term in the proportion:
$3 : \boxed{21} = 5 : 35$

11. [Indices]
Simplify $t^3 \times t^3$ **t^6**

12. [Square Roots]
$\sqrt{4} \times \sqrt{25} =$ **10**

13. [Exploring Number] *
$-10 \times 6 - 28 \div 7 =$ **–64**

14. [Financial Mathematics] *
Anna is paid $14.75 per hour. She works a 12 hour shift, the last 4 hours being at a double time pay rate. What is Anna's wage before tax? **$236**

15. [Number Patterns]
Complete the pattern:
192 , –96 , 48 , –24 , 12 , **–6** , **3**

16. [Expressions]
Simplify $3x + 3y + x$ **$4x + 3y$**

17. [Substitution] *
Use $A = \frac{1}{2}h(a + b)$ to find the area A of a trapezium when $a = 15$, $b = 9$ and $h = 7$ **84**

18. [Expansion]
Expand $-m(2m + 1)$ **$-2m^2 - m$**

19. [Factorisation]
Factorise $g - 6g^2$ **$g(1 - 6g)$**

20. [Equations] *
Solve for x: $8x = 3x - 5$ **–1**

21. [Coordinate Geometry] *
Use $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ to find the coordinates of the midpoint M of the interval joining the points (1,3) and (3,5). **(2,4)**

QUOTE OF THE WEEK: Rule Number 1: Don't sweat the small stuff. Rule Number 2: It's all small stuff. Dr. Robert S. Eliot

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

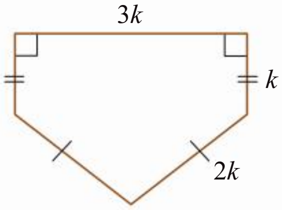
22. [Units of Measurement / Time] *

How many Christmas trees, 180 cm tall, would it take, end to end, to be as tall as a 90 metre high Mountain Ash tree?

50

23. [Perimeter / Area] *

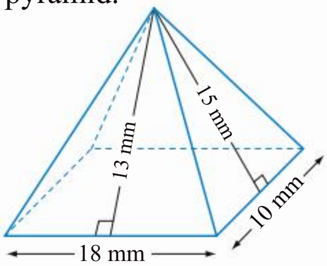
Write a formula for the perimeter P of the shape.



$P = 9k$

24. [Surface Area] *

Find the total surface area of the rectangular pyramid.



$564\ \text{mm}^2$

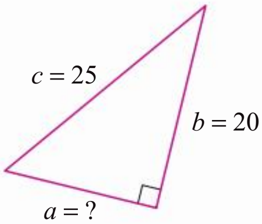
25. [Volume] *

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 volume of the pyramid?

$2\,592\,100\ \text{m}^3$

26. [Pythagoras] *

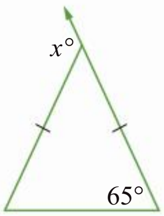
Using Pythagoras' theorem, find the length of the side labelled a.



15

27. [Angles] *

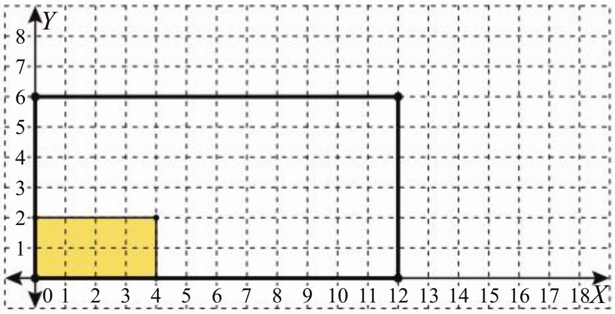
Find the value of $x°$.



130°

28. [Geometric Reasoning]

Redraw the rectangle enlarged by a scale factor of 3 about the origin of the axes.



29. [Statistics] *

The stem plot shows the life span of selected animals. Find the median and mode of the data.

STEM	LEAF
0	3 3 5 5 9
1	0 0 0 5 5 5 5 7
2	0 2 5 5
3	
4	0
5	
6	
7	0 0

Key
2 | 7 = 27 years

median = 15 mode = 15

30. [Probability] *

If the probability of winning a division 4 lotto prize (4 winning numbers) is $\frac{1}{733}$, what is the probability of not winning a division 4 lotto prize?

$\frac{732}{733}$

31. [Problem Solving 1]

Find all the pairs of prime numbers that add to 36.

(5,31) (7,29) (13,23) (17,19)

32. [Problem Solving 2] *

In the multiplication below, each of A, B and C represents a different digit. What is ABC?

$$\begin{array}{r} \text{A B C} \\ \times \quad 3 \\ \hline \text{B B B} \end{array}$$

148

MATHS MATE

Term 3 - Sheet 4

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$174 \times 28 =$ **4872**

2. [Decimal +,–] *

$10.1 - 0.306 =$ **9.794**

3. [Decimal ×,÷] *

$162.4 \div 7 =$ **23.2**

4. [Fraction +,–]

$3 - \frac{5}{6} =$ **$2\frac{1}{6}$**

5. [Fraction ×,÷] *

$\frac{4}{5} \times \frac{7}{12} =$ **$\frac{7}{15}$**

6. [Percentages] *

250% of 60 = **150**

7. [Decimals / Fractions / Percentages] *

Nine tenths of a watermelon is water. Write this fraction as a percentage. **90%**

8. [Integer +,–]

$(-13) + (-8) =$ **–21**

9. [Integer ×,÷]

$(+70) \times (-10) =$ **–700**

10. [Rates / Ratios] *

Find the missing term in the proportion:

$\frac{10}{6} = \frac{x}{15}$ **$x = 25$**

11. [Indices]

Simplify $n^2 \times n^5$ **n^7**

12. [Square Roots]

$\sqrt{36} \times \sqrt{9} =$ **18**

13. [Exploring Number] *

$-20 + 6 \times (8 + 12) \div 4 - 3 =$ **7**

14. [Financial Mathematics] *

Hannah and Zach together earn $950 for an advertising drop. They earn equal hourly rates of pay. If Hannah worked for 10 hours and Zach for 9 hours, how much did Zach earn? **$450**

15. [Number Patterns]

Complete the pattern:

729 , –243 , 81 , –27 , 9 , **–3** , **1**

16. [Expressions]

Simplify $2m^2 - 2m + 3m^2$ **$5m^2 - 2m$**

17. [Substitution] *

Use $SI = PRT$ to find the simple interest SI when $P = 2000$, $R = 0.08$ and $T = 2$ **320**

18. [Expansion]

Expand $-2s(3t + 5s)$ **$-6st - 10s^2$**

19. [Factorisation]

Factorise $4y + 12y^2$ **$4y(1 + 3y)$**

20. [Equations] *

Solve for x: $5x = 21 - 2x$ **3**

21. [Coordinate Geometry] *

Use $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ to find the coordinates of the midpoint M of the interval joining the points (–1,4) and (–3,–2). **(–2,1)**

QUOTE OF THE WEEK: Make money your God and it will plague you like the devil. Henry Fielding

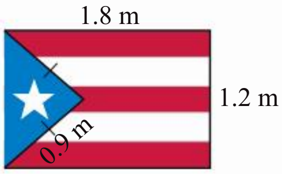
22. [Units of Measurement / Time] *

The world high jump record for men is 2.45 m. The world high jump record for women is 2.09 m. Express the difference in millimetres.

360 mm

23. [Perimeter / Area] *

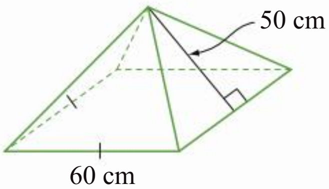
Find the perimeter around the striped portion of this Puerto Rican flag.



6.6 m

24. [Surface Area] *

Find the total surface area of the regular square pyramid.



9600 cm^2

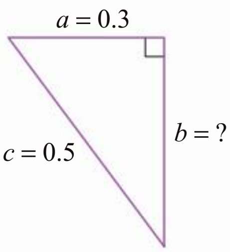
25. [Volume] *

The Luxor Hotel in Las Vegas is a square pyramid approximately 200 m wide at the base and 105 m high. Find the volume of the building.

1 400 000 m^3

26. [Pythagoras] *

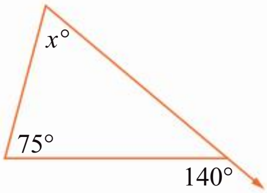
Using Pythagoras' theorem, find the length of the side labelled b.



0.4

27. [Angles] *

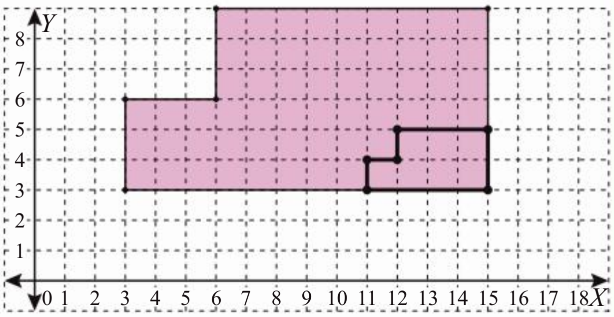
Find the value of $x°$.



65°

28. [Geometric Reasoning]

Redraw the shape reduced by a scale factor of $\frac{1}{3}$ about the point of coordinates (15,3).



29. [Statistics] *

The stem plot shows the points for and against West Coast during the 2018 Australian Football League home-and-away season. Find the difference between the medians of the two sets of data.

Points for		Points against
1	4	6
7 2	5	8 9
2	6	0 0 1 7 9
9 8 5	7	0 2 2 5
9 6 6 6	8	0 0 1 1 3 4 8 8
8 5 1	9	
2 2 1 0	10	8
	11	5
1	12	
9 0	13	
2	14	

Key
10 | 5 = 105

16.5

30. [Probability] *

The traffic lights at a certain intersection show red 55% of the time, yellow 10% and green the rest of the time. What is the probability that the lights will not be green at any given time? [Give your answer as a decimal.]

0.65

31. [Problem Solving 1] *

Find all the possible values for the integer n so that $\frac{9}{n+1}$ is also an integer.

[Hint: Integers are –3, –2, –1, 0, 1, 2.....]

–10, –4, –2, 0, 2, 8

32. [Problem Solving 2] *

Find the largest 6-digit number which is divisible by 3, 4 and 5.

999 960

MATHS MATE

Term 3 - Sheet 5

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$902 \div 11 =$ **82**

2. [Decimal +,–] *

$2.23 + 0.01 + 0.41 =$ **2.65**

3. [Decimal ×,÷]

$3.5 \div 10 =$ **0.35**

4. [Fraction +,–] *

$\frac{1}{2} + \frac{1}{4} =$ $\frac{3}{4}$

5. [Fraction ×,÷] *

$3 \div \frac{2}{5} =$ $7\frac{1}{2}$

6. [Percentages] *

Increase 900 by 1%. **909**

7. [Decimals / Fractions / Percentages] *

Complete the table:

Decimal	Fraction	Percentage
0.03	$\frac{3}{100}$	3%

8. [Integer +,–]

$(-18) - (+5) =$ **–23**

9. [Integer ×,÷]

$\frac{-18}{-3} =$ **6**

10. [Rates / Ratios] *

The ratio of strings to woodwind instruments in a baroque orchestra is 5 : 3. If there are 24 instruments in total, how many stringed instruments are there in the orchestra? **15**

11. [Indices] *

Evaluate $2^9 \div 2^5$ **16**

12. [Square Roots] *

$\sqrt{400} \div \sqrt{16} =$ **5**

13. [Exploring Number]

Write 3×10^7 km^3, the total volume of the continental Antarctica ice sheet, as a basic numeral. **30 000 000**

14. [Financial Mathematics] *

Holly's pay cheque is \$1500 per fortnight. Holly's tax for the year is \$11 000. How much is her yearly gross income?
[Assume 26 fortnights in a year.] **\$50 000**

15. [Number Patterns] *

Find the 10th term in the pattern:
1 , 3 , 5 , 7 , 9 , ... **19**

16. [Expressions]

Simplify $3 \times 5y$ **$15y$**

17. [Substitution] *

If $y = 3(x + 1)$, find y when $x = 0$ **3**

18. [Expansion] *

Expand and simplify
$5(y + 1) - 2y$ **$3y + 5$**

19. [Factorisation]

Factorise $ab^2 - b$ **$b(ab - 1)$**

20. [Equations] *

Solve for x: $\frac{8}{x} = 4$ **2**

21. [Coordinate Geometry] *

Write the equation $7x - y = 14$ in the gradient-intercept form $y = mx + c$, where m represents the gradient and c the y-intercept. **$y = 7x - 14$**

QUOTE OF THE WEEK: If it can't cry for you, don't cry for it. Sammy Newman

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

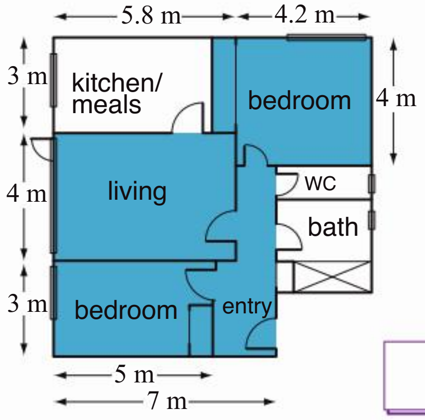
22. [Units of Measurement / Time] *

Convert 1234 milligrams to grams.

1.234 g

23. [Perimeter / Area] *

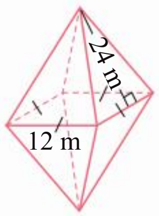
Find the total floor area to be carpeted.



67 m^2

24. [Surface Area] *

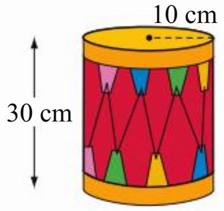
Find the total surface area of the octahedron.



1152 m^2

25. [Volume] *

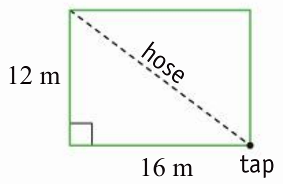
Using $V = \pi r^2 h$ and $\pi \approx 3.14$, find the volume of the drum.



9420 cm^3

26. [Pythagoras] *

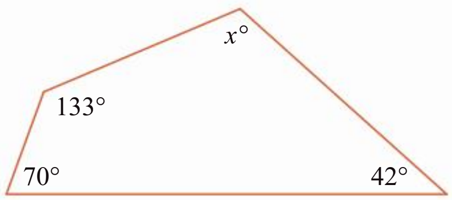
How long must the garden hose be to reach the furthest corner of the garden?



20 m

27. [Angles] *

Find the value of $x°$.

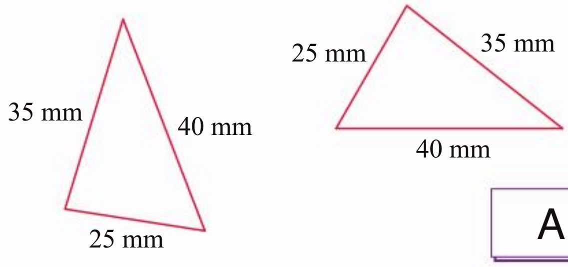


115°

28. [Geometric Reasoning]

Which congruence test can be applied to show that these triangles are congruent?

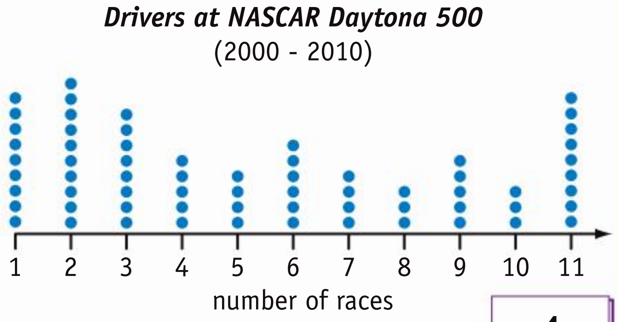
A) side-side-side (SSS)
B) side-angle-side (SAS)
C) angle-angle-side (AAS)
D) right-hypotenuse-side (RHS)



A

29. [Statistics]

How many drivers participated in the '*Daytona 500*' seven times between 2000 and 2010?

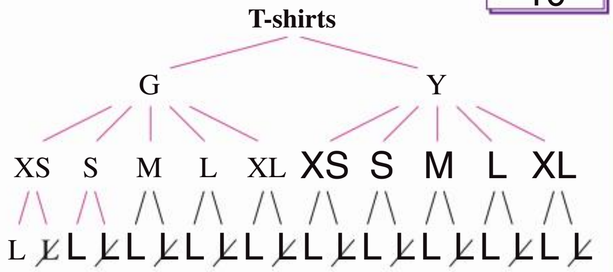


4

30. [Probability] *

The T-shirts on sale come in 2 colours (green, yellow) and in 5 sizes (XS, S, M, L, XL). The T-shirts can be purchased with or without a logo. Complete the tree diagram. What is the probability of choosing a medium (M) T-shirt with a logo? [Give your answer as a fraction in simplest form.]

$\frac{1}{10}$



31. [Problem Solving 1] *

What are the last two digits in the expansion of 5^{2012}?

25

32. [Problem Solving 2] *

How many numbers between 201 and 301 are divisible by both 3 and 4?

9

MATHS MATE
Term 3 - Sheet 6

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *
$2844 \div 12 =$ **237**

2. [Decimal +,−] *
$12.1 + 1.8 + 0.2 =$ **14.1**

3. [Decimal ×,÷]
$50.7 \div 100 =$ **0.507**

4. [Fraction +,−] *
$\frac{7}{15} - \frac{1}{5} =$ $\frac{4}{15}$

5. [Fraction ×,÷] *
$4 \div \frac{2}{7} =$ **14**

6. [Percentages] *
Increase 80 by 15%. **92**

7. [Decimals / Fractions / Percentages] *
Complete the table:

Decimal	Fraction	Percentage
0.125	$\frac{125}{1000} = \frac{1}{8}$	12.5%

8. [Integer +,−]
$(-17) - (-12) =$ **−5**

9. [Integer ×,÷]
$\frac{-28}{7} =$ **−4**

10. [Rates / Ratios] *
A mower is fueled with petrol and oil in a ratio of 4 : 1. If the tank holds 1200 mL, how much oil is in the tank? **240** mL

11. [Indices] *
Evaluate $7^4 \div 7$ **343**

12. [Square Roots] *
$\sqrt{225} \div \sqrt{25} =$ **3**

13. [Exploring Number]
Write 4 600 000 000 years, the age of the Earth, in scientific notation. 4.6×10^9

14. [Financial Mathematics] *
Tim's gross wage is \$3000 per fortnight. He pays 25% of the gross wage in tax and 9% of the gross wage in other deductions. Calculate Tim's net wage per fortnight.
[net wage = gross wage − total deductions] **\$1980**

15. [Number Patterns] *
Find the 20th term in the pattern:
2 , 4 , 6 , 8 , 10 , ... **40**

16. [Expressions]
Simplify $2ab \times 4$ $8ab$

17. [Substitution] *
If $y = -2(x - 3)$, find y when $x = 3$ **0**

18. [Expansion] *
Expand and simplify
$3(w - 2) + 8$ $3w + 2$

19. [Factorisation]
Factorise $3m^2n + 2m$ $m(3mn + 2)$

20. [Equations] *
Solve for x: $\frac{4}{x} = \frac{2}{5}$ **10**

21. [Coordinate Geometry] *
Write the equation $3y - 9x = 18$ in the gradient-intercept form $y = mx + c$, where m represents the gradient and c the y-intercept. $y = 3x + 6$

QUOTE OF THE WEEK: Realise what you really want. It stops you from chasing butterflies and puts you to work digging gold. William Moulton Marston

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

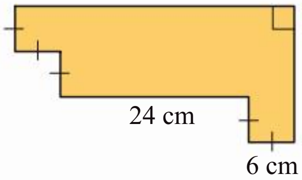
22. [Units of Measurement / Time] ✻

Weightlifter Leonid Taranenko, in 1988 in Canberra, lifted 266 kg in the 'clean and jerk'. Is this record <, = or > 26 600 g?

>

23. [Perimeter / Area] ✻

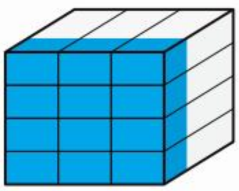
Find the area of the shape.

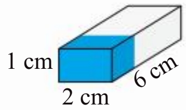


432 cm^2

24. [Surface Area] ✻

Lou bought a rectangular box containing 12 tightly packaged erasers. What is the total surface area of the box?

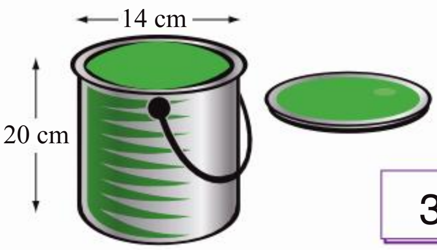




168 cm^2

25. [Volume] ✻

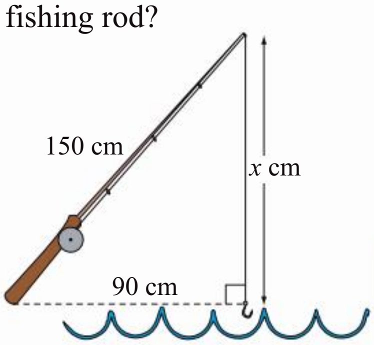
Using $\pi \approx \frac{22}{7}$ find the volume of the paint can.



3080 cm^3

26. [Pythagoras] ✻

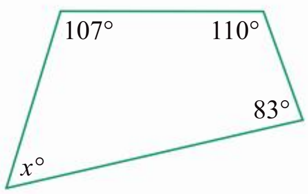
How long is the vertical fishing line on the fishing rod?



120 cm

27. [Angles] ✻

Find the value of $x°$.

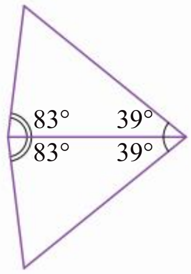


60°

28. [Geometric Reasoning]

Which congruence test can be applied to show that these triangles are congruent?

A) side-side-side (SSS)
B) side-angle-side (SAS)
C) angle-side-angle (ASA)
D) right-hypotenuse-side (RHS)



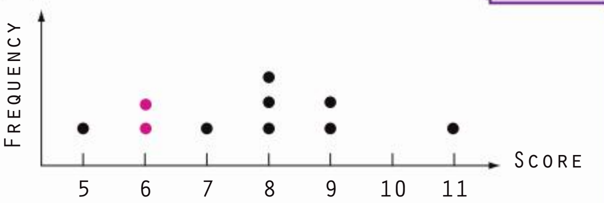
C

29. [Statistics] ✻

Complete the dot plot and find the median of the following data:

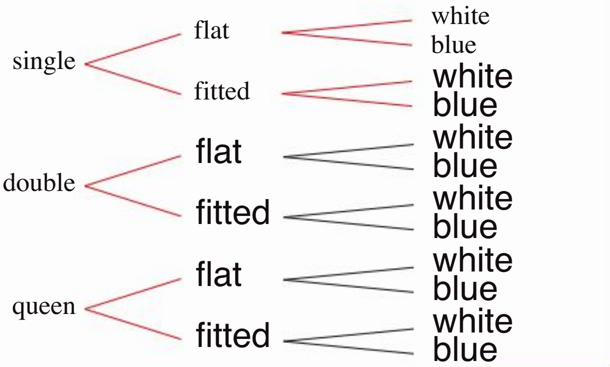
~~6~~, ~~6~~, 5, 11, 7, 8, 9, 8, 8, 9

8



30. [Probability] ✻

The sheets displayed for sale on a table come in 3 bed sizes (single, double, queen) and in 2 styles (flat and fitted). Each style comes in 2 colours (white and blue). Complete the tree diagram. What is the probability of choosing a double bed sheet from the sale table? [Give your answer as a fraction in simplest form.]



$\frac{1}{3}$

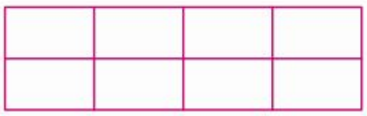
31. [Problem Solving 1] ✻

Find the sum of the first 20 odd numbers.

400

32. [Problem Solving 2] ✻

How many rectangles are in the diagram?



30

MATHS MATE

Term 3 - Sheet 7

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$4650 \div 25 =$ **186**

2. [Decimal +,−] *

$2.31 + 0.05 - 0.3 =$ **2.06**

3. [Decimal ×,÷]

$0.9 \div 100 =$ **0.009**

4. [Fraction +,−] *

$\frac{1}{10} - \frac{3}{50} =$ $\frac{1}{25}$

5. [Fraction ×,÷] *

$9 \div \frac{3}{8} =$ **24**

6. [Percentages] *

Increase 400 by 12%. **448**

7. [Decimals / Fractions / Percentages] *

Since 1973, 10 male tennis players have been world number one for 80 or more weeks, and two fifths of these are American. How many Americans is this? **4**

8. [Integer +,−]

$(+16) - (-7) =$ **23**

9. [Integer ×,÷]

$\frac{24}{-8} =$ -3

10. [Rates / Ratios] *

The ages of mother and son are in a ratio of 10 : 3. If the mother is 40 years old, how old is the son? **12** years

11. [Indices] *

Evaluate $\frac{3^6}{3^2}$ **81**

12. [Square Roots] *

$\frac{\sqrt{2500}}{\sqrt{100}} =$ **5**

13. [Exploring Number]

The distance travelled by light in one year is 9 500 000 000 000 km. Write this in scientific notation.

9.5×10^{12}

14. [Financial Mathematics] *

Nate's taxable income is $47,000. What is the amount of tax payable on his income?

Taxable Income	Tax on this income*
0-$18,200	Nil
$18,201 - $37,000	19¢ for each $1 over $18,200
$37,001 - $90,000	$3,572 plus 32.5¢ for each dollar over $37,000
$90,001 - $180,000	$20,797 plus 37¢ for each dollar over $90,000
$180,001 and over	$54,097 plus 45¢ for each dollar over $180,000

*Resident tax rates 2019-2020 (Australia)

$6822

15. [Number Patterns] *

Find the 10th term in the pattern:

2 , 4 , 8 , 16 , 32 , ...

1024

16. [Expressions]

Simplify $-3l \times 4m$ $-12lm$

17. [Substitution] *

If $y = x(x - 4)$, find y when $x = 7$ **21**

18. [Expansion] *

Expand and simplify

$10c + c(c - 4)$ $c^2 + 6c$

19. [Factorisation]

Factorise $8b - 6ab^2$ $2b(4 - 3ab)$

20. [Equations] *

Solve for x: $\frac{2x - 6}{4} = 5$ **13**

21. [Coordinate Geometry] *

Complete the table:

equation	gradient (m)	x-intercept	y-intercept (c)
$y = 3x + 4$	3	$(-\frac{4}{3}, 0)$	(0,4)

QUOTE OF THE WEEK: One joy scatters a hundred griefs. Chinese Proverb

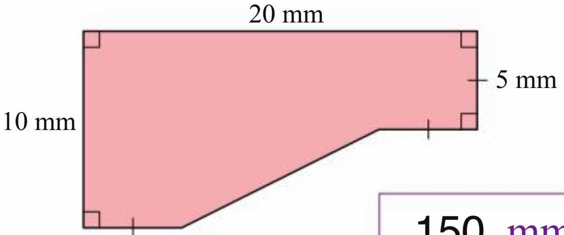
22. [Units of Measurement / Time] ✻

The 'Lesser Star of Africa' diamond on the front of the 'Imperial State Crown' worn by the British monarchy is 317.4 carats in size. If a carat is equivalent to 0.2 g, what is the weight of the diamond?

63.48 g

23. [Perimeter / Area] ✻

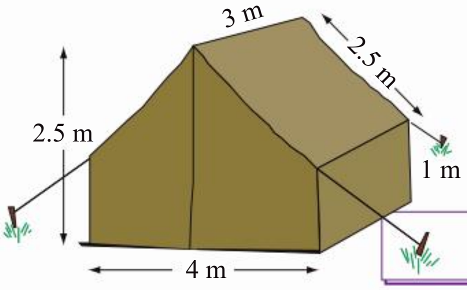
Find the area of the polygon.



150 mm^2

24. [Surface Area] ✻

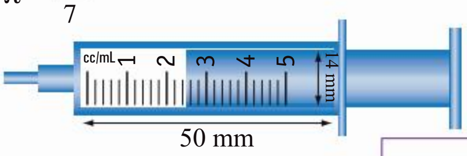
Find the surface area of the tent canvas without the floor.



35 m^2

25. [Volume] ✻

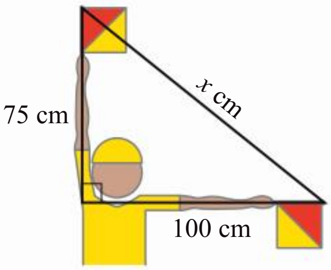
Find the total volume of the cylindrical syringe of diameter 14 mm and length 50 mm, using $\pi \approx \frac{22}{7}$



7700 mm^3

26. [Pythagoras] ✻

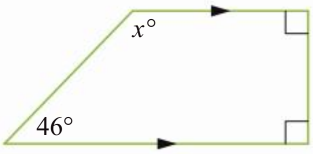
What is the distance between the flags when this semaphore is signalling the letter J as shown in the diagram?



125 cm

27. [Angles] ✻

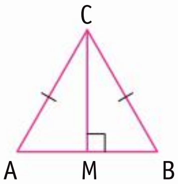
Find the value of $x°$.



134°

28. [Geometric Reasoning]

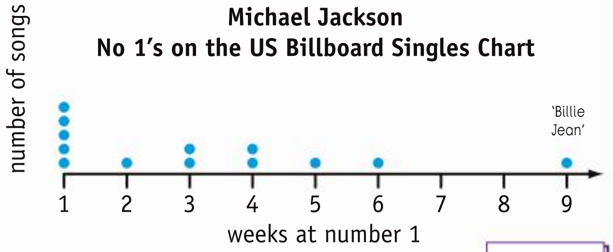
Which congruence test (SSS, SAS, AAS, RHS) can be applied to show that triangle AMC is congruent to triangle MBC?



RHS

29. [Statistics] ✻

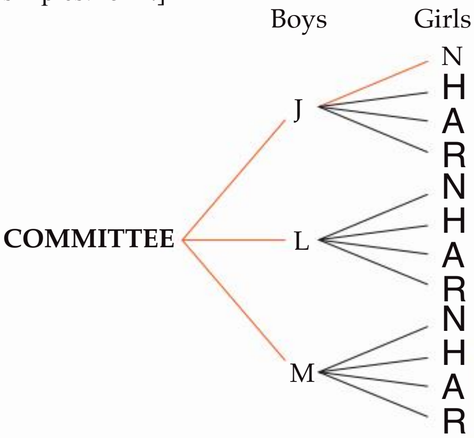
Michael Jackson had 13 songs that made it to number one on the US Billboard charts. What is the median number of weeks spent at number one for these songs?



3

30. [Probability] ✻

A committee consisting of one boy and one girl is to be selected from 3 boys (Jordan, Lee and Marco) and 4 girls (Nicole, Helen, Anna and Rita). Complete the tree diagram. Find the probability that Jordan is not a member of the committee. [Give your answer as a fraction in simplest form.]



$\frac{2}{3}$

31. [Problem Solving 1] ✻

If you have 50¢, $1 and $2 coins, in how many ways can you make up $5?

12

32. [Problem Solving 2] ✻

What is the last digit in the expansion of 3^{100}?

1

MATHS MATE

Term 3 - Sheet 8

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *
$5306 \div 14 =$ **379**

2. [Decimal +,–] *
$7.4 + 1.46 - 0.04 =$ **8.82**

3. [Decimal ×,÷]
$0.062 \div 10 =$ **0.0062**

4. [Fraction +,–] *
$\frac{3}{4} - \frac{9}{20} =$ $\frac{3}{10}$

5. [Fraction ×,÷] *
$6 \div \frac{4}{7} =$ $10\frac{1}{2}$

6. [Percentages] *
Increase 65 by 80%. **117**

7. [Decimals / Fractions / Percentages] *
Of the 24 players who scored 2 goals or more at the 2010 FIFA World Cup, seven eighths were not from Brazil. How many of these players were not from Brazil? **21**

8. [Integer +,–]
$(-13) - (+4) =$ **–17**

9. [Integer ×,÷]
$\frac{-35}{7} =$ **–5**

10. [Rates / Ratios] *
The ratio of molars to all teeth in healthy human adults is 3 : 8. If adults have 32 teeth, how many molars do adults have? **12**

11. [Indices] *
Evaluate $\frac{5^5}{5^4}$ **5**

12. [Square Roots] *
$\frac{\sqrt{144}}{\sqrt{9}} =$ **4**

13. [Exploring Number]
Write 400 billion, the number of stars in the Milky Way galaxy, in scientific notation. 4×10^{11}

14. [Financial Mathematics] *
Joanna's taxable income is $100,000. What is the amount of tax payable on her income?

Taxable Income	Tax on this income*
0-$18,200	Nil
$18,201 - $37,000	19¢ for each $1 over $18,200
$37,001 - $90,000	$3,572 plus 32.5¢ for each dollar over $37,000
$90,001 - $180,000	$20,797 plus 37¢ for each dollar over $90,000
$180,001 and over	$54,097 plus 45¢ for each dollar over $180,000

*Resident tax rates 2019-2020 (Australia)

$24,497

15. [Number Patterns] *
Find the 15th term in the pattern:
2 , 5 , 8 , 11 , 14 , ... **44**

16. [Expressions]
Simplify $10v \times 4v$ $40v^2$

17. [Substitution] *
If $y = (x + 1)(x - 5)$, find y when $x = 5$ **0**

18. [Expansion]
Expand $12 + q(3p - 5)$ $12 + 3pq - 5q$

19. [Factorisation]
Factorise $c^2b - 4c^2d$ $c^2(b - 4d)$

20. [Equations] *
Solve for x: $\frac{x+4}{3} = \frac{x-8}{5}$ **–22**

21. [Coordinate Geometry] *
Complete the table:

equation	gradient (m)	x-intercept	y-intercept (c)
$y = \frac{2}{3}x + 1$	$\frac{2}{3}$	$(-\frac{3}{2},0)$	(0,1)

QUOTE OF THE WEEK: Katz's Law - Men and nations will act rationally when all other possibilities have been exhausted. Rossiter

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

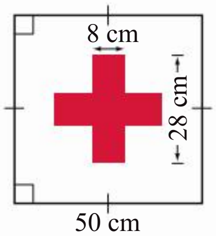
22. [Units of Measurement / Time] ✻

New Yorkers create about 12 000 000 kg of rubbish per day. The Hoover dam is made from 8 400 000 tonnes of concrete. How many days of rubbish would be equivalent to the mass of the Hoover dam?

700 days

23. [Perimeter / Area] ✻

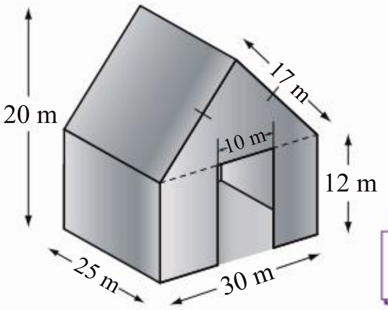
Given the International Red Cross is central on the flag, and both cross bars are congruent, what area of this flag is white?



2116 cm^2

24. [Surface Area] ✻

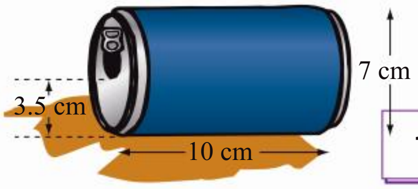
Find the surface area of the steel warehouse excluding its floor and front door.



2290 m^2

25. [Volume] ✻

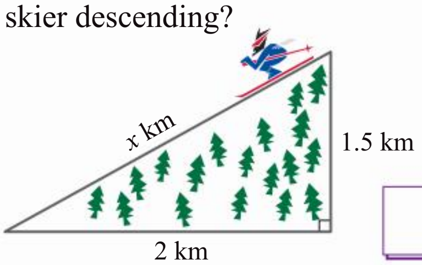
Using $\pi \approx \frac{22}{7}$ find the volume of drink left in the can given that it remains half full.
[Hint: 1 mL = 1 cm^3]



192.5 mL

26. [Pythagoras] ✻

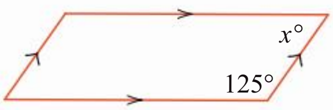
How far down this mountain slope is the skier descending?



2.5 km

27. [Angles] ✻

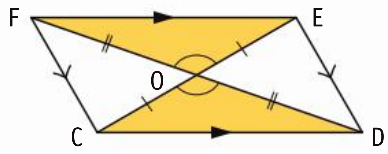
Find the value of $x°$.



55°

28. [Geometric Reasoning]

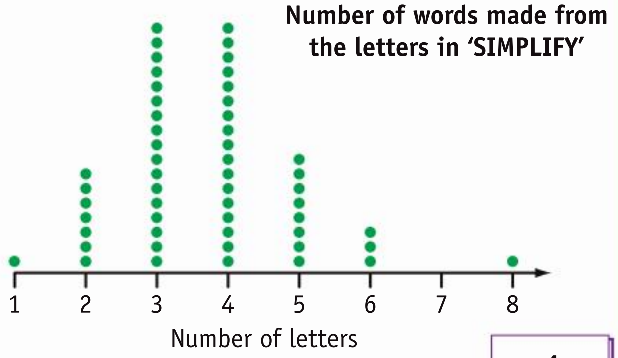
Which congruence test (SSS, SAS, AAS, RHS) can be applied to show that triangle COD is congruent to triangle EOF?



SAS

29. [Statistics] ✻

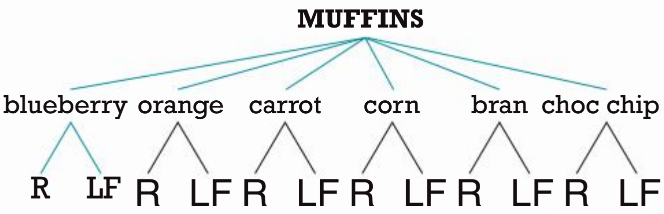
Of the total number of words that can be made from the letters in 'SIMPLIFY', how many letters are there in the median word?



4

30. [Probability] ✻

At the cafeteria, muffins are sold in the following flavours: blueberry, orange, carrot, corn, bran and choc chip. There are regular and low fat options for all flavours. Shirley chooses a muffin at random. Complete the tree diagram. What is the probability she chooses a low fat muffin? [Give your answer as a fraction in simplest form.]



$\frac{1}{2}$

31. [Problem Solving 1] ✻

A bag weighs 336 grams when full and 171 grams when half full. What does the bag weigh when empty?

6 g

32. [Problem Solving 2] ✻

What is the sum of the digits of all 2-digit numbers from 10 to 99?

855

MATHS MATE

Term 4 - Sheet 1

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$670 \times 150 =$ **100 500**

2. [Decimal +,–] *

$1 - 0.25 =$ **0.75**

3. [Decimal ×,÷] *

$5.8 \div 0.1 =$ **58**

4. [Fraction +,–] *

$\frac{1}{4} + \frac{3}{5} =$ **$\frac{17}{20}$**

5. [Fraction ×,÷] *

$\frac{4}{5} \times \frac{5}{16} =$ **$\frac{1}{4}$**

6. [Percentages] *

Decrease 6000 by 7%. **5580**

7. [Decimals / Fractions / Percentages] *

Which is greater?

0.5 or $\frac{2}{3}$ **$\frac{2}{3}$**

8. [Integer +,–] *

$(+9) + (-2) + (+4) =$ **11**

9. [Integer ×,÷] *

$(-2) \times (+4) \times (+5) =$ **–40**

10. [Rates / Ratios] *

The Horned Sungem, a hummingbird from South America, can beat its wings 5400 times a minute. What is the average rate in beats per second? **90 beats/s**

11. [Indices]

Simplify $w^8 \div w^2$ **w^6**

12. [Square Roots] *

$\sqrt{49} - \sqrt{25} =$ **2**

13. [Exploring Number]

Choose the whole numbers from this list:

$-6, 4, 3.14, 71, \frac{4}{5}, 0$ **4, 71, 0**

14. [Financial Mathematics] *

Simple Interest = Principal × Rate × Time.
How much interest would Anthony earn if he invests $1000 for 2 years at an interest rate of 9% per year? **$180**

15. [Number Patterns] *

If the general rule of a sequence is $3n + 2$ find the 25th term ($n = 25$). **77**

16. [Expressions]

Simplify $16a \div 4$ **$4a$**

17. [Substitution] *

If $y = -x + 6$, find y when $x = -4$ **10**

18. [Expansion] *

Expand and simplify
$2(t - 5) + 6(t + 1)$ **$8t - 4$**

19. [Factorisation]

Factorise
$a(a + 4) + 3(a + 4)$ **$(a + 4)(a + 3)$**

20. [Equations] *

Solve the inequation:
$3x - 4 \geq 8$ **$x \geq 4$**

21. [Coordinate Geometry] *

Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line passing through the points (3,5) and (0,–7). **4**

QUOTE OF THE WEEK: If we had everything we wanted, we wouldn't like what we had. William Feather

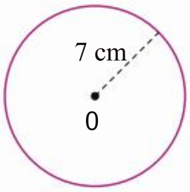
22. [Units of Measurement / Time] ✻

Convert 300 millilitres to litres.

0.3 L

23. [Perimeter / Area] ✻

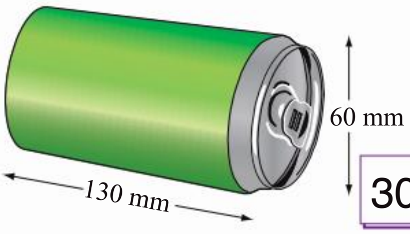
Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, find the circumference of the circle.



44 cm

24. [Surface Area] ✻

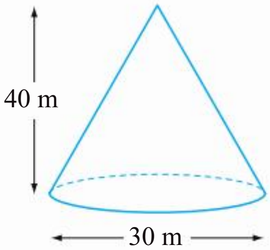
Using $TSA = 2\pi r(r + h)$ and $\pi \approx 3.14$, find the total surface area of the can.



30 144 mm^2

25. [Volume] ✻

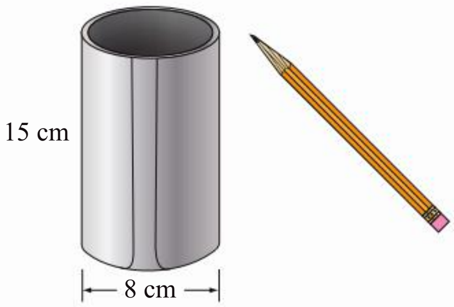
Using $V = \frac{\pi r^2 h}{3}$ and $\pi \approx 3.14$, find the volume of the cone.



9420 m^3

26. [Pythagoras] ✻

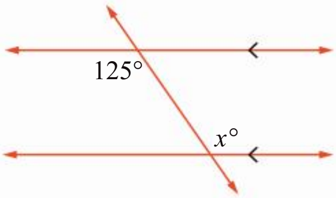
Would a pencil 18 cm long fit inside this tin with its lid on? [Objects not drawn to scale.]



no

27. [Angles]

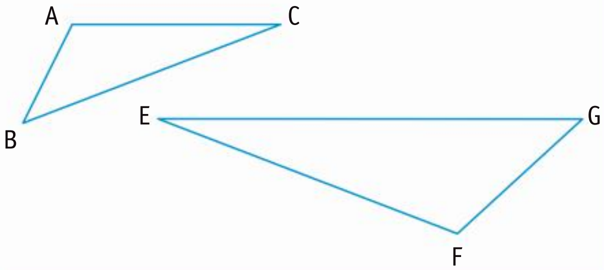
Find the value of $x°$.



125°

28. [Geometric Reasoning]

Complete the pairs of equal angles for these similar triangles.



$\angle A = \angle F$, $\angle B = \angle G$, $\angle C = \angle E$

29. [Statistics]

How many scores are there of 2 or less in the following distribution?

Score	0	1	2	3	4
Frequency	7	11	4	3	1

22

30. [Probability] ✻

Two coins are tossed at the same time. Complete the table. Find the probability of tossing a tail and a head. [Give your answer as a fraction in simplest form.]

Possible outcomes		Coin 1	
		H	**T**
Coin 2	**H**	H,H	H,T
	T	T,H	T,T

$\frac{1}{2}$

31. [Problem Solving 1] ✻

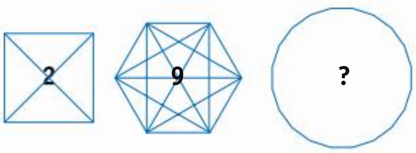
On a quiz, a correct response is awarded 2 points, but 1 point is deducted for each error. Lu received 9 points for his 15 answers. How many correct responses did he make?

8

32. [Problem Solving 2] ✻

If each corner of a square is joined to every opposite corner, 2 diagonals will have been drawn. If opposite vertices of a hexagon are joined, there would be 9 diagonals. How many diagonals can be drawn in a regular polygon with 20 sides?

Formula:
Number of diagonals on a polygon with n sides
$\frac{n(n-3)}{2}$



170

MATHS MATE

Term 4 - Sheet 2

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$342 \times 260 =$ **88 920**

2. [Decimal +,–] *

$10 - 0.07 =$ **9.93**

3. [Decimal ×,÷] *

$0.067 \div 0.1 =$ **0.67**

4. [Fraction +,–] *

$\frac{3}{8} - \frac{1}{3} =$ $\frac{1}{24}$

5. [Fraction ×,÷] *

$\frac{5}{9} \times \frac{3}{10} =$ $\frac{1}{6}$

6. [Percentages] *

Reduce 3400 by 80%. **680**

7. [Decimals / Fractions / Percentages] *

Which is greater?

40% or $\frac{1}{5}$ **40%**

8. [Integer +,–] *

$(+7) + (+3) - (-5) =$ **15**

9. [Integer ×,÷] *

$(+6) \times (+2) \times (-2) =$ **–24**

10. [Rates / Ratios] *

In Australia, the minimum rate of pay for adults is \$18.93 per hour. At this rate what is the pay for an adult working 8 hours?

\$151.44

11. [Indices]

Simplify $a^6 \div a$ a^5

12. [Square Roots] *

$\sqrt{121} + \sqrt{81} =$ **20**

13. [Exploring Number]

Choose the integers from this list:

$13, -4.5, -100, 8, \frac{2}{15}, \frac{6}{3}$ $13, -100, 8, \frac{6}{3}$

14. [Financial Mathematics] *

Simple Interest = Principal × Rate × Time. How much interest would Paul pay on his loan after 2 years if he owed \$1200 at an interest rate of 15% per year? **\$360**

15. [Number Patterns] *

If the general rule of a sequence is $2(n + 5)$ find the 17th term ($n = 17$). **44**

16. [Expressions]

Simplify $9r \div 3r$ **3**

17. [Substitution] *

If $y = -10 - x$, find y when $x = -2$ **–8**

18. [Expansion] *

Expand and simplify

$3(x - 3) + 7(x - 4)$ $10x - 37$

19. [Factorisation]

Factorise

$c(c - 2) + 5(c - 2)$ $(c - 2)(c + 5)$

20. [Equations] *

Solve the inequation:

$2x + 1 < 7$ $x < 3$

21. [Coordinate Geometry] *

Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line passing through the points (0,0) and (–5,1).

$-\frac{1}{5}$

QUOTE OF THE WEEK: When a diplomat says yes, he means perhaps; when he says perhaps, he means no; and when he says no, he is no diplomat. Rossiter

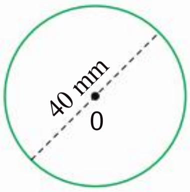
22. [Units of Measurement / Time] *

The petrol tank of a ride on mower holds $0.004\ m^3$. What is its volume in cm^3?

$4000\ cm^3$

23. [Perimeter / Area] *

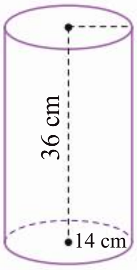
Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



125.6 mm

24. [Surface Area] *

Find the total surface area of the cylinder, using $\pi \approx \frac{22}{7}$



$4400\ cm^2$

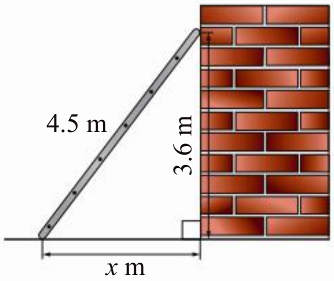
25. [Volume] *

Using $V = \frac{4\pi r^3}{3}$ and $\pi \approx \frac{22}{7}$, find the volume of the spherical globe of the gumball machine.

$4851\ cm^3$

26. [Pythagoras] *

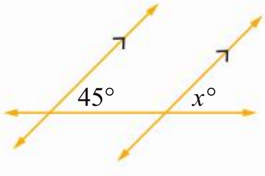
A 4.5 m long ladder is leaning 3.6 m up a wall. How far out from the base of the wall is the end of the ladder?



2.7 m

27. [Angles]

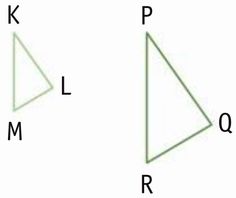
Find the value of $x°$.



45°

28. [Geometric Reasoning]

Complete the ratios of corresponding sides for these similar triangles.



$\frac{KL}{PQ} = \frac{LM}{QR} = \frac{KM}{PR}$

29. [Statistics] *

Find the median and range of the following distribution.

Score	9	6	3	1	0
Frequency	3	5	4	5	6

median = 3 range = 9

30. [Probability] *

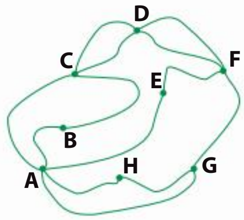
A pair of standard dice are rolled. Complete the table. What is the probability of rolling at least one even number in the pair? [Give your answer as a fraction in simplest form.]

Possible outcomes	Die 1: 1	2	3	4	5	6
Die 2: 1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

$\frac{3}{4}$

31. [Problem Solving 1] *

If you start at point A and travel every road once and only once, at which point would you finish?



G

32. [Problem Solving 2] *

A farmer was asked how many cows he had on his property. He replied that he was unsure, but he knew that when he counted them by twos, threes, fours, fives or sixes, he always had one left over. The only way he could avoid this was to count by sevens; he then had none left over. What is the smallest number of cows the farmer could possibly have owned?

301

MATHS MATE
Term 4 - Sheet 3

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *
$157 \times 240 =$ **37 680**

2. [Decimal +,–] *
$100 - 0.57 =$ **99.43**

3. [Decimal ×,÷] *
$0.89 \div 0.01 =$ **89**

4. [Fraction +,–] *
$\frac{2}{9} - \frac{1}{12} =$ **$\frac{5}{36}$**

5. [Fraction ×,÷] *
$\frac{7}{15} \times \frac{5}{21} =$ **$\frac{1}{9}$**

6. [Percentages] *
Decrease 200 by 3%. **194**

7. [Decimals / Fractions / Percentages] *
Place in ascending order:
$\frac{1}{2}$, 55%, 0.05 **0.05, $\frac{1}{2}$, 55%**

8. [Integer +,–] *
$(+8) - (+4) + (-9) =$ **–5**

9. [Integer ×,÷] *
$(-2) \times (-5) \times (-5) =$ **–50**

10. [Rates / Ratios] *
\$10/kg = **1000** cents/kg

11. [Indices]
Simplify $\frac{k^6}{k^2}$ **k^4**

12. [Square Roots] *
$3\sqrt{16} + 2\sqrt{16} =$ **20**

13. [Exploring Number]
Is $-\frac{6}{12}$ a whole number, an integer or a rational number? **rational**

14. [Financial Mathematics] *
Derek invested \$850 at 6% simple interest for 5 years. Using $SI = PRT$, how much interest did Derek earn? **\$255**

15. [Number Patterns] *
If the general rule of a sequence is $8 - \frac{n}{4}$ find the 40th term ($n = 40$). **–2**

16. [Expressions]
Simplify $-15tu \div 5u$ **$-3t$**

17. [Substitution] *
If $y = 12x$, find y when $x = -5$ **–60**

18. [Expansion] *
Expand and simplify
$4(2vw + 1) + 3(vw - 5)$ **$11vw - 11$**

19. [Factorisation]
Factorise
$3(g - 5) - g(g - 5)$ **$(g - 5)(3 - g)$**

20. [Equations] *
Solve the inequation:
$\frac{x}{3} + 4 \le 2$ **$x \le -6$**

21. [Coordinate Geometry] *
Use $y - y_1 = m(x - x_1)$ where $m = \frac{y_2 - y_1}{x_2 - x_1}$ to write the equation of the line passing through the points (–1,3) and (–4,0). **$y = x + 4$**

QUOTE OF THE WEEK: To make any gain, some outlay is necessary. Dutch Proverb

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

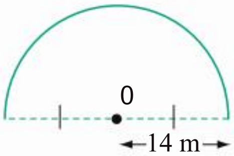
22. [Units of Measurement / Time] *

A manufacturer uses 1.5 L of water to make 1 L of cola drink. Express the difference in millilitres.

500 mL

23. [Perimeter / Area] *

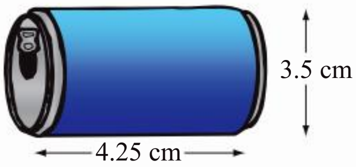
Using $\pi \approx \frac{22}{7}$ find the perimeter of the semicircle.



44 m

24. [Surface Area] *

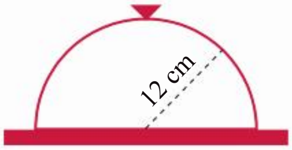
The kindergarten students are making labels to cover soft drink cans for a charity drive. Each label will cover the entire lateral area of a can. Using $\pi \approx \frac{22}{7}$ find the lateral area that needs to be covered for each can.



46.75 cm^2

25. [Volume] *

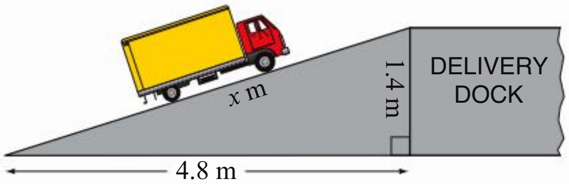
Find the volume of this lid in the shape of a hemisphere, using $\pi \approx 3.14$ [Round the answer to the nearest whole number.]



3617 cm^3

26. [Pythagoras] *

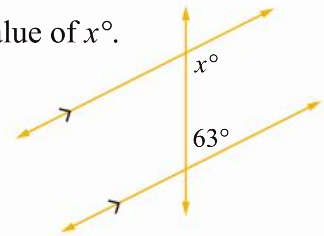
What is the total distance up the ramp that a truck must travel to reach the delivery dock?



5 m

27. [Angles] *

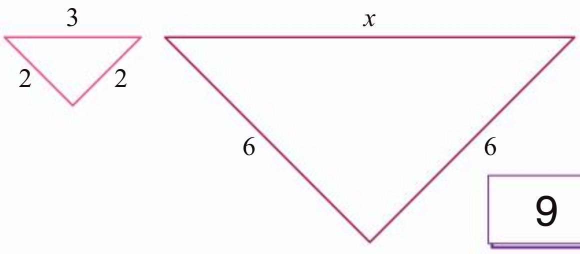
Find the value of $x°$.



117°

28. [Geometric Reasoning] *

Find the value of x in this pair of similar triangles. [All measurements are in cm.]



9

29. [Statistics] *

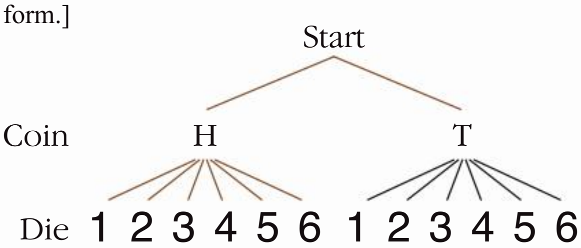
Find the median and mode of the following distribution.

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

median = 13   mode = 13

30. [Probability] *

A coin is tossed and a standard die is rolled. Complete the tree diagram. What is the probability of tossing tails and rolling an odd number? [Give your answer as a fraction in simplest form.]



$\frac{1}{4}$

31. [Problem Solving 1] *

Find the value of the product:

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

3

32. [Problem Solving 2] *

Three women and three children wish to cross a river in a canoe that will hold only one woman or two children. They can all row on their own but no one can swim. If a one way trip in the canoe takes ten minutes, what is the minimum time in which all six people can cross the river?

150 min

MATHS MATE

Term 4 - Sheet 4

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$268 \times 320 =$ **85 760**

2. [Decimal +,–] *

$10 - 0.0289 =$ **9.9711**

3. [Decimal ×,÷] *

$23.04 \div 0.1 =$ **230.4**

4. [Fraction +,–] *

$\frac{1}{6} + \frac{3}{10} =$ **$\frac{7}{15}$**

5. [Fraction ×,÷] *

$\frac{5}{8} \times \frac{12}{15} =$ **$\frac{1}{2}$**

6. [Percentages] *

Reduce 350 by 40%. **210**

7. [Decimals / Fractions / Percentages] *

Place in descending order:

70%, 0.72, $\frac{3}{4}$ **$\frac{3}{4}$, 0.72, 70%**

8. [Integer +,–] *

$(-6) - (+7) - (+3) =$ **–16**

9. [Integer ×,÷] *

$(-3) \times (+6) \times (-3) =$ **54**

10. [Rates / Ratios] *

3 km/min = **180** km/h

11. [Indices]

Simplify $\frac{r^5}{r^4}$ **r**

12. [Square Roots] *

$4\sqrt{64} + \sqrt{64} =$ **40**

13. [Exploring Number]

Is $\sqrt{2}$ a rational or an irrational number? **irrational**

14. [Financial Mathematics] *

Find the balance of an account with $900 invested at a 3% simple interest rate for 4 years. [Hint: Principal + interest.] **$1008**

15. [Number Patterns] *

If the general rule of a sequence is $-16n$ find the 20th term ($n = 20$). **–320**

16. [Expressions]

Simplify $-24x^2 \div 6x$ **$-4x$**

17. [Substitution] *

If $y = \frac{75}{x}$, find y when $x = -3$ **–25**

18. [Expansion] *

Expand and simplify

$k(k + 1) - k(k - 5)$ **$6k$**

19. [Factorisation] *

Factorise

$v^2 + 6v + v + 6$ **$(v + 6)(v + 1)$**

20. [Equations] *

Solve the inequation:

$\frac{x}{5} - 1 \le 9$ **$x \le 50$**

21. [Coordinate Geometry] *

Use $y - y_1 = m(x - x_1)$ where $m = \frac{y_2 - y_1}{x_2 - x_1}$ to write the equation of the line passing through the points (1,7) and (–3,–1). **$y = 2x + 5$**

QUOTE OF THE WEEK: When we put ourselves in the other person's place, we're less likely to want to put him in his place.

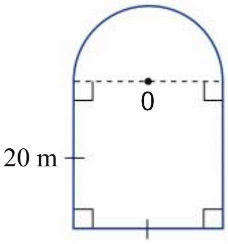
22. [Units of Measurement / Time] *

Your set of measuring cups consists of one, a half, a third and a quarter cup measures. If one cup equals 240 millilitres, how many litres does your set hold?

0.5 L

23. [Perimeter / Area] *

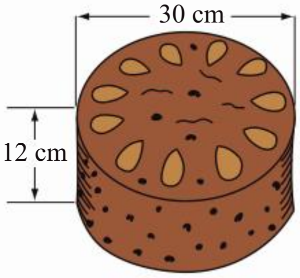
Using $\pi \approx 3.14$ find the perimeter of the shape.



91.4 m

24. [Surface Area] *

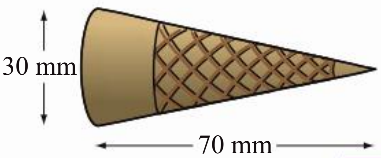
Using $\pi \approx 3.14$ find the surface area of the cylindrical cake, excluding its base.



1836.9 cm^2

25. [Volume] *

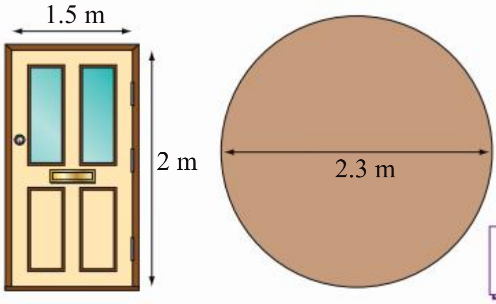
Using $\pi \approx \frac{22}{7}$ find the volume of the ice cream cone.



16 500 mm^3

26. [Pythagoras] *

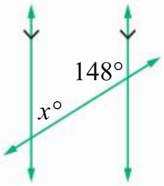
Can a circular table top with a diameter of 2.3 m fit through a rectangular door with dimensions 1.5 m wide and 2 m high?
[Objects not drawn to scale.]



yes

27. [Angles] *

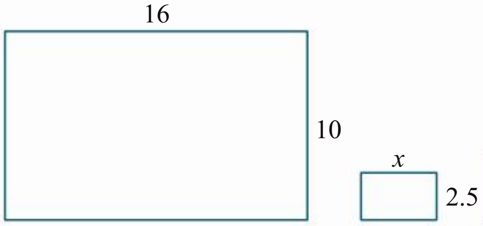
Find the value of $x°$.



32°

28. [Geometric Reasoning] *

Find the value of x in this pair of similar rectangles. [All measurements are in cm.]



4

29. [Statistics] *

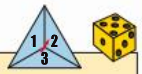
Find the mean and mode of the following distribution.

Score	0	1	3	6	9
Frequency	5	6	4	5	2

mean = 3 mode = 1

30. [Probability] *

A standard die is tossed and a spinner labelled 1, 2 and 3 is spun. Complete the table. What is the probability of obtaining a total of 7 when the die is tossed and the spinner is spun once?
[Give your answer as a fraction in simplest form.]



Total value		Die					
		1	**2**	**3**	**4**	**5**	**6**
Spinner	**1**	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9

$\frac{1}{6}$

31. [Problem Solving 1] *

How many numbers are there from 10 to 99 in which the digits differ by 4?

11

32. [Problem Solving 2] *

What is the last digit of the number 4^{2012}?

6

MATHS MATE

Term 4 - Sheet 5

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$965 \div 2 =$ **482.5**

2. [Decimal +,–] *

$7 - 1.3 =$ **5.7**

3. [Decimal ×,÷] *

$0.8 \div 0.2 =$ **4**

4. [Fraction +,–] *

$2\frac{3}{5} + 2\frac{4}{5} =$ $5\frac{2}{5}$

5. [Fraction ×,÷] *

$\frac{2}{5} \div 3 =$ $\frac{2}{15}$

6. [Percentages] *

A meat pie contains 15% or 30 g of fat. What is the weight of the pie in grams? **200 g**

7. [Decimals / Fractions / Percentages] *

$0.\dot{4}$ is the notation for:

A) 0.04444.....
B) 0.4444.....
C) 1.4444.....

B

8. [Integer +,–] *

$(-16) + (+9) + (-15) =$ **–22**

9. [Integer ×,÷] *

$(+9) \div (-3) \div (+3) =$ **–1**

10. [Rates / Ratios] *

Paper costs \$6.50 for 500 sheets. What is the cost for 300 sheets? **\$ 3.90**

11. [Indices]

Simplify $2a \times a^3$ $2a^4$

12. [Square Roots] *

$2\sqrt{81} + 3\sqrt{25} =$ **33**

13. [Exploring Number]

Which is **not** a rational number?

A) -4.565 B) $\frac{25}{144}$
C) $\sqrt{900}$ D) π

D

14. [Financial Mathematics] *

Brendan's car is now worth \$2700 or 10% of its original cost. How much did Brendan originally pay for the car? **\$27 000**

15. [Number Patterns] *

position	1	2	3	4	5	....	n
term	4	6	8	10	12	....	?

The rule for the term in position n is:

A) $2n$ B) $2n + 1$
C) $2n + 2$ D) $3n + 1$

C

16. [Expressions] *

Simplify $9 + 3ab - ab - 4$ $5 + 2ab$

17. [Substitution] *

If $y = x^3 + 1$, find y when $x = 2$ **9**

18. [Expansion] *

Expand and simplify $(x + 1)(x + 2)$ $x^2 + 3x + 2$

19. [Factorisation] *

Factorise $b^2 - 16$ $(b + 4)(b - 4)$

20. [Equations] *

Solve for x:
$(x + 1)(x - 4) = 0$ **–1, 4**

21. [Coordinate Geometry] *

Complete the table of values for the non-linear rule $y = x^2 + 4$ (parabola).

x	–2	–1	0	1	2
y	8	5	4	5	8
(x,y)	(–2,8)	(–1, 5)	(0 , 4)	(1 , 5)	(2 , 8)

QUOTE OF THE WEEK: The First Law of Computing - To err is human, but to really foul things up requires a computer. Rossiter

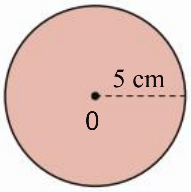
22. [Units of Measurement / Time] ✻

Convert 5 m^2 to cm^2.

$50\,000$ cm^2

23. [Perimeter / Area] ✻

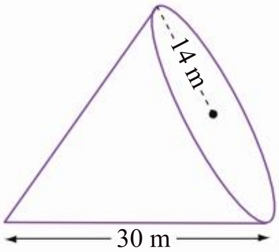
Using $A = \pi r^2$ where $\pi \approx 3.14$, find the area of the circle.



78.5 cm^2

24. [Surface Area] ✻

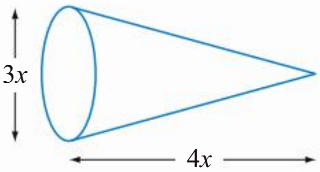
Use $TSA = \pi r(r + s)$ and $\pi \approx \frac{22}{7}$ to find the total surface area of the cone.



1936 m^2

25. [Volume] ✻

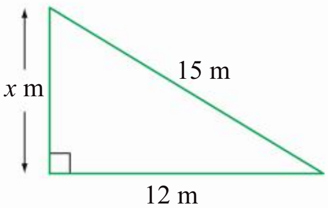
Write an algebraic expression for the volume V of the cone. [Express the answer in terms of x and π.]



$V = 3\pi x^3$

26. [Pythagoras] ✻

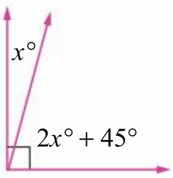
Find the perimeter of the right-angled triangle by first calculating the missing side length.



36 m

27. [Angles] ✻

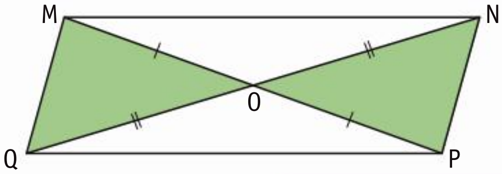
Find the value of $x°$.



15°

28. [Geometric Reasoning]

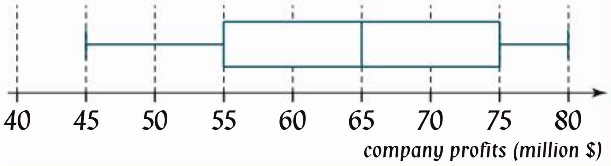
Write the pairs of equal sides and angles to prove that ΔMOQ and ΔNOP are congruent. Which congruence test did you use?



MO = OP
QO = ON
∠MOQ = ∠NOP
congruence test: SAS

29. [Statistics] ✻

The box-and-whisker plot shows a set of company profits. Find the median and range.



median = 65 range = 35

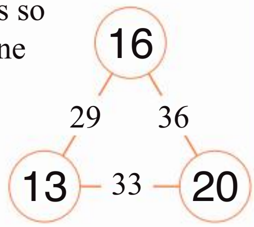
30. [Probability] ✻

A 52-card deck of playing cards is shuffled, and one card is dealt from the top of the deck. What is the probability that it is a king of hearts or a spade? [Give your answer as a fraction in simplest form.]

$\frac{7}{26}$

31. [Problem Solving 1] ✻

Enter numbers in the circles so that the numbers on each line equal the sum of the numbers at each end.



32. [Problem Solving 2] ✻

Place the digits 1, 2, 3, 4, 5 and 6 into the squares so that the multiplication problem is correct.

$$\begin{array}{r} 5\,4 \\ \times\quad 3 \\ \hline 1\,6\,2 \end{array}$$

MATHS MATE

Term 4 - Sheet 6

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$804 \div 5 =$ **160.8**

2. [Decimal +,–] *

$3 - 0.75 =$ **2.25**

3. [Decimal ×,÷] *

$0.06 \div 0.006 =$ **10**

4. [Fraction +,–] *

$1\frac{5}{9} + 4\frac{7}{9} =$ $6\frac{1}{3}$

5. [Fraction ×,÷] *

$\frac{4}{9} \div 3 =$ $\frac{4}{27}$

6. [Percentages] *

On average, 8% of the letters in a written passage are A's. If there are 112 letter A's in a passage, how many letters are there altogether? **1400**

7. [Decimals / Fractions / Percentages] *

$0.3\dot{7}$ is the notation for:

A) 0.373737.....
B) 0.333777.....
C) 0.3777.....

C

8. [Integer +,–] *

$(+8) + (-17) - (+5) =$ **–14**

9. [Integer ×,÷] *

$(-7) \times (+7) \div (+7) =$ **–7**

10. [Rates / Ratios] *

I can buy eight pencils for \$2.80 How many pencils can I buy for \$11.20? **32**

11. [Indices]

Simplify $3y^2 \times 5y$ $15y^3$

12. [Square Roots] *

$9\sqrt{16} \div \sqrt{4} =$ **18**

13. [Exploring Number]

Choose the rational numbers from this list:

$-4, \frac{6}{12}, 0.\dot{7}\dot{6}, \sqrt{5}, -\sqrt{9}$

$-4, \frac{6}{12}, 0.\dot{7}\dot{6}, -\sqrt{9}$

14. [Financial Mathematics] *

The value of Harry's computer has depreciated by \$360 or 30%. What was the purchase price of Harry's computer? **\$1200**

15. [Number Patterns] *

position	1	2	3	4	5	....	n
term	0.5	1.5	2.5	3.5	4.5	....	?

The rule for the term in position n is:

A) $n - 0.5$ B) $2n$
C) $\frac{n}{2}$ D) $\frac{n}{4}$

A

16. [Expressions] *

Simplify $2y + 6z - 5y - 4z$ $-3y + 2z$

17. [Substitution] *

If $a = 5$ and $b = 2$,

find the value of $\frac{a}{4} + \frac{b}{3}$ $1\frac{11}{12}$

18. [Expansion] *

Expand and simplify

$(h - 2)(h + 3)$ $h^2 + h - 6$

19. [Factorisation] *

Factorise $144 - x^2$ $(12 + x)(12 - x)$

20. [Equations] *

Solve for x:

$(x + 2)(x + 3) = 0$ **–2, –3**

21. [Coordinate Geometry] *

Complete the table of values for the non-linear rule $y = -4x^2$ (parabola).

x	–2	–1	0	1	2
y	–16	–4	0	–4	–16

QUOTE OF THE WEEK: If we did all things we are capable of doing, we would literally astound ourselves. Thomas Edison

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

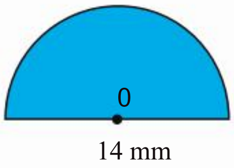
22. [Units of Measurement / Time] *

Convert 60 mm^2 to cm^2.

$0.6\ cm^2$

23. [Perimeter / Area] *

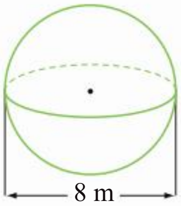
Using $A = \pi r^2$ where $\pi \approx \frac{22}{7}$, find the area of the semicircle.



$77\ mm^2$

24. [Surface Area] *

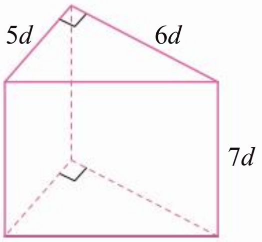
Using $TSA = 4\pi r^2$ and $\pi \approx 3.14$, find the total surface area of the sphere.



$200.96\ m^2$

25. [Volume] *

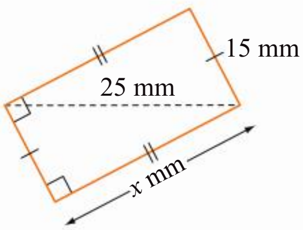
Write an algebraic expression for the volume V of the prism. [Express the answer in terms of d.]



$V = 105d^3$

26. [Pythagoras] *

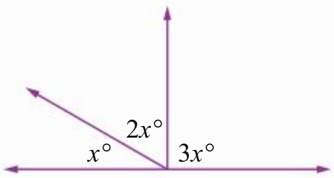
Find the perimeter of the rectangle by first calculating the missing side length.



70 mm

27. [Angles] *

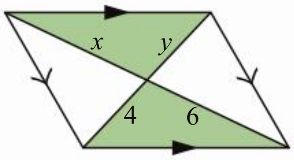
Find the value of $x°$.



30°

28. [Geometric Reasoning]

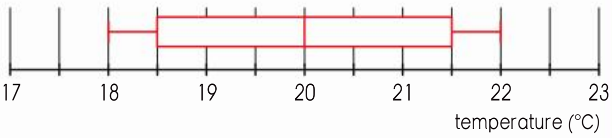
Find the value of x and y given the pair of shaded triangles are congruent.
[All measurements are in cm.]



$x = 6 \quad y = 4$

29. [Statistics] *

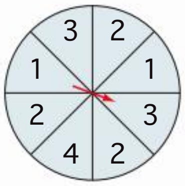
The box-and-whisker plot shows a set of average monthly minimum temperatures for Cook Islands. Find the median and range.



median = 20 range = 4

30. [Probability] *

This spinner is spun once. What is the probability of spinning a 1 or a 3? [Give your answer as a fraction in simplest form.]

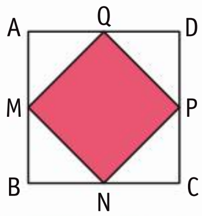


$\frac{1}{2}$

31. [Problem Solving 1] *

M, N, P and Q are the midpoints of the sides of square ABCD. What is the ratio of the area of square MNPQ to the area of square ABCD?

A) 1 : 2 B) 1 : 4 C) 2 : 1



A

32. [Problem Solving 2] *

At recess time five young students were discussing the new teacher.
"He's fabulously handsome, and only 32," said Macala.
"Nonsense!" cried Lauren. "He's not a day over 30."
"I'm sure he's at least 33," frowned Misty.
"He's definitely over 28," said Deanne.
But Zoe had the last word.
"I happen to know he's under 30," she sniffed.
Only one girl was right.
How old is the teacher?

31

MATHS MATE

Term 4 - Sheet 7

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$1221 \div 4 =$ **305.25**

2. [Decimal +,–] *

$8 - 0.374 =$ **7.626**

3. [Decimal ×,÷] *

$10.15 \div 0.7 =$ **14.5**

4. [Fraction +,–] *

$4\frac{3}{7} - 1\frac{4}{7} =$ $2\frac{6}{7}$

5. [Fraction ×,÷] *

$\frac{3}{7} \div 6 =$ $\frac{1}{14}$

6. [Percentages] *

In Australia only 5% or 12 500 species of fungi are well known. How many species of fungi are in Australia altogether?

250 000

7. [Decimals / Fractions / Percentages] *

Write $\frac{1}{3}$ as a recurring decimal. $0.\dot{3}$

8. [Integer +,–] *

$(-17) - (+5) + (-4) =$ **–26**

9. [Integer ×,÷] *

$(-10) \times (+10) \div (-4) =$ **25**

10. [Rates / Ratios] *

Gary prepared 3 kg of dough after working for 2 hours. Assuming his work rate is directly proportional, how much dough would Gary prepare if he worked for 7 hours?

10.5 kg

11. [Indices]

Simplify $4c^3 \div 2c^2$ $2c$

12. [Square Roots] *

$\frac{10\sqrt{81}}{2\sqrt{9}} =$ **15**

13. [Exploring Number]

Which numbers are rational?

A) $\sqrt{25}$ B) $\sqrt{18}$
C) -7.7725 D) π

A and C

14. [Financial Mathematics] *

A book was discounted by 20% to \$16.20. How much was the book before the discount?

\$20.25

15. [Number Patterns] *

Write an expression for the term in position n given the table of values for the sequence.

position	1	2	3	4	5	....	n
term	8	9	10	11	12	....	?

$n + 7$

16. [Expressions] *

Simplify $3n^2 - n^2 - 2n - n^2$ $n^2 - 2n$

17. [Substitution] *

If $y = \frac{2x-3}{x}$, find y when $x = 3$ **1**

18. [Expansion] *

Expand and simplify $(q+4)(q-6)$ $q^2 - 2q - 24$

19. [Factorisation] *

Factorise $4y^2 - 36$ $4(y+3)(y-3)$

20. [Equations] *

Solve for x: $x^2 - 25 = 0$ **5, –5**

21. [Coordinate Geometry] *

Complete the table of values for the non-linear rule $y = \frac{1}{x}$ (hyperbola).

x	–2	–1	0	1	2
y	$-\frac{1}{2}$	–1		1	$\frac{1}{2}$

QUOTE OF THE WEEK: You can preach a better sermon with your life than with your lips. Oliver Goldsmith

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

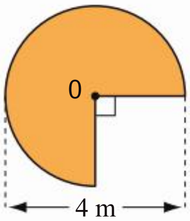
22. [Units of Measurement / Time]

The Old Town Square in Prague is 9000 m^2. Is the square <, = or > 1 hectare?

<

23. [Perimeter / Area] ✻

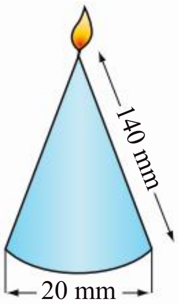
Using $\pi \approx 3.14$ find the area of the shaded shape.



9.42 m^2

24. [Surface Area] ✻

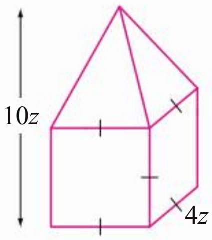
Use $\pi \approx 3.14$ to find the total surface area of the conical candle.



4710 mm^2

25. [Volume] ✻

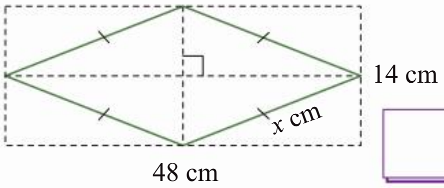
Write an algebraic expression for the volume V of the cube which has a regular square pyramid on top. [Express the answer in terms of z.]



$V = 96z^3$

26. [Pythagoras] ✻

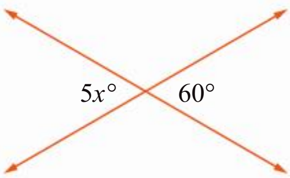
Find the perimeter of the rhombus by first calculating the missing side length.



100 cm

27. [Angles] ✻

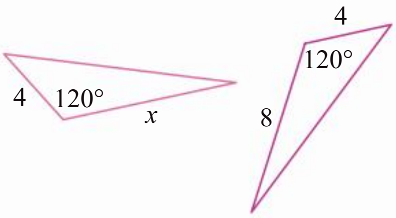
Find the value of $x°$.



12°

28. [Geometric Reasoning]

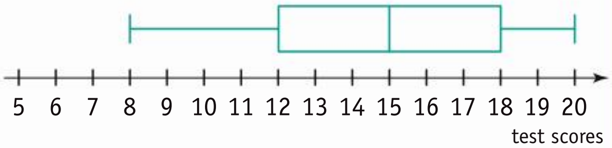
Find the value of x in this pair of congruent triangles. [All measurements are in cm.]



8

29. [Statistics] ✻

The box-and-whisker plot shows a set of Mathematics test scores. Find the median and lower quartile (LQ).



median = 15 LQ = 12

30. [Probability] ✻

In a small town, 56% of the secondary school students attend the public high school, 28% go to the catholic college and the rest are enrolled in a TAFE course. What is the probability that a student chosen at random goes to the catholic college or to the TAFE institute?
[Give your answer as a decimal.]

0.44

31. [Problem Solving 1] ✻

The table below shows the team standings after 2 rounds of the 2018 Soccer World Cup. Who did Croatia play in its third round robin game? [Each team plays each 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 D TEAMS	MP matches played	W wins	D draws	L losses	GF goals for	GA goals against	Pts points
Croatia	2	2	0	0	5	0	6
Nigeria	2	1	0	1	2	2	3
Iceland	2	0	1	1	1	3	1
Argentina	2	0	1	1	1	4	1

Croatia vs Iceland

32. [Problem Solving 2] ✻

A bi-athlete travels 50 km in $2\frac{1}{6}$ hours.
She cycles part of the way at 30 km/h and runs the rest at 12 km/h. How far did she run?

10 km

MATHS MATE

Term 4 - Sheet 8

MAUVE

Name: ....

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

Parent's Signature: ....

1. [Long ×,÷] *

$1894 \div 8 =$ **236.75**

2. [Decimal +,−] *

$16 - 0.041 =$ **15.959**

3. [Decimal ×,÷] *

$2.88 \div 0.9 =$ **3.2**

4. [Fraction +,−] *

$6\frac{1}{8} - 2\frac{3}{8} =$ $3\frac{3}{4}$

5. [Fraction ×,÷] *

$\frac{5}{8} \div 15 =$ $\frac{1}{24}$

6. [Percentages] *

What is Australia's total indigenous labour force if 10% or 13 460 indigenous Australians work in sparsely settled areas?

134 600

7. [Decimals / Fractions / Percentages] *

Write $\frac{4}{9}$ as a recurring decimal. $0.\dot{4}$

8. [Integer +,−] *

$(-13) - (-9) - (+7) =$ **−11**

9. [Integer ×,÷] *

$(+18) \div (-9) \times (-3) =$ **6**

10. [Rates / Ratios] *

A group of children worked together for 1.5 hours to plant 10 trees. Assuming their work rate is directly proportional, how many trees would they plant if they worked for 6 hours?

40

11. [Indices]

Simplify $6b^4 \div 3b$ $2b^3$

12. [Square Roots] *

$4\sqrt{4} \times 5\sqrt{25} =$ **200**

13. [Exploring Number]

Choose the rational numbers from this list:

$-\frac{1}{2}, \pi, -60, \sqrt{\frac{3}{4}}, \sqrt{400}$ $-\frac{1}{2}, -60, \sqrt{400}$

14. [Financial Mathematics] *

The value of a photocopier has depreciated by \$3600 or 15%. What was the purchase price of the photocopier?

\$24 000

15. [Number Patterns] *

Write an expression for the term in position n given the table of values for the sequence.

position	1	2	3	4	5	....	n
term	4	8	12	16	20	....	?

$4 \times n$ or $4n$

16. [Expressions] *

Simplify

$4a^2 - ab - a^2 + 4ab$ $3a^2 + 3ab$

17. [Substitution] *

If $y = x^2(x - 1)$, find y when $x = -2$ **−12**

18. [Expansion]

Expand

$(m + 2)(n - 7)$ $mn - 7m + 2n - 14$

19. [Factorisation] *

Factorise

$25a^2 - 100$ $25(a + 2)(a - 2)$

20. [Equations] *

Solve for x: $x^2 - 64 = 0$ **8, −8**

21. [Coordinate Geometry] *

Complete the table of values for the non-linear rule $y = 5^x$ (exponential function).

x	−2	−1	0	1	2
y	$\frac{1}{25}$	$\frac{1}{5}$	1	5	25

QUOTE OF THE WEEK: Whatever you do or dream you can, begin it. Boldness has genius, power and magic in it. Begin it now. Goethe

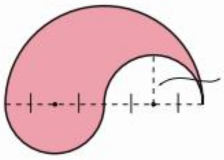
22. [Units of Measurement / Time] ✻

New South Wales has 1400 hectares of islands and the Northern Territory has 13 387 km^2. Which has the largest area of islands?

Northern Territory

23. [Perimeter / Area] ✻

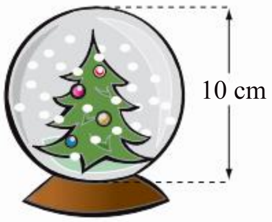
Find the area of the shaded shape. (Use $\pi \approx 3.14$)



1413 mm^2

24. [Surface Area] ✻

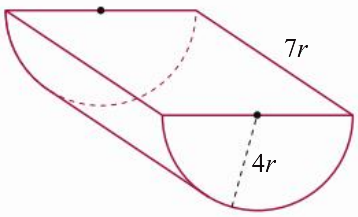
Using $TSA = 4\pi r^2$ and $\pi \approx 3.14$, find the total surface area of the snow globe.



314 cm^2

25. [Volume] ✻

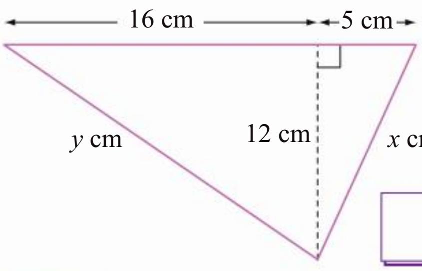
Write an algebraic expression for the volume V of the half cylinder. [Express the answer in terms of r and π.]



$V = 56\pi r^3$

26. [Pythagoras] ✻

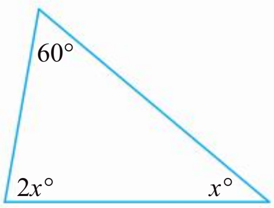
Find the perimeter of the triangle by first calculating the missing side lengths.



54 cm

27. [Angles] ✻

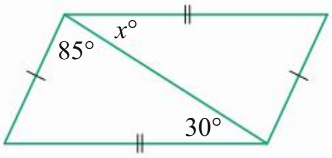
Find the value of $x°$.



40°

28. [Geometric Reasoning]

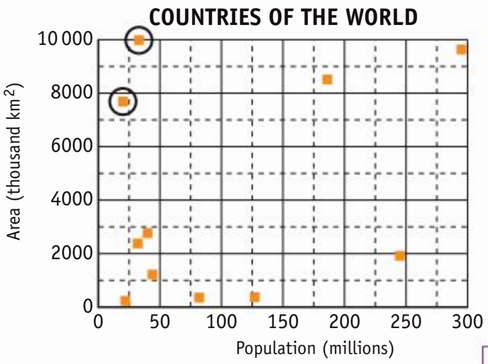
Find the value of $x°$ in this pair of congruent triangles.



30°

29. [Statistics]

Of the countries sampled in the graph, how many with a population of less than 100 million people have an area greater than 5 million square kilometres?



2

30. [Probability] ✻

There are 12 choc chip, 3 milk choc macadamia, 13 rainbow and 2 caramel classic cookies in the cookie jar. If a cookie is chosen at random, what is the probability it will be a choc chip or a caramel classic? [Give your answer as a fraction in simplest form.]

$\frac{7}{15}$

31. [Problem Solving 1] ✻

If you double Rob's age and subtract 1, the result is a prime number. Rob is less than 20 years old. If the sum of the digits in Rob's age is divisible by 5, how old is Rob?

19

32. [Problem Solving 2] ✻

In a mathematics competition with 15 questions, 6 marks are awarded for each correct response, 0 marks for each incorrect response and 3 marks are awarded for no response. Mark scored 51 points in this competition. What is the greatest number of incorrect responses he could have had?

6

MATHS MATE

MAUVE

Teacher Resource

MATHS MATE

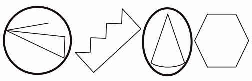
Short Answers

1.1 - 1.4

1.1

1. 630
2. 5.9
3. 1.8
4. $\frac{4}{5}$
5. $\frac{3}{5}$
6. 75%
7. 0.025, 0.052, 0.125, 0.215
8. 8
9. –25
10. 300
11. 100
12. 4
13. 9
14. \$520
15. 30
16. $n + 16$
17. 15
18. $5n - 5$
19. $5(x - 3)$
20. 3
21.

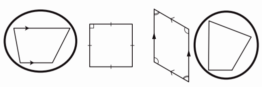
x	$y = x - 5$	y	(x, y)
–3	$y = -3 - 5$	–8	(–3 , –8)
–1	$y = -1 - 5$	–6	(–1 , –6)
1	$y = 1 - 5$	–4	(1 , –4)
3	$y = 3 - 5$	–2	(3 , –2)
5	$y = 5 - 5$	0	(5 , 0)

22. 2500 RPM
23. 72 cm
24. 486 sq. units
25. 270 000 cm^3
26. 10
27. B
28. 
29. C
30. C
31. 32 cm
32. 198

1.2

1. 1940
2. 0.07
3. 24.5
4. $\frac{2}{9}$
5. $1\frac{7}{9}$
6. 17%
7. 0.902, 0.209, 0.092, 0.029
8. 5
9. 16
10. 4
11. 16
12. 6
13. 12
14. \$4160
15. 3072
16. $30x$ or $30 \times x$
17. 20
18. $3p + 18$
19. $2(3m - 1)$
20. 8
21.

x	$y = 2x - 3$	y	(x, y)
0	$y = 2 \times 0 - 3$	–3	(0 , –3)
0.5	$y = 2 \times 0.5 - 3$	–2	(0.5 , –2)
1	$y = 2 \times 1 - 3$	–1	(1 , –1)
1.5	$y = 2 \times 1.5 - 3$	0	(1.5 , 0)
2	$y = 2 \times 2 - 3$	1	(2 , 1)

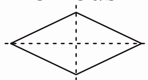
22. 765 mmHg
23. 84 cm
24. 312 sq. units
25. 0.39 m^3
26. 15
27. C
28. 
29. 29°C
30. A
31. Sam
32. 70

1.3

1. 2340
2. 11.7
3. 59.12
4. $\frac{8}{11}$
5. $\frac{1}{3}$
6. 75%
7. $\frac{57}{100}, \frac{3}{5}, \frac{7}{10}$
8. –9
9. –28
10. \$5.19
11. 27
12. 12
13. 60
14. \$75
15. –7
16. $m - 200$
17. 0
18. $9x - 18$
19. $12(p + 2m)$
20. –9
21.

x	$y = -x + 4$	y	(x, y)
–4	$y = -(-4) + 4$	8	(–4 , 8)
–2	$y = -(-2) + 4$	6	(–2 , 6)
0	$y = 0 + 4$	4	(0 , 4)
2	$y = -2 + 4$	2	(2 , 2)
4	$y = -4 + 4$	0	(4 , 0)

22. 55 mL
23. 8.5 cm
24. 1340 sq. units
25. 3225 cm^3
26. 13
27. A
28. rhombus



29. 2008
30. F
31. $41 \times 32 = 1312$

$$\begin{array}{r} \boxed{4}\,\boxed{1} \\ \times\ \boxed{3}\,\boxed{2} \\ \hline 8\ 2 \\ 1\ 2\ 3\ 0 \\ \hline \boxed{1\ 3\ 1\ 2} \end{array}$$

32. 8967

1.4

1. 32 000
2. 4.03
3. 8.312
4. $\frac{4}{15}$
5. 14
6. 57%
7. $\frac{7}{20}, \frac{3}{10}, \frac{27}{100}$
8. 3
9. 36
10. \$2.75/kg
11. 64
12. 40
13. 7
14. \$93.20
15. 32
16. $-6a$ or $-6 \times a$
17. 0
18. $4a + 20$
19. $3(a - 6b)$
20. 5
21.

x	$y = -3x - 6$	y	(x, y)
–4	$y = -3 \times (-4) - 6$	6	(–4 , 6)
–2	$y = -3 \times (-2) - 6$	0	(–2 , 0)
0	$y = -3 \times 0 - 6$	–6	(0 , –6)
2	$y = -3 \times 2 - 6$	–12	(2 , –12)
4	$y = -3 \times 4 - 6$	–18	(4 , –18)

22. 15 mm
23. 107 m
24. 1560 sq. units
25. 96 cm^3
26. 12
27. B
28. A and B
29. 16
30. B
31. 18
32.

+	12	5	6	7
3	15	8	9	10
16	28	21	22	23
8	20	13	14	15
7	19	12	13	14

MATHS MATE

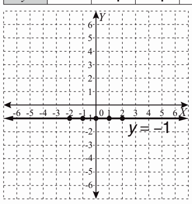
Short Answers

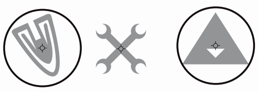
1.5 - 1.8

1.5

1. 1900
2. 53.78
3. 32.4
4. $1\frac{1}{11}$
5. $\frac{9}{20}$
6. \$480
7. 16
8. 4
9. 2
10. 1 : 7
11. 1
12. $\frac{1}{3}$
13. 144
14. \$17.95 Accept \$17 to \$18
15. 32, 44
16. $90 - x$
17. 12
18. $4d + 6$
19. $2(3y - 5)$
20. 10
21.

x	–2	–1	0	1	2
y	–1	–1	–1	–1	–1

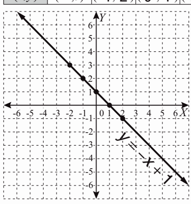


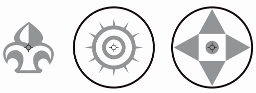
22. C
23. 2840 cm^2
24. 712 mm^2
25. 102 cm^3
26. c
27. 60°
28. 
29. calcium & aluminium
30. $\frac{1}{3}$ or $0.\dot{3}$
31. <u>1</u> <u>5</u> <u>10</u> <u>10</u> <u>5</u> <u>1</u>
32. 532

1.6

1. 248
2. 26
3. 20
4. $1\frac{3}{5}$
5. $1\frac{3}{4}$
6. \$140
7. 25
8. –3
9. –1
10. 5 : 2
11. 1
12. $\frac{9}{10}$
13. 256
14. \$88 Accept \$85 to \$90
15. 26, 37
16. $\frac{z}{2}$ or $z \div 2$
17. 5
18. $6b - 15$
19. $5(2r + 5)$
20. 4
21.

x	–2	–1	0	1	2
y	3	2	1	0	–1
(x,y)	(–2,3)	(–1, 2)	(0 , 1)	(1 , 0)	(2 ,–1)

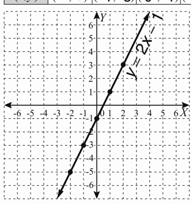


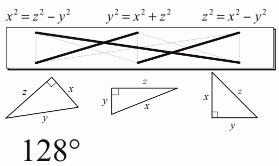
22. B
23. 549.4 m^2
24. 8990 cm^2
25. 25 m^3
26. m
27. 63°
28. 
29. Wimbledon
30. $\frac{1}{3}$ or $0.\dot{3}$
31. 22
32. 28

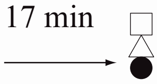
1.7

1. 39.33
2. 22.073
3. 8070
4. $1\frac{1}{17}$
5. $\frac{12}{25}$
6. \$1.25
7. 3, 50
8. 9
9. –6
10. 8 : 5 : 2
11. 5
12. $3\frac{1}{2}$
13. 32
14. \$100 Accept \$99.50 to \$100.50
15. 26, 20
16. $5t + 8$
17. 24
18. $40 - 30a$
19. $4(3x - 2y)$
20. 6
21.

x	–2	–1	0	1	2
y	–5	–3	–1	1	3
(x,y)	(–2,–5)	(–1,–3)	(0 ,–1)	(1 , 1)	(2 , 3)



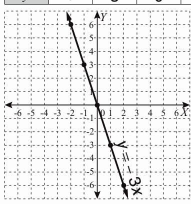
22. B
23. 40 500 cm^2
24. 88 mm^2
25. 150 cm^3
26. 

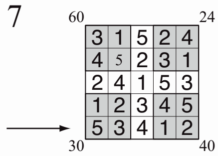
27. 128°
28. 4
29. 2009
30. $\frac{1}{26}$
31. 17 min
32. 

1.8

1. 20.8
2. 16.834
3. 0.3
4. $2\frac{1}{7}$
5. $3\frac{1}{5}$
6. \$0.40
7. 4, 75
8. –7
9. 8
10. 5 : 9 : 7
11. 0
12. $1\frac{2}{3}$
13. 17
14. \$12 Accept \$11.50 to \$12.50
15. 32, 20
16. $10m + 3p$
17. 6
18. $28y - 21$
19. $3(5a + 2b)$
20. 12
21.

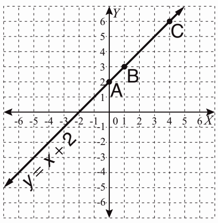
x	–2	–1	0	1	2
y	6	3	0	–3	–6



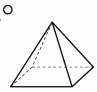
22. A
23. 1662.9 cm^2
24. 8950 cm^2
25. 4000 cm^3
26. B and C
27. 25°
28. 2
29. liquid
30. $\frac{3}{26}$
31. 7
32. 

2.1

1. 272
2. 5.6
3. 1.726
4. $\frac{1}{2}$
5. $\frac{1}{12}$
6. 35
7. 75%
8. 2
9. 36
10. 7 : 10
11. $\frac{1}{8}$
12. 0.3
13. 0.9
14. $7.05
15. 0, 3
16. $2x$
17. 0
18. $c^2 + 4c$
19. $m(n + 1)$
20. 3
21. A(0,2), B(1,3), C(4,6)



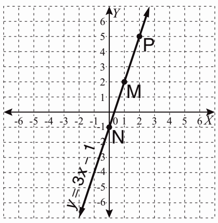
22. C
23. 44 cm
24. 288 cm^2
25. 1400 cm^3
26. 40
27. 64°
28. 5



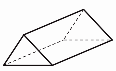
29. median = 5
range = 4
30. $\frac{1}{5}$ or 0.2
31. $2.35
32. 9

2.2

1. 312
2. 0.66
3. 0.065
4. $\frac{3}{4}$
5. $\frac{4}{15}$
6. 6
7. 30%
8. –5
9. –48
10. 11 : 9
11. $\frac{4}{9}$
12. 0.9
13. 8.47
14. $70
15. 7, 11
16. ab
17. 9
18. $e^2 - 5e$
19. $3p(1 + 5q)$
20. 18
21. M(1,2), N(0,–1), P(2,5)



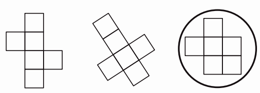
22. A
23. 9.6 km
24. 256 cm^2
25. 2160 m^3
26. 5
27. 143°
28. triangular prism



29. mode = 15
median = 15.5
30. $\frac{5}{16}$ or 0.3125
31. 17
32. 360 cm^2

2.3

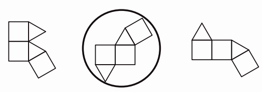
1. 819
2. 18.43
3. 0.4563
4. $1\frac{1}{4}$
5. $\frac{3}{20}$
6. 48
7. 0.8
8. –2
9. –18
10. 13 : 12
11. $\frac{1}{10\,000}$
12. 1.5
13. 3.14
14. $1431
15. –8, –11
16. $4cd$
17. 7
18. $2g - gh$
19. $3t(s + 2u)$
20. $-\frac{1}{2}$
21. B
22. 410 g
23. 13.6 cm
24. 36 m^2
25. 150 m^3
26. 17
27. $x° = 57°$ $y° = 123°$
28.



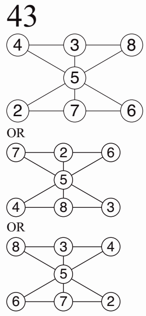
29. median = 3.9
mode = 4.2
30. $\frac{3}{16}$ or 0.1875
31. bag 3
32. 39

2.4

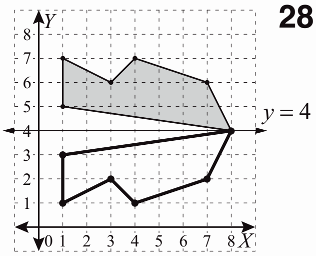
1. 810
2. 0.949
3. 0.0809
4. 1
5. $\frac{3}{16}$
6. 54
7. 0.05
8. –1
9. 56
10. 1 : 3
11. $\frac{27}{125}$
12. 1.1
13. 1.732
14. $71.50
15. –8, –12
16. $\frac{5m}{3}$
17. 1
18. $3l + lm$
19. $2y(2x - 3z)$
20. –4
21. B and C
22. 3056 mm
23. 7.5 m
24. 400 m^2
25. 8640 cm^3
26. 24
27. $x° = 25°$ $y° = 50°$
28.

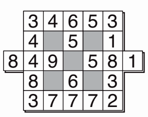


29. mode = 12
mean = 11
30. $\frac{1}{4}$ or 0.25
31. 43
32.



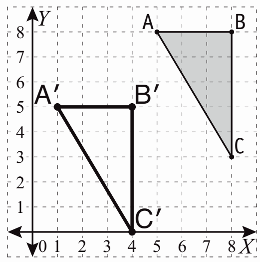
2.5

1. 161
2. 13.48
3. 0.45
4. $4\frac{4}{5}$
5. 2
6. 8 million
7. $\frac{1}{2}$
8. –4
9. 5
10. 210 km
11. 64
12. 8
13. B
14. $8400
15. 48, 96
16. $2z$, $3z$
17. 0
18. $3i^2 + 9i$
19. 99
20. 0
21. (4,0)
22. 455 min
23. 36 mm^2
24. 2760 mm^2
25. 486 cm^3
26. 55
27. 60°
28. 

29. 20
30. $\frac{3}{5}$ or 0.6
31. 

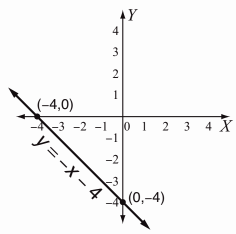
32. 857 142

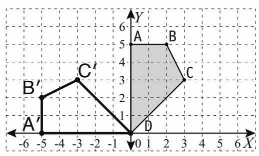
2.6

1. 249
2. 14.703
3. 0.06
4. $2\frac{1}{3}$
5. $\frac{4}{5}$
6. 9 minutes
7. $\frac{3}{50}$
8. –6
9. 2
10. 90 m/s
11. 27
12. 18
13. C
14. $4440
15. 64, 256
16. x^2, $5x^2$
17. 0
18. $15x - 5x^2$
19. 123
20. 7
21. (0,–3)
22. 215 s
23. 585 m^2
24. 62 cm^2
25. 495 m^3
26. 17
27. 107°
28. 

29. 24
30. $\frac{1}{3}$ or $0.\dot{3}$
31. 125%
32. 92 km (ACEBDA or ADBECA)

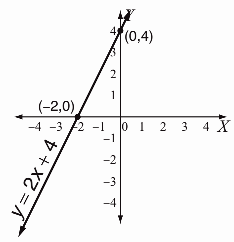
2.7

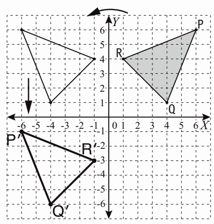
1. 1610
2. 1.265
3. 1.164
4. 7
5. $\frac{3}{4}$
6. 3 000 000 km^2
7. 0.65
8. 7
9. –8
10. 156 km/h
11. 625
12. 40
13. A
14. $36 000
15. 2500, 12 500
16. ab, $4ba$
17. 55
18. $20m + 12mn$
19. 250
20. –2
21. 

22. 5 min
23. 2.5 mm^2
24. 510 cm^2
25. 198 cm^3
26. 26
27. 45°
28. 

29. 24
30. $\frac{1}{24}$
31. 5
32. 333

2.8

1. 342
2. 25.74
3. 0.7524
4. $2\frac{1}{6}$
5. $\frac{1}{2}$
6. 975
7. 0.25
8. –1
9. –7
10. 12 h
11. 10 000
12. 28
13. B
14. $7000
15. 64, –128
16. $2m$, $-2m$
17. 8
18. $3qr - 6q^2$
19. 1000
20. –3
21. 

22. 13 h 45 min
23. 88 cm^2
24. 444 cm^2
25. 3.12 m^3
26. 25
27. 66°
28. 

29. 22
30. $\frac{2}{5}$ or 0.4
31. 22 km
32. $1\frac{1}{3}$ h or 1 h 20 min

3.1

1. 6390
2. 11.32
3. 24.6
4. $3\frac{2}{3}$
5. $\frac{2}{5}$
6. 12.5
7. $\frac{3}{25}$
8. 5
9. –200
10. false
11. x^5
12. 4
13. –3
14. $780
15. 10, 1
16. $3a$
17. 5050
18. $-4f + 12$
19. $x(x + 4)$
20. 1
21. $-\frac{4}{3}$
22. 25 cm
23. $P = 5s$
24. 1400 mm^2
25. 96 m^3
26. 12
27. 150°
28. 3
29.

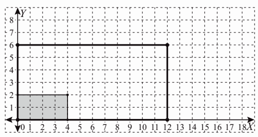
STEM	LEAF
0	5 9
1	4 7 7 8
2	2 4 7 9
3	5 5
4	1 6 9
5	8

30. 0.3
31. 1 min
32. 252

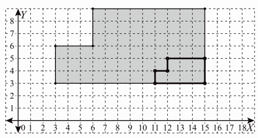
3.2

1. 3995
2. 0.84
3. 4.63
4. $1\frac{3}{7}$
5. $\frac{1}{20}$
6. 40
7. $\frac{4}{5}$
8. –8
9. –600
10. false
11. m^3
12. 16
13. 48
14. $1300
15. 8, 4
16. $4k$
17. 40
18. $-5 + 4j$
19. $u(u - 3)$
20. 6
21. $\frac{9}{5}$
22. $>$
23. 116 mm
24. 1890 m^2
25. 800 cm^3
26. 8
27. 65°
28. $\frac{1}{2}$
29. 115
30. 0.975
31. K
32. (2,3), (1,6), (4,7), (5,8), (9,10), (11,12) OR (1,4), (2,5), (3,8), (6,7), (9,10), (11,12)

3.3

1. 9408
2. 0.065
3. 25.03
4. $4\frac{3}{10}$
5. $\frac{2}{33}$
6. 0.8
7. 62%
8. 9
9. 8000
10. 3 : 21 = 5 : 35
11. t^6
12. 10
13. –64
14. $236
15. –6, 3
16. $4x + 3y$
17. 84
18. $-2m^2 - m$
19. $g(1 - 6g)$
20. –1
21. (2,4)
22. 50
23. $P = 9k$
24. 564 mm^2
25. 2 592 100 m^3
26. 15
27. 130°
28. 
29. median = 15
mode = 15
30. $\frac{732}{733}$
31. (5,31), (7,29), (13,23), (17,19)
32. 148

3.4

1. 4872
2. 9.794
3. 23.2
4. $2\frac{1}{6}$
5. $\frac{7}{15}$
6. 150
7. 90%
8. –21
9. –700
10. $x = 25$
11. n^7
12. 18
13. 7
14. $450
15. –3, 1
16. $5m^2 - 2m$
17. 320
18. $-6st - 10s^2$
19. $4y(1 + 3y)$
20. 3
21. (–2,1)
22. 360 mm
23. 6.6 m
24. 9600 cm^2
25. 1 400 000 m^3
26. 0.4
27. 65°
28. 
29. 16.5
30. 0.65
31. –10, –4, –2, 0, 2, 8
32. 999 960

MATHS MATE

Short Answers

3.5 - 3.8

3.5

1. 82
2. 2.65
3. 0.35
4. $\frac{3}{4}$
5. $7\frac{1}{2}$
6. 909
7.

Decimal	Fraction	Percentage
0.03	$\frac{3}{100}$	3%

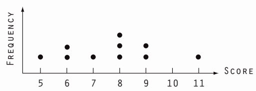
8. –23
9. 6
10. 15
11. 16
12. 5
13. 30 000 000
14. $50 000
15. 19
16. $15y$
17. 3
18. $3y + 5$
19. $b(ab - 1)$
20. 2
21. $y = 7x - 14$
22. 1.234 g
23. 67 m^2
24. 1152 m^2
25. 9420 cm^3
26. 20 m
27. 115°
28. A
29. 4
30. $\frac{1}{10}$ or 0.1
31. 25
32. 9

3.6

1. 237
2. 14.1
3. 0.507
4. $\frac{4}{15}$
5. 14
6. 92
7.

Decimal	Fraction	Percentage
0.125	$\frac{125}{1000} = \frac{1}{8}$	12.5%

8. –5
9. –4
10. 240 mL
11. 343
12. 3
13. 4.6×10^9
14. $1980
15. 40
16. $8ab$
17. 0
18. $3w + 2$
19. $m(3mn + 2)$
20. 10
21. $y = 3x + 6$
22. >
23. 432 cm^2
24. 168 cm^2
25. 3080 cm^3
26. 120 cm
27. 60°
28. C
29. 8



30. $\frac{1}{3}$ or $0.\dot{3}$
31. 400
32. 30

3.7

1. 186
2. 2.06
3. 0.009
4. $\frac{1}{25}$
5. 24
6. 448
7. 4
8. 23
9. –3
10. 12 years
11. 81
12. 5
13. 9.5×10^{12}
14. Total ded. = $322.63
Net wage = $564.79
15. 1024
16. $-12lm$
17. 21
18. $c^2 + 6c$
19. $2b(4 - 3ab)$
20. 13
21.

equation	gradient (m)	x-intercept	y-intercept (c)
$y = 3x + 4$	3	$(-\frac{4}{3}, 0)$	(0,4)

22. 63.48 g
23. 150 mm^2
24. 35 m^2
25. 7700 mm^3
26. 125 cm
27. 134°
28. RHS
29. 3
30. $\frac{2}{3}$ or $0.\dot{6}$
31. 12
32. 1

3.8

1. 379
2. 8.82
3. 0.0062
4. $\frac{3}{10}$
5. $10\frac{1}{2}$
6. 117
7. 21
8. –17
9. –5
10. 12
11. 5
12. 4
13. 4×10^{11}
14. $6822
15. 44
16. $40v^2$
17. 0
18. $12 + 3pq - 5q$
19. $c^2(b - 4d)$
20. –22
21.

equation	gradient (m)	x-intercept	y-intercept (c)
$y = \frac{2}{3}x + 1$	$\frac{2}{3}$	$(-\frac{3}{2}, 0)$	(0,1)

22. 700 days
23. 2116 cm^2
24. 2290 m^2
25. 192.5 mL
26. 2.5 km
27. 55°
28. SAS
29. 4
30. $\frac{1}{2}$ or 0.5
31. 6 g
32. 855

4.1

1. 100 500
2. 0.75
3. 58
4. $\frac{17}{20}$
5. $\frac{1}{4}$
6. 5580
7. $\frac{2}{3}$
8. 11
9. –40
10. 90 beats/s
11. w^6
12. 2
13. 4, 71, 0
14. \$180
15. 77
16. $4a$
17. 10
18. $8t - 4$
19. $(a + 4)(a + 3)$
20. $x \geq 4$
21. 4
22. 0.3 L
23. 44 cm
24. 30 144 mm²
25. 9420 m³
26. no
27. 125°
28. ∠A = ∠F, ∠B = ∠G, ∠C = ∠E
29. 22
30. $\frac{1}{2}$ or 0.5
31. 8
32. 170

4.2

1. 88 920
2. 9.93
3. 0.67
4. $\frac{1}{24}$
5. $\frac{1}{6}$
6. 680
7. 40%
8. 15
9. –24
10. \$130.96
11. a^5
12. 20
13. 13, –100, 8, $\frac{6}{3}$
14. \$360
15. 44
16. 3
17. –8
18. $10x - 37$
19. $(c - 2)(c + 5)$
20. $x < 3$
21. $-\frac{1}{5}$
22. 4000 cm³
23. 125.6 mm
24. 4400 cm²
25. 4851 cm³
26. 2.7 m
27. 45°
28. $\frac{KL}{PQ}$, $\frac{LM}{QR}$, $\frac{KM}{PR}$
29. median = 3
range = 9
30. $\frac{3}{4}$ or 0.75
31. G
32. 301

4.3

1. 37 680
2. 99.43
3. 89
4. $\frac{5}{36}$
5. $\frac{1}{9}$
6. 194
7. 0.05, $\frac{1}{2}$, 55%
8. –5
9. –50
10. 1000 cents/kg
11. k^4
12. 20
13. rational
14. \$255
15. –2
16. $-3t$
17. –60
18. $11vw - 11$
19. $(g - 5)(3 - g)$
20. $x \leq -6$
21. $y = x + 4$
22. 500 mL
23. 44 m
24. 46.75 cm²
25. 3617 cm³
26. 5 m
27. 117°
28. 9
29. median = 13
mode = 13
30. $\frac{1}{4}$ or 0.25
31. 3
32. 150 min

4.4

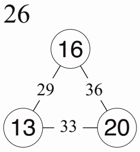
1. 85 760
2. 9.9711
3. 230.4
4. $\frac{7}{15}$
5. $\frac{1}{2}$
6. 210
7. $\frac{3}{4}$, 0.72, 70%
8. –16
9. 54
10. 180 km/h
11. r
12. 40
13. irrational
14. \$1008
15. –320
16. $-4x$
17. –25
18. $6k$
19. $(v + 6)(v + 1)$
20. $x \leq 50$
21. $y = 2x + 5$
22. 0.5 L
23. 91.4 m
24. 1836.9 cm²
25. 16 500 mm³
26. yes
27. 32°
28. 4
29. mean = 3
mode = 1
30. $\frac{1}{6}$ or $0.1\dot{6}$
31. 11
32. 6

4.5

1. 482.5
2. 5.7
3. 4
4. $5\frac{2}{5}$
5. $\frac{2}{15}$
6. 200 g
7. B
8. –22
9. –1
10. $3.90
11. $2a^4$
12. 33
13. D
14. $27 000
15. C
16. $5 + 2ab$
17. 9
18. $x^2 + 3x + 2$
19. $(b + 4)(b - 4)$
20. –1, 4
21.

x	–2	–1	0	1	2
y	8	5	4	5	8
(x,y)	(–2,8)	(–1, 5)	(0, 4)	(1, 5)	(2, 8)

22. $50\,000\ \text{cm}^2$
23. $78.5\ \text{cm}^2$
24. $1936\ \text{m}^2$
25. $V = 3\pi x^3$
26. 36 m
27. 15°
28. MO = OP QO = ON
∠MOQ = ∠NOP
SAS
29. median = 65
range = 35
30. $\frac{7}{26}$
31.



32. $\longrightarrow$ $\boxed{5}\boxed{4} \times \boxed{3} = \boxed{1}\boxed{6}\boxed{2}$

4.6

1. 160.8
2. 2.25
3. 10
4. $6\frac{1}{3}$
5. $\frac{4}{27}$
6. 1400
7. C
8. –14
9. –7
10. 32
11. $15y^3$
12. 18
13. $-4, \frac{6}{12}, 0.\dot{7}\dot{6}, -\sqrt{9}$
14. $1200
15. A
16. $-3y + 2z$
17. $1\frac{11}{12}$
18. $h^2 + h - 6$
19. $(12 + x)(12 - x)$
20. –2, –3
21.

x	–2	–1	0	1	2
y	–16	–4	0	–4	–16

22. $0.6\ \text{cm}^2$
23. $77\ \text{mm}^2$
24. $200.96\ \text{m}^2$
25. $V = 105d^3$
26. 70 mm
27. 30°
28. $x = 6$ $y = 4$
29. median = 20
range = 4
30. $\frac{1}{2}$ or 0.5
31. A
32. 31

4.7

1. 305.25
2. 7.626
3. 14.5
4. $2\frac{6}{7}$
5. $\frac{1}{14}$
6. 250 000
7. $0.\dot{3}$
8. –26
9. 25
10. 10.5 kg
11. $2c$
12. 15
13. A and C
14. $20.25
15. $n + 7$
16. $n^2 - 2n$
17. 1
18. $q^2 - 2q - 24$
19. $4(y + 3)(y - 3)$
20. 5, –5
21.

x	–2	–1	0	1	2
y	$-\frac{1}{2}$	–1	$\times$	1	$\frac{1}{2}$

22. <
23. $9.42\ \text{m}^2$
24. $4710\ \text{mm}^2$
25. $V = 96z^3$
26. 100 cm
27. 12°
28. 8
29. median = 15
LQ = 12
30. 0.44
31. Croatia vs Iceland
32. 10 km

4.8

1. 236.75
2. 15.959
3. 3.2
4. $3\frac{3}{4}$
5. $\frac{1}{24}$
6. 134 600
7. $0.\dot{4}$
8. –11
9. 6
10. 40
11. $2b^3$
12. 200
13. $-\frac{1}{2}, -60, \sqrt{400}$
14. $24 000
15. $4 \times n$ or $4n$
16. $3a^2 + 3ab$
17. –12
18. $mn - 7m + 2n - 14$
19. $25(a + 2)(a - 2)$
20. 8, –8
21.

x	–2	–1	0	1	2
y	$\frac{1}{25}$	$\frac{1}{5}$	1	5	25

22. Northern Territory
23. $1413\ \text{mm}^2$
24. $314\ \text{cm}^2$
25. $V = 56\pi r^3$
26. 54 cm
27. 40°
28. 30°
29. 2
30. $\frac{7}{15}$
31. 19
32. 6

MATHS MATE

MAUVE

Teacher Resource

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

31. **Hint:** *Find the area of the square, then find the length of its side.*
Solution: If the shaded area of the square has an area of 16 cm^2, then the total area must be 4 times this, or 64 cm^2.
Use the formula for the area of a square:
$A = s^2$
$s^2 = 64$
$s = 8$
Use the formula for the perimeter of a square:
$P = 4s = 4 \times 8 = 32$
The perimeter of the square is **32** cm.

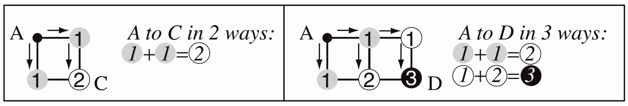
32. **Hint:** *Start by trying to find the hundreds digit. Use trial and error.*
Solution: A has to be 1 or 2, because three 2-digit numbers can not add to 300 or more. $(99 + 88 + 77 = 264)$
If A = 2, the only possible numbers for B and C that will give an answer greater than 200 are 8 and 9 but
22 + 88 + 99 = 209 doesn't work.
Therefore **A = 1**
Now we know that 1 + B + C ends in C.
So 1 + B must end in 0. Therefore **B = 9**
By substitution we find **C = 8**, so ABC = **198**

$$\begin{array}{r} \text{A A} \\ \text{B B} \\ +\ \text{C C} \\ \hline \text{A B C} \end{array} \qquad \begin{array}{r} 1\ 1 \\ 9\ 9 \\ +\ 8\ 8 \\ \hline 1\ 9\ 8 \end{array}$$

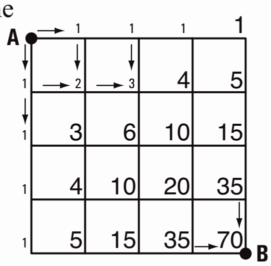
1.2

31. **Hint:** *Consider who gives the most information at a glance. Write logic statements.*
Solution: Arrows from Mark indicate he is taller than Alex, David and Joe.
The only other person left to consider is Sam.
Sam is taller than Mark.
By inference Sam is also taller than Alex, David and Joe.
Sam is the tallest.

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:
'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: 35 + 35 = 70
Movement from A to B can be done in **70** ways.

1.3

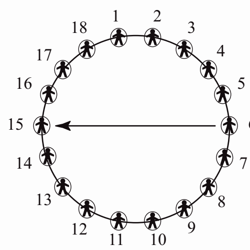
31. **Hint:** *Think about the digits 1, 2, 3 and 4 in terms of the two largest, 2-digit numbers you can make out of them. Use trial and error.*
Solution: The 3 and 4 should be used in the tens positions.
The possible choices and their results are:
$42 \times 31 = 1302$ and
$\mathbf{41 \times 32 = 1312}$
The larger product results from 2 lots of 40s rather than 2 lots of 30s.

$$\begin{array}{r} \boxed{4}\boxed{1} \\ \times\ \boxed{3}\boxed{2} \\ \hline 8\ 2 \\ 1\ 2\ 3\ 0 \\ \hline 1\ 3\ 1\ 2 \end{array}$$

32. **Hint:** *List the numbers from highest to lowest, working backwards, until you get to the number in the 17th position. Look for a pattern.*
Solution: There are 24 possible 4-digit numbers made out of the digits 6, 7, 8 and 9.
4 digits $\Rightarrow 4 \times 3 \times 2 \times 1 = 24$ combinations
Working from the largest to the smallest number gets us to the 17th position most simply:
24th 9876
23th 9867
22th 9786
21th 9768
20th 9687
19th 9678
18th 8976
17th 8967
The number in the 17th position is **8967**.

1.4

31. **Hint:** *Establish what you know. Draw a diagram.*
Solution: There are 8 students between the 6th and the 15th students no matter which way you go.
So 8 + 8 = 16.
Then include the 6th and the 15th students.
You have **18** students evenly spaced in the circle.

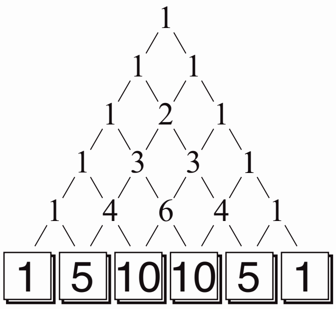


32. **Hint:** *The addition table has the numbers to be added in the first row and the first column. Their sums go in the corresponding intersecting spaces. Look for sums where 2 of these 3 facts are known.*
Solution:

+	12	5	6	7
3	15	8	9	10
16	28	21	22	23
8	20	13	14	15
7	19	12	13	14

1.5

31. **Hint:** *Look for patterns.*
Solution: Pascal's triangle has 1 at the apex and has a 1 at both ends of each line. Any other number equals the sum of the two numbers directly above it.
The sixth line is **1**, **5**, **10**, **10**, **5**, **1**



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

Guess	Cows	Bulls
2 4 5	2	–
3 5 4	2	–
4 2 3	2	–

Two cows in every row indicate that no numbers are in the right positions in any row.
4 is in all three positions, so it can not be part of the solution.
5 can not be in positions 2 or 3, so it is in position 1.
2 can not be in positions 1 and 2, so it is in position 3.
3 can not be in positions 1 and 3, so it is in position 2.
So the answer is **532**.

1.6

31. **Hint:** *Which symbols appear to have the greatest/least values? Presume a simple relationship between symbols. e.g.* ▽△| = *6 if* ▽ = *3,* △ = *2 and* | = *1.*
Solution: △|| = 5. The only possible values for | are 0, 1 and 2.
If | = 0, then △ = 5 but from ▽△△ = 15, ▽ = 5. This must be false because two different symbols have the same value.
If | = 2, then △ = 1 but from ▽△△ = 15, ▽ = 13.
This would make the the statement ▽▽| = 19 false.
If | = 1, then △ = 3 and from ▽△△ = 15, ▽ = 9.
This would make all statements true.
SO: ▽▽△| = 9 + 9 + 3 + 1 = **22**

32. **Hint:** *Make a list. Work systematically. Look for a pattern.*
Solution: The list of possible combinations of dots on the domino tiles is as follows (remember order is of no importance on each tile):

00	11	22	33	44	55	66
01	12	23	34	45	56	
02	13	24	35	46		
03	14	25	36			
04	15	26				
05	16					
06						

The possibilities are 7 then 6, 5, etc.
7 + 6 + 5 + 4 + 3 + 2 + 1 = 28
There are **28** domino pieces in the set.

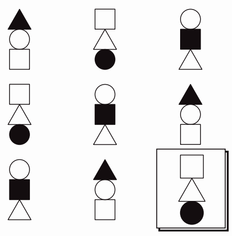
1.7

31. **Hint:** *Make an organised list. A table format may help.*
Solution:

Minute	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	**17**
Metres moved	+2	–1	+2	–1	+2	–1	+2	–1	+2	–1	+2	–1	+2	–1	+2	–1	+2
Height up wall	2	1	3	2	4	3	5	4	6	5	7	6	8	7	9	8	**10**

The frog took **17** minutes to reach the top of the well.

32. **Hint:** *Look for patterns. What are the variables?*
Solution: The variables are shape, colour and position. Every figure has one of each shape, one black and two white shapes and an order not used by any other figure in its same row or column.



1.8

31. **Hint:** *Make organised lists.*
Solution: Let B and G represent the number of boys and girls in the family.

Fact 1
Each of my sons has as many brothers as sisters.
Some possibilities are:

Gender	Total
B + (G + B)	(1G, 2B)
B + (2G + 2B)	(2G, 3B)
B + (3G + 3B)	(3G, 4B)
B + (4G + 4B)	(4G, 5B)

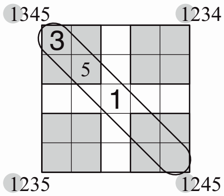
Fact 2
Each of my daughters has half as many sisters as brothers.
Some possibilities are:

Gender	Total
G + (G + 2B)	(2G, 2B)
G + (2G + 4B)	(3G, 4B)
G + (3G + 6B)	(4G, 6B)
G + (4G + 8B)	(5G, 8B)

There is one option that fits both criteria.
So there are 3 girls and 4 boys in the family, a total of **7** children.

1.8 (cont.)

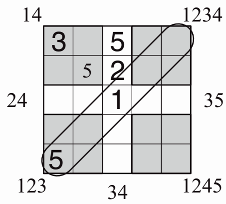
32. **Hint:** *Find the 4 digits whose products are listed in the corners. After filling in everything you can deduce from these products, work the central cross.*
Solution: The products must be:
$1 \times 3 \times 4 \times 5 = 60$
$1 \times 2 \times 3 \times 4 = 24$
$1 \times 2 \times 3 \times 5 = 30$
$1 \times 2 \times 4 \times 5 = 40$
We can also deduce that because 1 is in every shaded box, the 1 in the cross must be in the central position.



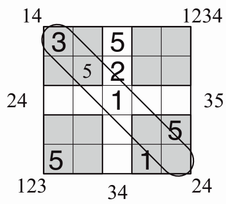
This also means that there is only one 3 available in the main diagonal so it must be in the top left position.

Similarly in the top 2 shaded squares there is only one 2 and one 5 so they must also be located in the top of the cross as shown.

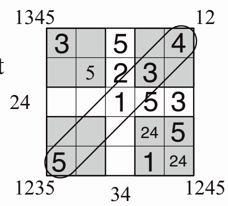
Looking at the second diagonal the bottom left corner must be 5 as it can't be anywhere else on this diagonal.



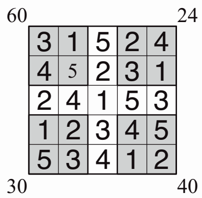
Looking to the bottom right shaded square 5 must be in the upper right corner and 1 in the bottom left.



The 3 and 5 on the right hand side of the cross can be placed now as can the 3 in the upper right shaded square. Now a 4 must go in the top right corner, as it can't be anywhere else on that diagonal.



Continue working systematically and place the numbers as shown.



2.1

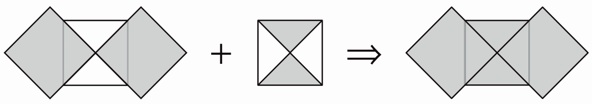
31. **Hint:** *Make a systematic list. Start with the largest coin and work backwards.*
Solution: I need two dollars in change. There must only be a one dollar coin. Two one dollar coins would give change. Again there must only be one 50 cent coin because two fifty cents, added with the dollar would give change. A maximum of four 20¢ coins can be had because again, five would result in a dollar.
Any 10¢ would combine with the 20¢ coins to form 50¢, so there are no 10¢ coins, but one 5¢ coin would be possible. Therefore
\$1 + 50¢ + 20¢ + 20¢ + 20¢ + 20¢ + 5¢ = \$**2.35**
is the largest amount of money I could possibly have without being able to give exactly \$2.00 in change.

32. **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:
We know that F must be 1 because $B \times F = B$.
$B \times B = CF$ or C1. The only two-digit perfect square number that ends in 1 is 81.
So $B = 9$
The table represents the **9**× multiplication table.

2.2

31. **Hint:** *Think about the sum of the numbers when the average is given.*
Solution: Six numbers with an average of 8.5 add to 51
$(6 \times 8.5 = 51)$
Eight numbers with an average of 8.5 add to 68
$(8 \times 8.5 = 68)$
The sum of the further two numbers added must be
$68 - 51 =$ **17**

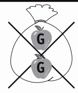
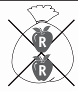
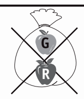
32. **Hint:** *Visualise the area of the resulting shape in terms of the number of squares.*
Solution: There are 2 full squares and half a square in the resulting shape:



The side length of each square is 12 cm.
Area of 1 square is $A = 12 \times 12$
$= 144 \text{ cm}^2$
Area of half a square is $A = \frac{144}{2}$
$= 72 \text{ cm}^2$
Total area $A = 144 + 144 + 72$
$= 360 \text{ cm}^2$
The area of the resulting shape is **360** cm^2.

2.3

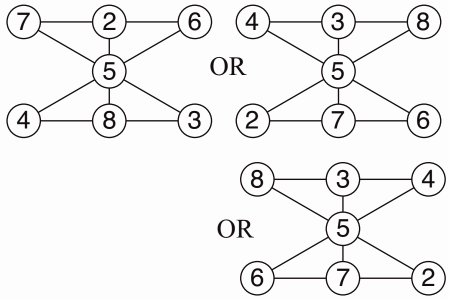
31. **Hint:** *Consider the faulty label and the real possibilities. Draw a diagram. Use trial and error.*
Solution: If you select a green (G) apple from bag 3:

Bag	Faulty label	Possibilities	Trial: Selection G	Information gathered
1		RR or GR	??	GR taken so RR
2		GG or GR	??	GG taken so GR
3		RR or GG	GG	

Similarly, if you select a red (R) apple from bag 3, then this bag contains 2 red apples (RR). Therefore bag 1 must contain a GR combination and bag 2 must contain a GG combination.
Trial of an apple from bags 1 and 2 gives relative results. To be sure you could determine the contents of all three bags you would choose from **bag 3**.

32. **Hint:** *List all possible combinations of the same, double digit and triple digit numbers. Then consider the other palindromes. Look for a pattern.*
Solution: The same, double digit combinations are:
11, 22, 33, 44, 55, 66, 77, 88, 99 $\Rightarrow 9$
The same, triple digit combinations are:
111, 222, 333 $\Rightarrow 3$
Other combinations include:
101, 121, 131, 141, 151, 161, 171, 181, 191 $\Rightarrow 9$
202, 212, 232, 242, 252, 262, 272, 282, 292 $\Rightarrow 9$
303, 313, 323, 343, 353, 363, 373, 383, 393 $\Rightarrow 9$
$9 + 3 + 9 + 9 + 9 = 39$
There are **39** palindromic numbers between 10 and 400.

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 combinations are (2,5,8), (2,6,7), (3,4,8), (3,5,7) and (4,5,6). 5 is the most used number. It should be in the centre of the diagram, where 3 lines cross.
There are a variety of solutions but 258 must be on a line through the centre. Three solutions are shown below:



2.4

31. **Hint:** *Look for a pattern. Draw a diagram to establish the number of toothpicks needed for 1, 2, 3 and 4 triangles.*
Solution: You'll note that every added triangle requires two toothpicks apart from the first which requires 3. So take one toothpick from the total of toothpicks used and then halve it.

$$\begin{aligned}(\text{Total Toothpicks} - 1) \div 2 &= \Delta\text{'s formed}\\ &= (87 - 1) \div 2\\ &= 86 \div 2\\ &= 43\end{aligned}$$

The number of triangles formed is **43**.

2.5

31. **Hint:** *Establish the position for the two-digit numbers first. Match central digits. Work systematically.*
Solution: Of the two-digit numbers 65 and 67, 67 must be on the lower position on the grid because 5 is not a central digit in any of the five-digit numbers. Work systematically to place the numbers as shown.

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

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

$$\begin{array}{r} 2\ A\ B\ C\ D\ E \\ \times \qquad\qquad 3 \\ \hline A\ B\ C\ D\ E\ 2 \end{array}$$

$3 \times E$ ends in 2
Therefore $\mathbf{E} = \mathbf{4}$. (Carry 1)
$3 \times D + 1$ ends in 4
Therefore $\mathbf{D} = \mathbf{1}$.
$3 \times C$ ends in 1
Therefore $\mathbf{C} = \mathbf{7}$. (Carry 2)
$3 \times B + 2$ ends in 7
Therefore $\mathbf{B} = \mathbf{5}$. (Carry 1)
$3 \times A + 1$ ends in 5
Therefore $\mathbf{A} = \mathbf{8}$. (Carry 2)
The original number was **857 142.**

Check:

$$\begin{array}{r} 2\ 8\ 5\ 7\ 1\ 4 \\ \times \qquad\qquad 3 \\ \hline 8\ 5\ 7\ 1\ 4\ 2 \end{array}$$

2.6

31. **Hint:** *Solve algebraically.*
Solution:

Original size	x	
Reduced size (Scale Factor 80%)	80% of x means $\frac{80}{100} \times x$	
Original size (Scale Factor y%)	$\frac{y}{100} \times \frac{80 \times x}{100} = x$ $\frac{y}{100} \times \frac{80}{100} = 1$ $y = \frac{10\,000}{80} = 125\%$	Divide both sides by x

The drawing must be enlarged by a scale factor of **125%** to return it to its original size.

32. **Hint:** *Try opting for the shortest distance every time. Progress step by step. Use trial and error.*
Solution: The shortest distance from A is 17 km to D, so try this first. From D the shortest distance is 15 km to E. From E you need to go back to B. This road is 19 km long. It is then 24 km to C, and the quickest route to A is 22 km.
A, D, E, B, C, A
$17 + 15 + 19 + 24 + 22 = 97$
There is however the possibility of not going backwards to B. Consider going from A to D and then to B.
From B you would need to go to E and then to C to include all towns.
From C the quickest route home is directly to A taking the 22 km long road.
A, D, B, E, C, A
$17 + 18 + 19 + 16 + 22 = 92$
The reverse order of this is possible:
A, C, E, B, D, A
The shortest route is **92** km.

2.7

31. **Hint:** *Write down what you know. First find the number of lollies each friend received. Use trial and error.*
Solution: Lisa had 60 lollies and 5 were left for herself. This leaves 55 lollies to share equally among her friends. If each friend had more than 5 lollies and the divisions were equal then you need to find a number greater than 5 that can be divided into 55.
The factors of 55 are 1, 5, 11 and 55, so 11 is the only solution.
$55 \div 11 = 5$
Lisa shared her lollies with **5** friends.

32. **Hint:** *Start by listing the possible combinations of 3-digit numbers. Be systematic.*
Solution: The possible 3-digit numbers are:
234 243 324 342 423 432
To find the mean, add the numbers and divide by the number of alternatives which is 6.
$234 + 243 + 324 + 342 + 423 + 432 = 1998$
$1998 \div 6 = 333$
Given that the mean of 2, 3, and 4 is 3 it follows that the mean of all 3-digit numbers made with 2, 3 and 4, arranged in any order would be 333.
The mean of all the different numbers Mia can make is **333**.

2.8

31. **Hint:** *Look for a pattern. Write a list.*
Solution: When Carol's odometer clicks to the next km it will be 032720. Therefore all of the next 10 readings will contain a 2 for the tens digit, a match to the 2 in the thousands position.
Similarly when the odometer clicks to the 3 in the tens position, all of these next 10 readings will contain a match to the 3 in the tens of thousands position.
When the odometer clicks to a 4 in the tens position, while a 0 in the units position is a match, a 1 is different.
The odometer would then read 032741.
The difference between the readings 032741 and 032719 equals 22.
Carol must travel **22 km** before the digits are different again.

32. **Hint:** *Determine the rate of painting for each person, in rooms/hour.*
Solution: The painting rates of each person are given:
Harry = $\frac{1}{3}$ rooms/h, Annie = $\frac{1}{4}$ rooms/h and
Mitch = $\frac{1}{6}$ rooms/h

Together they paint at a combined rate of:
$\frac{1}{3} + \frac{1}{4} + \frac{1}{6} = \frac{4+3+2}{12} = \frac{\cancel{9}^{3}}{\cancel{12}_{4}}$ rooms/h
One room at a rate of $\frac{3}{4}$ rooms/h can be painted in:
$\frac{3}{4} \times x = 1$ multiply both sides by 4
$3x = 4$ divide both sides by 3
$x = \mathbf{1\frac{1}{3}}$ hours or **1 h and 20 min**.

3.1

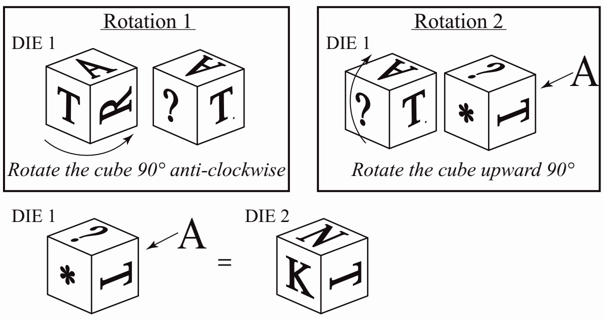
31. **Hint:** *Distance travelled = Speed × Time OR*
Time = $\dfrac{\textit{Distance travelled}}{\textit{Speed}}$

Solution:
Time taken to travel 10 km at 120 km/h is
$\frac{10}{120} = \frac{1}{12}\text{h} = \frac{1}{12} \times 60 \text{ min} = 5 \text{ min}$
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 120 km/h is
6 min – 5 min = **1** min
Definitely not worth the risk!

32. **Hint:** *Break the problem into parts calculating the number of strikes for each part. Be systematic.*
Solution: In 12 hours ⇒
For the hours the clock strikes:
$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 = 78$
For the half hours the clock strikes:
$2 \times 12 = 24$ (one half hour in every hour)
For the quarter hours the clock strikes:
$1 \times 24 = 24$ (two quarter hours in every hour)
In 12 hours:
$78 + 24 + 24 = 126$
In 24 hours:
$2 \times 126 = 252$
The clock strikes **252** times in 24 hours.

3.2

31. **Hint:** *Make a model. Alternatively, mentally rotate the left hand die so that the T's match. What do you see?*
Solution: Rotating the first die so that it is in the same position as the second takes two rotations as shown.



The cubes are now in matching positions

? and ∗ are the unknown faces that appear on die 1.
Comparing die 1 to die 2 we see that ? is N and ∗ is K.
K is on the face opposite the A.

32. **Hint:** *List all prime numbers up to 23, as 23 is the sum of the largest two choices. List numbers 1 to 12 and cross them out when they have been used. Start with the greatest sum and work backwards. Be systematic.*
Solution: The prime numbers involved are:
3, 5, 7, 11, 13, 17, 19 and 23. (2 is too small to be a sum of two different numbers from 1 to 12, so it is omitted.)
There are 8 prime numbers in all so we have 2 spares!
The 6 pairs are:

11 + **12** = 23	OR	**11** + **12** = 23
9 + **10** = 19		**9** + **10** = 19
+ = 17		+ = 17
5 + **8** = 13		**6** + **7** = 13
4 + **7** = 11		**3** + **8** = 11
1 + **6** = 7		**2** + **5** = 7
2 + **3** = 5		**1** + **4** = 5
+ = 3		+ = 3

3.3

31. **Hint:** *List the prime numbers up to 36. Use trial and error.*
Solution:
The prime numbers up to 36 are:
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31
By trial and error:
$5 + 31 = 36$ $\quad 7 + 29 = 36$
$13 + 23 = 36$ $\quad 17 + 19 = 36$
The 4 pairs of prime numbers that add up to 36 are
(5, 31), (7, 29), (13, 23), (17, 19).

32. **Hint:** *Work through the multiplication from right to left. Use trial and error.*
Solution: The unit digit that results from the multiplication of 3 times C is B which is the key to the whole equation. This B value can be tested with the second multiplication of 3 times B.
We know that C is not 0 or 5 because each would result in B = C ⇒ impossible.
If C = 1, then B = 3, but the next multiplication of 3 × 3 results in B = 9 in the answer ⇒ impossible
If C = 2, then B = 6, but the next multiplication of 3 × 6 results in B = 8 in the answer ⇒ impossible
If C = 3, then B = 9, but the next multiplication of 3 × 9 results in B = 7 in the answer ⇒ impossible
If C = 4, then B = 2, but the next multiplication of 3 × 2 (plus carry 1) results in B = 7 in the answer ⇒ impossible
If C = 6, then B = 8, but the next multiplication of 3 × 8 (plus carry 1) results in B = 5 in the answer ⇒ impossible
If C = 7, then B = 1, but the next multiplication of 3 × 1 (plus carry 2) results in B = 5 in the answer ⇒ impossible
If C = 8, then B = 4, and the next multiplication of 3 × 4 (plus carry 2) results in B = 4 in the answer.
A = 1 as once you add the carry of 1, B = 4 in the answer.

$$\begin{array}{rccc} & A & B & C \\ \times & & & 3 \\ \hline & B & B & B \end{array} \quad \Rightarrow \quad \begin{array}{rccc} & 1 & {}^{1}4 & {}^{2}8 \\ \times & & & 3 \\ \hline & 4 & 4 & 4 \end{array}$$

ABC is **148**.

3.4

31. **Hint:** *Discuss what an integer is. The fraction must equal an integer, so the numerator must be a multiple of the denominator.*
e.g. $\frac{9}{3} = 3$ *or* $\frac{9}{-1} = -9$
Solution:
$n + 1$ must equal $+1, -1, +3, -3, +9$ or -9.
The possible values for n are **−10**, **−4**, **−2**, **0**, **2** and **8**.

32. **Hint:** *Find the largest 6-digit number possible. Consider the conditions that being a multiple of 3, 4 and 5 places on a number. Use trial and error.*
Solution: The largest possible 6-digit number is 999 999.
A number is divisible by 3 if the sum of its digits is divisible by 3.
A number is divisible by 4 if its last two digits form a number divisible by 4.
A number is divisible by 5 if its last digit is 5 or 0.
So our number must end in zero (if it ends in 5 the number cannot be divisible by 4) and be divisible by 3 and 4.
Start checking from the highest number down:
999 990, 999 980, 999 970, 999 960, 999 950......
The largest 6-digit number which is divisible by 3, 4 and 5 is **999 960**.

3.5

31. **Hint:** *Look for a pattern in the last two digits of the expansion of* 5^n.
Solution:
$5^1 = \mathbf{5}$
$5^2 = \mathbf{25}$
$5^3 = 1\mathbf{25}$
$5^4 = 6\mathbf{25}$
5 raised to any power other than 1, always results in the last two digits being 25.
So the last two digits of 5^{2020} are **25**.

32. **Hint:** *Use the divisibility tests for 3 and 4. A number divisible by both 3 and 4 is a multiple of 12.*
Solution:
A number is divisible by both 3 and 4 if the sum of its digits is divisible by 3 and its last two digits are divisible by 4.
The first number that is divisible by both 3 and 4 (or is a multiple of 12), greater than 201 is 204.
To find the rest of the numbers between 201 and 301 that are divisible by both 3 and 4, count by 12 starting with 204.
All the multiples of 12 between 201 and 301 are:
204, 216, 228, 240, 252, 264, 276, 288, 300.
There are **9** numbers between 201 and 301 divisible by both 3 and 4.

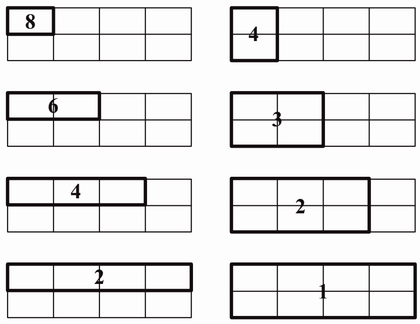
3.6

31. **Hint:** *Write a list of the first 20 odd numbers. Consider the last digits of all odd numbers. Look for shortcuts.*
Solution:

1	11	21	31
3	13	23	33
5	15	25	35
7	17	27	37
9	19	29	39

Add 1, 3, 5, 7, 9 and multiply the result by 4.
$25 \times 4 = 100$
There are also 5 lots of 10, 5 lots of 20 and 5 lots of 30.
$50 + 100 + 150 = 300$
$100 + 300 = 400$
The sum of the first 20 odd numbers is **400**.

32. **Hint:** *Be systematic. Draw diagrams of the different possible sizes.*
Solution: The following rectangle sizes are possible:



$8 + 4 + 6 + 3 + 4 + 2 + 2 + 1 = 30$
There are **30** rectangles in this diagram.

3.7

31. **Hint:** *Make a systematic list in table format. Start with the largest coin and work backwards.*
Solution:

# of ways	\$2	\$1	50¢
1	2 + 2	1	
2	2	1 + 1 + 1	
3		1 + 1 + 1 + 1 + 1	
4		1 + 1 + 1 + 1	50 + 50
5		1 + 1 + 1	50 + 50 + 50 + 50
6		1 + 1	50 + 50 + 50 + 50 + 50 + 50
7		1	50 + 50 + 50 + 50 + 50 + 50 + 50 + 50
8	2 + 2		50 + 50
9	2		50 + 50 + 50 + 50 + 50 + 50
10	2	1	50 + 50 + 50 + 50
11	2	1 + 1	50 + 50
12			50 + 50 + 50 + 50 + 50 + 50 + 50 + 50 + 50 + 50

If you have 50¢, \$1 and \$2 coins, you can make up \$5 in **12** ways.

3.7 (cont.)

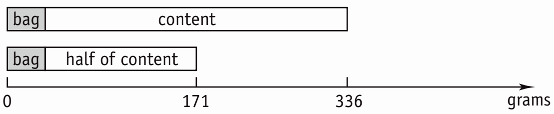
32. **Hint:** *Look for a pattern in the last digit of the expansion of 3^n.*
Solution: The last digits form the repetitive cycle 3, 9, 7, 1, 3, 9, 7, 1, ... with the last digits repeating every 4 steps.

i.e. $3^1, 3^5, 3^9, ..., 3^{97}, ...$ always end in 3
$3^2, 3^6, 3^{10}, ..., 3^{98}, ...$ always end in 9
$3^3, 3^7, 3^{11}, ..., 3^{99}, ...$ always end in 7
$3^4, 3^8, 3^{12}, ..., 3^{100}, ...$ always end in 1

So the last digit of 3^{100} is **1**.

3.8

31. **Hint:** *Draw a diagram OR Use algebra.*
Solution:



Looking at the diagram, half of the content must weigh
$336 - 171 = 165$ g
The whole content weighs twice as much
$165 \times 2 = 330$ g
The bag must weigh the difference between 336 g and 330 g
$336 - 330 = $ **6** g
OR
Let c = content weight and b = bag weight
(1) $c + b = 336$
(2) $\frac{c}{2} + b = 171$ multiply by 2 both sides
$c + 2 \times b = 2 \times 171$ subtract $2 \times b$ from both sides
$c = 2 \times 171 - 2 \times b$
$c = 342 - 2b$
Substituting into equation (1) $c + b = 336$
$342 - 2b + b = 336$ subtract 342 from both sides
$-b = 336 - 342$
$-b = -6$
$b = 6$
The bag weighs **6** g.

32. **Hint:** *Consider how many times each digit is used.*
Solution: A table of some 2-digit numbers would look like:

10	20	30	40	50	60	70	80	90
11	21	31						.
12	22							.
13								.
14								.
15								.
16								.
17								.
18								.
19	.	.	.	.	.	.	.	99

Adding the columns for the tens digits there is 10 times each of them:
$1 \times 10 + 2 \times 10 + 3 \times 10 + 4 \times 10 +$
$5 \times 10 + 6 \times 10 + 7 \times 10 + 8 \times 10 + 9 \times 10 =$
$10 + 20 + 30 + 40 + 50 + 60 + 70 + 80 + 90 = 450$

Because the digits 1 to 9 in the units column are repeated 9 times, add them once and multiply by 9.
$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45$
$45 \times 9 = 405$
$450 + 405 = 855$
The sum of the digits of all 2-digit numbers from 10 to 99 is **855**.

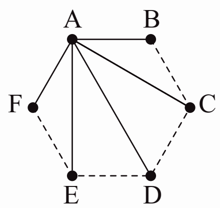
4.1

31. **Hint:** *Use trial and error. A table format may help. OR Use algebra.*
Solution: Let c = number of correct responses
e = number of errors
r = total responses
Trials should consider that $r = c + e = 15$

Trials	Correct responses		Errors		**Total**		Result
	c	*points*	e	*points*	r	*points*	*points*
1	10	+20	5	–5	**15**	***15***	✗
2	5	+10	10	–10	**15**	***0***	✗
3	**8**	+16	7	–7	**15**	***9***	✓

OR Using simultaneous equations:
(1) $c + e = 15$ (number of questions)
(2) $2c - e = 9$ (number of points)
Add equations (1) and (2) to eliminate e.
$c + e + 2c - e = 15 + 9$
$3c = 24$
$c = 8$
So the number of correct responses is **8**.

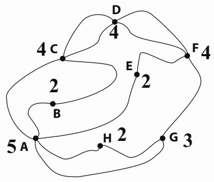
32. **Hint:** ***Diagonals of a hexagon (n = 6):***
In a hexagon we can draw 5 lines from A to each of B, C, D, E and F. Two of these lines (AB and AF) are sides of the hexagon, so diagonals from A = 5 – 2 = 3. In total we have 6 × 3 = 18 diagonals. But lines from A to C and C to A are the same so we have exactly half of 18 different diagonals, which is 9.



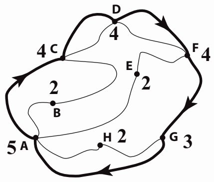
Use this to find the general formula for the number of diagonals of a polygon with n sides.
Solution:
For any polygon with n sides (vertices) we can draw $n - 1$ lines from each corner (vertex) to the others.
Two of these lines are sides of the polygon. So we are left with $(n - 1) - 2 = n - 3$ diagonals 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 $n = 20$ in the formula:
$\frac{n(n-3)}{2} = \frac{20 \times (20 - 3)}{2} = \frac{340}{2} = 170$
A regular polygon with 20 sides has **170** diagonals.

4.2

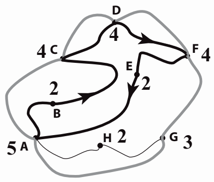
31. **Hint:** *Use trial and error. Consider even and odd nodes.*
Solution: Points A and G are the only two nodes or points with an odd number of paths meeting: 5 for A and 3 for G.
A and G are called odd nodes.
Euler's rule for networks:
"You can travel on any path of a network once and once only if that network has exactly 2 odd nodes by starting at one odd node and finishing at the other."



There are many possible routes but this is an alternative:
Travel from A clockwise around the outside and back to A.
path: A, C, D, F, G, A



Travel from A clockwise around the inside and back to A.
path: A, B, C, D, F, E, A



All that is left is from A through H to G.
path: A, H, G
You would finish at point **G** after travelling every road once only.

32. **Hint:** *Find the Lowest Common Multiple (LCM) of 2, 3, 4, 5 and 6.*
Solution: To find the LCM (smallest positive integer that evenly divides by 2, 3, 4, 5 and 6) list the multiples of the largest number, 6 and restrict the list considering the divisibility rules of the other numbers. Multiples of 5 must end in a 0 or a 5 but considering the divisibility by 6 it means the numbers must only end in a 0. The list of multiples is 30, 60, 90 etc. When you also consider divisibility by 4, then the LCM is 60.
Now consider that when the farmer counts his cows by 2s, 3s, 4s, 5s or 6s, he always has a remainder of 1.
Make a list of the multiples of 60 in ascending order and then add 1 to each of the multiples to create the remainder: 61, 121, 181, 241, 301, 361 and so on.
Next consider that if he counts by 7s the remainder is 0.
The smallest number of cows the farmer could possibly have owned is the smallest number in this list that is divisible by 7.
The smallest number of cows the farmer could have owned is **301**.

4.3

31. **Hint:** *Evaluate the sums inside each bracket showing each answer as an improper fraction and then simplify.*
Solution:

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

32. **Hint:** *Draw a diagram. Be systematic.*
Solution: The maximum number of people who can cross at 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 15 trips.

WAITING!	Travellers	STAYERS?	Time Spent (min)
WWW	cc →		10
c ~~c~~ ~~c~~	← c	c	20
WW~~W~~	W →	W	30
c c	← c		40
WW	cc →	W	50
c ~~c~~ ~~c~~	← c	c	60
W~~W~~	W →	WW	70
c c	← c		80
W	cc →	WW	90
c ~~c~~ ~~c~~	← c	c	100
~~W~~	W →	WWW	110
c c	← c		120
	cc →	WWW	130
c ~~c~~ ~~c~~	← c	c	140
	cc →	WWW	150
~~c~~ ~~c~~		c c c	

The minimum time in which all 6 people can cross the river is **150** minutes.

4.4

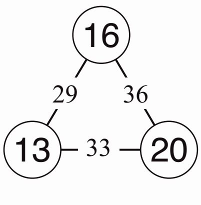
31. **Hint:** *List the digit pairs which differ by 4. Remember that order matters.*
Solution:
The digit pairs which differ by 4 are:
(9,5), (8,4), (7,3), (6,2), (5,1), (4,0)
and in reverse order
~~(0,4)~~, (1,5), (2,6), (3,7), (4,8), (5,9),
(0,4) is less than 10 so it is omitted.
In order: 15, 26, 37, 40, 48, 51, 59, 62, 73, 84, 95
There are **11** numbers from 10 to 99 in which the digits differ by 4.

4.4 (cont.)

32. **Hint:** *Look for a pattern in the last digit of the expansion of 4^n.*
Solution: The last digits form the repetitive cycle:
4, 6, 4, 6, 4, 6, ...
$4^1 = \mathbf{4}$
$4^2 = 1\mathbf{6}$
$4^3 = 6\mathbf{4}$
$4^4 = 25\mathbf{6}$
$4^5 = 102\mathbf{4}$
$4^6 = 409\mathbf{6}$
Odd exponents result in a last digit of 4.
Even exponents result in a last digit of 6.
2020 is an even exponent.
So the last digit of the number 4^{2020} is **6**.

4.5

31. **Hint:** *Try any reasonable guess in the top circle and observe your results.*
Solution: Whatever you place in the top circle, to get 36 and 29 on the sides, your base circles must have the same difference, which is 7. You therefore require two numbers that have a difference of 7 but add to 33.
By trial and error we find 13 and 20. The 20 must go on the right where the largest number is required for the 36.
The 13 goes on the left and this leads to a 16 at the top.



32. **Hint:** *Make a systematic list. Use trial and error.*
Solution: Let

$$\begin{array}{rccc} & & \boxed{D} & \boxed{A} \\ \times & & & \boxed{B} \\ \hline & \boxed{F} & \boxed{E} & \boxed{C} \end{array}$$

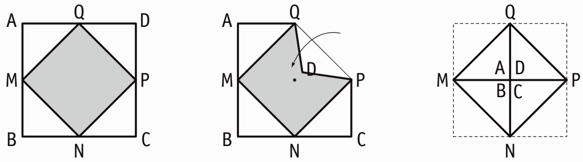
where A, B, C, D, E and F are digits from 1 to 6.

(2,3) and (3,4) are the only combinations that may be in positions A and B.
<u>Try (2,3) or (3,2)</u>:
If (2,3) or (3,2) is correct, then 6 is in the C position. This leaves 4 or 5 for the D position as the product using 1 would be too small.
Multiplying by 5 always results in 0 or 5 so 5 can be discounted.
If 4 is in the D position, then either 8 or 2 will result in position E and neither work.
<u>Try (3,4) or (4,3)</u>:
If (3,4) or (4,3) is correct, then 2 is in the C position. This leaves 1,5 and 6 as the other options for position D.
1 is too small to create a three digit answer.
NB We have a carry over.
6 in position D won't work.
If 5 is in position D, then $5 \times 4 + 1 = 21$ Not possible.
However $5 \times 3 + 1 = 16$ and all numbers are used once!
Check:

$$\begin{array}{rccc} & & \boxed{5} & \boxed{4} \\ \times & & & \boxed{3} \\ \hline & \boxed{1} & \boxed{6} & \boxed{2} \end{array}$$

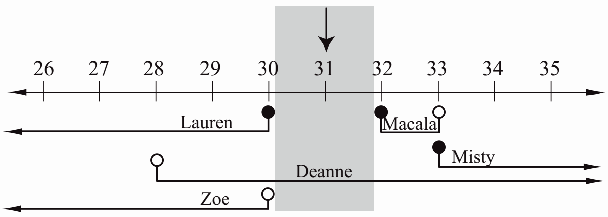
4.6

31. **Hint:** *Visualise how the size of the unshaded portion compares to the shaded portion.*
Solution: Visualise folding the corners of the unshaded square ABCD into the centre of the shaded square MNPQ.



The visible area of the outer square ABCD is equal to the area of the shaded square MNPQ.
Therefore the area of square ABCD is twice the area of square MNPQ.
So the ratio of the area of square MNPQ to the area of square ABCD is 1:2 or **A**.

32. **Hint:** *Draw a number line. Show all possible age intervals as discussed by the girls. Only one girl is right, so the solution lies in the interval where we don't see an intersection of ages.*
Solution: Visually from the graph, Misty can't be right because Deanne would be right too.
Zoe can't be right because Lauren and Deanne would be right too.
Macala can't be right because Deanne would be right too.
Lauren can't be right because Deanne and Zoe would be right too.
The intervals don't overlap between 30 and 32, excluding the values of 30 and 32.
So, Deanne is right and the teacher is **31**.



4.7

32. **Hint:** *Use the goals for and against each team to determine the scores for each of their games.*
Solution:

GROUP D TEAMS	MP matches played	W wins	D draws	L losses	GF goals for	GA goals against	Pts points
Croatia	2	2	0	0	5	0	6
Nigeria	2	1	0	1	2	2	3
Iceland	2	0	1	1	1	3	1
Argentina	2	0	1	1	1	4	1

Round 1:
Iceland had a draw with Argentina.
Croatia won against Nigeria.
Based on the goals for (GF) tally, assume that the draw game between Iceland and Argentina was 0 - 0
This leaves Iceland with a 1 - 3 loss and Argentina with a 1 - 4 loss.
This is not possible in Round 2, because only Croatia has more than 2 goals forward.
This leads to the score of 1 - 1 for the draw game between Iceland and Argentina.
This leaves Iceland with a 0 - 2 loss and Argentina with a 0 - 3 loss.
The only team that could score 3 goals against Argentina in round 2 must be Croatia, which has 5 GFs.
So Croatia played Argentina in round 2.
Therefore Croatia played **Iceland** in their third round robin game.

OR Algebraically
In terms of distance:
$d_{\text{running}} + d_{\text{cycling}} = 50$ km (1)
In terms of time:
$t_{\text{running}} + t_{\text{cycling}} = 2\frac{1}{6}$ h (2)
Apply the distance formula, $d = vt$ to running:

$$\begin{aligned} \underline{d_{\text{running}}} &= v_{\text{running}} t_{\text{running}} \\ &= 12t_{\text{running}} \end{aligned}$$

Apply the distance formula, $d = vt$ to cycling and consider equation (2):

$$\begin{aligned} \underline{d_{\text{cycling}}} &= v_{\text{cycling}} t_{\text{cycling}} && t_{\text{cycling}} = 2\tfrac{1}{6} - t_{\text{running}} \\ &= 30(2\tfrac{1}{6} - t_{\text{running}}) && \text{expand the brackets} \\ &= \cancel{30}^{5} \times \frac{13}{\cancel{6}_{1}} - 30t_{\text{running}} && \text{simplify 30 and 6} \\ &= 65 - 30t_{\text{running}} \end{aligned}$$

Substituting d_{running} and d_{cycling} into equation (1) and let $t_{\text{running}} = x$:

$$\begin{aligned} d_{\text{running}} + d_{\text{cycling}} &= 50 \text{ km} \\ 12x + 65 - 30x &= 50 && \text{group like terms} \\ 65 - 18x &= 50 \\ 65 - 65 - 18x &= 50 - 65 \\ -18x &= -15 \\ -18x \times -1 &= -15 \times -1 \\ 18x &= 15 \\ 18x \div 18 &= 15 \div 18 \\ x &= \frac{5}{6} \end{aligned}$$

$$\begin{aligned} d_{\text{running}} &= 12x \\ &= \cancel{12}^{2} \text{ km/h} \times \frac{5}{\cancel{6}_{1}} \text{ h} && \text{simplify 12 and 6} \\ &= 2 \text{ km/h} \times 5 \text{ h} \\ &= \mathbf{10} \text{ km} \end{aligned}$$

32. **Hint:** *Use trial and error. Start by assuming she travels the whole way by bike. A table may help. OR Use algebra and adapt the formula for distance travelled, $d = vt$.*
Solution: Cycling at 30 km/h means she cycles at 0.5 km/min (or 2 minute kilometres). Running at 12 km/hr means she runs at 0.2 km/min (or 5 minute kilometres).
Start with assuming she travels the whole way by bike.
Travelling 50 km by bike would take 100 minutes. Keep distance constant at 50 km and complete a table until you reach $2\frac{1}{6}$ h or 130 minutes travelled:

Trials	Cycling at 0.5 km/min		Running at 0.2 km/min		Total time 130 mins	
	Distance (km)	Time (min)	*Distance (km)*	Time (min)		
1	*50*	100	*0*	0	100 + 0 = 100	
2	*48*	96	*2*	10	96 + 10 = 106	
3	*46*	92	*4*	20	92 + 20 = 112	
4	*44*	88	*6*	30	88 + 30 = 118	
5	*42*	84	*8*	40	84 + 40 = 124	
6	*40*	80	**10**	50	80 + 50 = 130	✓

The bi-athlete ran **10** km.

4.8

31. **Hint:** *Write number sentences stating what you know. List the digit pairs which, when added together, are divisible by 5.*
Solution: Call Rob's age ab (one letter for each digit).
We know:
(1) Rob is between 10 and 19 years old.
(2) $2ab - 1$ = Prime number
(3) $a + b$ = Number divisible by 5
The digit pairs that are divisible by 5 and between 10 and 19 are (1,4) and (1,9).
Using (2) $2ab - 1$ = Prime number
Try 14: $2 \times 14 - 1$ = Prime number
$28 - 1 = 27$ ⇒ 27 is not a prime number
Try 19: $2 \times 19 - 1$ = Prime number
$38 - 1 = 37$ ⇒ 37 is a prime number
Rob is **19** years old.

4.8 (cont.)

32. **Hint:** *Use trial and error.*
Solution: There are only 15 questions possible.
Mark cannot have 7 or more incorrect answers, because the remaining questions, even if all correct, cannot add to 51 points. For example, for 7 incorrect and 8 correct answers the score is 48.
If Mark had 6 incorrect answers, he could score 51 points from 8 correct, 6 incorrect and 1 no response:
$48 + 0 + 3 = 51$
So the greatest number of incorrect responses Mark could have is **6**.

MATHS MATE

MAUVE

Teacher Resource

MATHS MATE

Test 1
Covering worksheets 1.1 - 1.4

Name: ....

1. [Long ×,÷]
$49 \times 20 =$

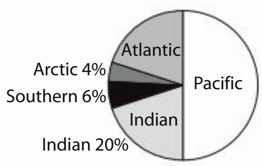
2. [Decimal +,–]
$5.38 + 0.08 =$

3. [Decimal ×,÷]
$13.27 \times 5 =$

4. [Fraction +,–]
$\frac{7}{10} - \frac{4}{10} =$

5. [Fraction ×,÷]
$\frac{5}{9} \times 3 =$

6. [Percentages]
What percentage of the earth's ocean area is covered by the Atlantic Ocean?



7. [Decimals / Fractions / Percentages]
Place in ascending order:
$\frac{2}{5}, \frac{1}{3}, \frac{4}{15}$

8. [Integer +,–]
$(+4) + (-9) =$

9. [Integer ×,÷]
$(+11) \times (-2) =$

10. [Rates / Ratios]
180 litres flow in 4 minutes =
☐ litres per minute

11. [Indices]
$4^2 =$

12. [Square Roots]
$\sqrt{900} =$

13. [Exploring Number]
$7 \times 6 - 12 \div 6 =$

14. [Financial Mathematics]
Lou's home contents insurance direct debit is \$30.50 per month. How much does she save if she pays the up-front annual amount of \$318?

\$

15. [Number Patterns]
What is the value of the missing term in the pattern?

position	1	2	3	4	5	6
term	6	12	24	48	96	?

16. [Expressions]
Write as an expression:
p increased by 300

17. [Substitution]
If $g = 0$, find the value of $9 + g$

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

19. [Factorisation]
Factorise $4h - 8$

20. [Equations]
Solve for x: $6 + x = 4$

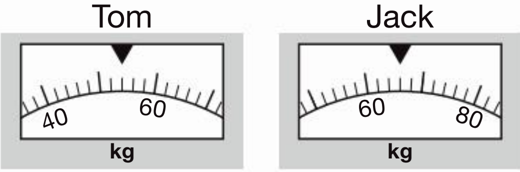
21. [Coordinate Geometry]
Complete the table of values for the linear rule $y = x - 6$

x	$y = x - 6$	y	(x, y)
–6	$y = -6 - 6$	–12	(–6 , –12)
–3			
0			
3			
6			

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

22. [Units of Measurement / Time]

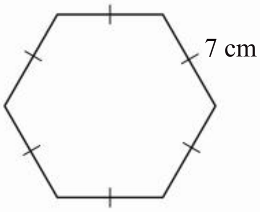
How much lighter in weight is Tom than Jack?



kg

23. [Perimeter / Area]

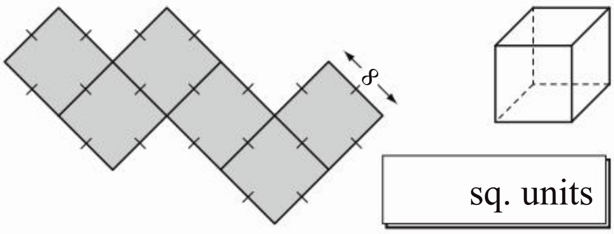
Find the perimeter of the hexagon.



cm

24. [Surface Area]

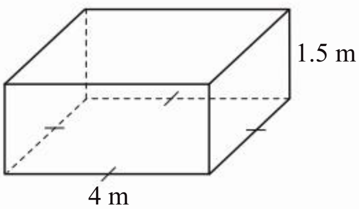
Find the total surface area of the cube by finding the area of its net.



sq. units

25. [Volume]

Find the volume of the square prism.



m^3

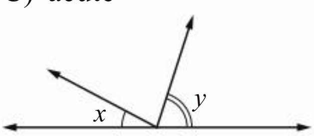
26. [Pythagoras]

Find the positive solution for b:
$b^2 = 144$

27. [Angles]

Which would describe the angles marked x and y in this diagram?

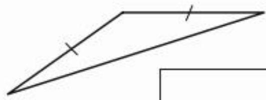
A) adjacent
B) supplementary
C) acute



28. [Geometric Reasoning]

Which two options describe this triangle?

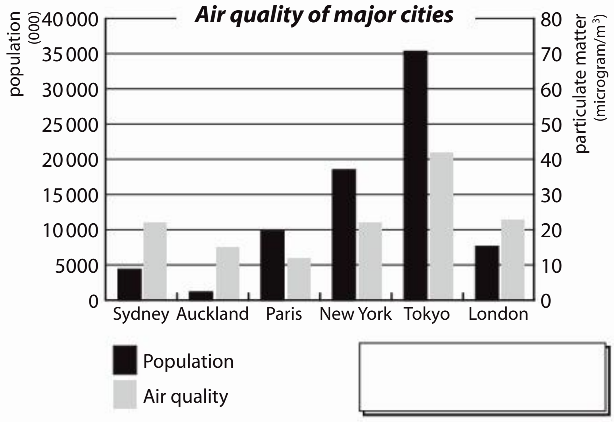
A) right-angled
B) obtuse-angled
C) isosceles



and

29. [Statistics]

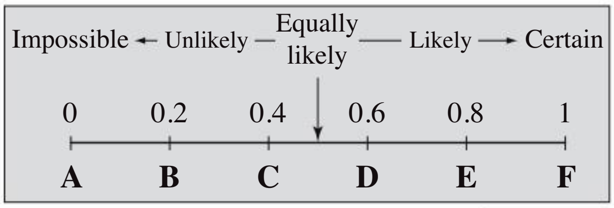
Relative to its population, which of these cities has the worst air quality?



30. [Probability]

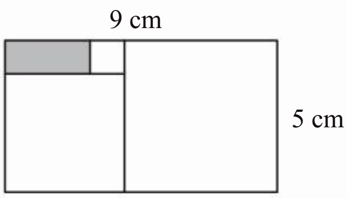
Which letter A to F describes the probability of this event?

'A spinner numbered 1 to 5 is spun and an odd number is obtained.'



31. [Problem Solving 1]

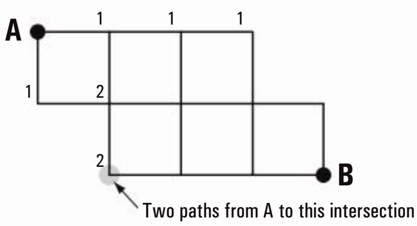
A 9 cm by 5 cm rectangle is divided into 3 squares and a rectangle as shown below.
Find the area of the shaded rectangle.



cm^2

32. [Problem Solving 2]

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.]



MATHS MATE

Test 1

Covering worksheets 1.1 - 1.4

Name: ....

1. [Long ×,÷]

$54 \times 20 =$

2. [Decimal +,–]

$4.67 + 0.07 =$

3. [Decimal ×,÷]

$11.54 \times 6 =$

4. [Fraction +,–]

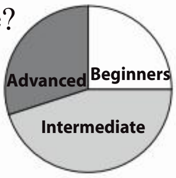
$\frac{13}{17} - \frac{8}{17} =$

5. [Fraction ×,÷]

$\frac{3}{4} \times 2 =$

6. [Percentages]

Of the slopes at Mount Buller, 30% are classified Advanced. What percentage of slopes are Intermediate?



7. [Decimals / Fractions / Percentages]

Place in descending order:

$\frac{2}{3}, \frac{5}{6}, \frac{5}{12}$

8. [Integer +,–]

$(+4) + (-8) =$

9. [Integer ×,÷]

$(+6) \times (-3) =$

10. [Rates / Ratios]

10°C drop in 4 hours =

☐ °C per hour

11. [Indices]

$3^2 =$

12. [Square Roots]

$\sqrt{400} =$

13. [Exploring Number]

$18 - 5 - (18 - 6) =$

14. [Financial Mathematics]

Joe's car insurance direct debit is $34.80 per month. How much does he save if he pays the up-front annual amount of $337?

$

15. [Number Patterns]

What is the value of the missing term in the pattern?

term position	1	2	3	4	5	6
term value	4	12	36	108	324	?

16. [Expressions]

Write as an expression:

g decreased by 25

17. [Substitution]

If $p = 0$, find the value of $16 - p$

18. [Expansion]

Expand $3(k - 2)$

19. [Factorisation]

Factorise $5s - 20$

20. [Equations]

Solve for x: $8 + x = 4$

21. [Coordinate Geometry]

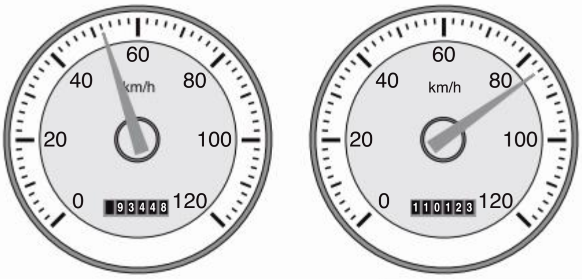
Complete the table of values for the linear rule $y = 3x$

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

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

22. [Units of Measurement / Time]

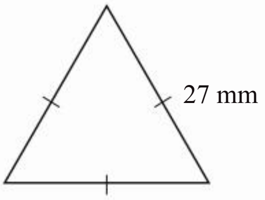
What is the difference in speed?



km/h

23. [Perimeter / Area]

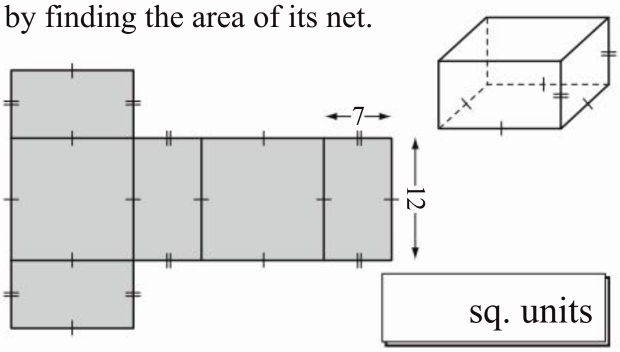
Find the perimeter of the equilateral triangle.



mm

24. [Surface Area]

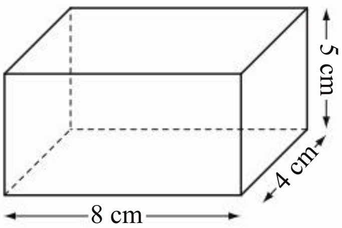
Find the total surface area of the square prism by finding the area of its net.



sq. units

25. [Volume]

Find the volume of the rectangular prism.



cm^3

26. [Pythagoras]

Find the positive solution for c:

$c^2 = 400$

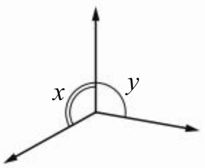
27. [Angles]

Which would describe the angles marked x and y in this diagram?

A) reflex

B) obtuse

C) complementary



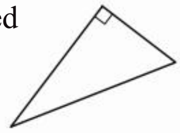
28. [Geometric Reasoning]

Which two options describe this triangle?

A) right-angled

B) scalene

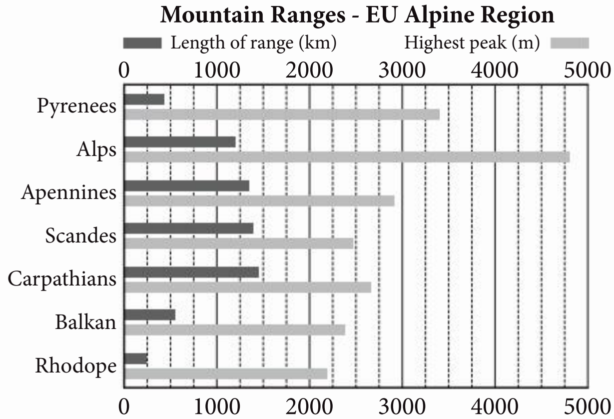
C) isosceles



and

29. [Statistics]

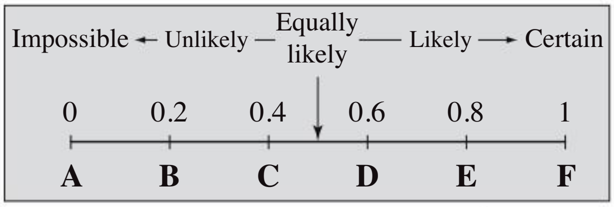
How many European mountain ranges have peaks between 2500 m and 3500 m?



30. [Probability]

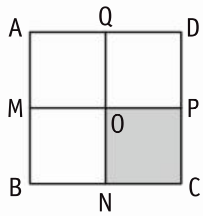
Which letter A to F describes the probability of this event?

'A red marble will be drawn from a bag containing 8 white marbles and 2 red marbles.'



31. [Problem Solving 1]

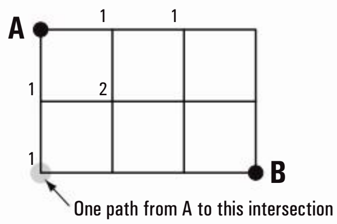
M, N, P and Q are the midpoints of the sides of the square ABCD. The shaded square has an area of 36 cm^2. What is the perimeter of the square ABCD?



cm

32. [Problem Solving 2]

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.]



22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

Test 2

Covering worksheets 1.5 - 1.8

Name: ....

1. [Long ×,÷]
$57\,040 \div 100 =$

2. [Decimal +,–]
$13.753 + 4.258 =$

3. [Decimal ×,÷]
$100 \times 0.4 =$

4. [Fraction +,–]
$\frac{3}{5} + \frac{4}{5} =$

5. [Fraction ×,÷]
$\frac{1}{4} \div \frac{2}{5} =$

6. [Percentages]
40% of \$600 = \$

7. [Decimals / Fractions / Percentages]
Complete the equivalent fractions:
$\frac{8}{10} = \frac{\square}{100}$

8. [Integer +,–]
$(+4) - (-2) =$

9. [Integer ×,÷]
$(+9) \div (-3) =$

10. [Rates / Ratios]
Simplify 30 s : 3 min

11. [Indices]
$1^8 =$

12. [Square Roots]
$\sqrt{6\frac{1}{4}} =$

13. [Exploring Number]
$(3 \times 2 + 5)^2 =$

14. [Financial Mathematics]
An electricity bill is \$399.75. Your share of the bill is 20%. Estimate the size of your share.
\$

15. [Number Patterns]
Complete the pattern:
0 , 1 , 3 , 6 , 10 , ___ , ___

16. [Expressions]
Paul is y years old. Irene is 6 years younger than Paul. How old is Irene?
[Express your answer in terms of y.]

17. [Substitution]
If $b = 4$, find the value of $3b$

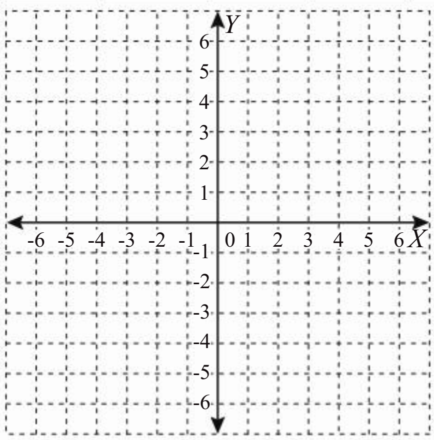
18. [Expansion]
Expand $3(2w + 6)$

19. [Factorisation]
Factorise $4n + 6$

20. [Equations]
Solve for x: $\frac{x}{4} = 4$

21. [Coordinate Geometry]
Graph the line of equation $y = x + 4$ by first completing this table of values.
[Label the line with the rule.]

x	-2	-1	0	1	2
y	2				



22. [Units of Measurement / Time]

The most appropriate unit for measuring the height of a tree is:

A) millimetres
B) kilometres
C) square metres
D) metres

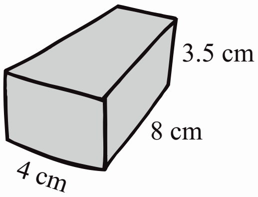
23. [Perimeter / Area]

The rectangular screen size of a computer is 50 cm wide and 32 cm high. What is its area?

cm^2

24. [Surface Area]

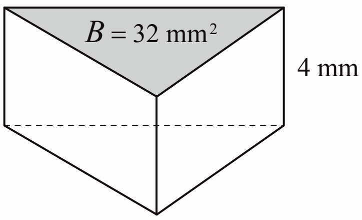
Find the total surface area of the brick.



cm^2

25. [Volume]

Using $V = Bh$ find the volume of the triangular prism.

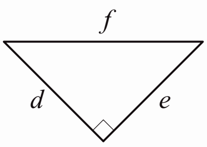


mm^3

26. [Pythagoras]

Which statements are true for the triangle below?

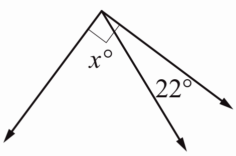
A) $e^2 = f^2 - d^2$
B) $e^2 = d^2 + f^2$
C) $d^2 + e^2 = f^2$



and

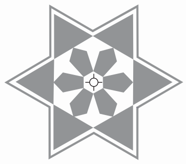
27. [Angles]

Find the value of $x°$.



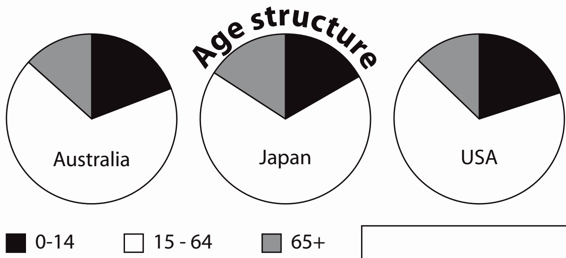
28. [Geometric Reasoning]

This shape has rotational symmetry. How many times during a full turn (360°) does the image of the shape exactly cover the original figure?



29. [Statistics]

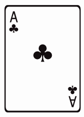
Which country has the greatest proportion of over 65s in their population?



30. [Probability]

A 52-card deck of playing cards is shuffled, and one card is dealt from the top of the deck. What is the probability that it is an ace?

[Give the answer as a fraction in simplest form.]



31. [Problem Solving 1]

An archaeologist found some ancient numbers written as follows:

 for 33

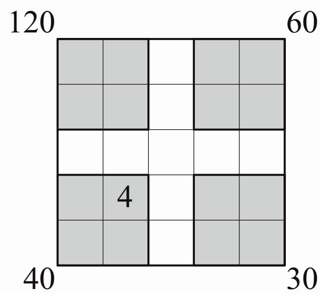
 for 28

and  for 6.

What did  equal?

32. [Problem Solving 2]

Place all the digits 1 to 5 in each row and column, so that they are not repeated in any of the rows, columns, diagonals and shaded squares. The numbers outside the big square represent the products of the four digits in each shaded square.



22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

Test 2

Covering worksheets 1.5 - 1.8

Name: ....

1. [Long ×,÷]
7450 ÷ 100 =

2. [Decimal +,−]
10.476 + 7.524 =

3. [Decimal ×,÷]
100 × 0.7 =

4. [Fraction +,−]
$\frac{4}{7} + \frac{6}{7} =$

5. [Fraction ×,÷]
$\frac{3}{4} \div \frac{10}{3} =$

6. [Percentages]
80% of $400 = $

7. [Decimals / Fractions / Percentages]
Complete the equivalent fractions: $\frac{20}{100} = \frac{1}{\square}$

8. [Integer +,−]
$(+3) - (-2) =$

9. [Integer ×,÷]
$(+8) \div (-2) =$

10. [Rates / Ratios]
Simplify 30 min : 2 h

11. [Indices]
$0^3 =$

12. [Square Roots]
$\sqrt{7\frac{1}{9}} =$

13. [Exploring Number]
$1 + (3 + 6)^2 =$

14. [Financial Mathematics]
A phone bill is $259.50. Your share of the bill is 25%. Estimate the size of your share.

$

15. [Number Patterns]
Complete the pattern:
4 , 5 , 7 , 10 , 14 , ___ , ___

16. [Expressions]
Alex earned $100 and spent x dollars. How much money does he have left?
[Express your answer in terms of x.]

17. [Substitution]
If $c = 6$, find the value of $5c$

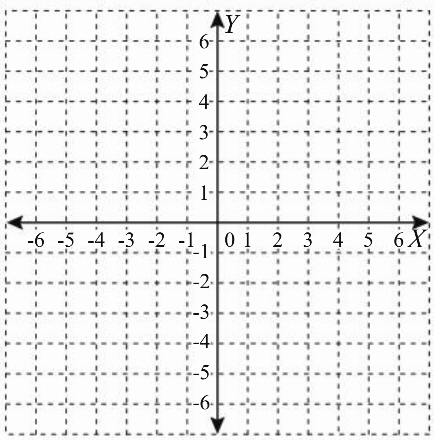
18. [Expansion]
Expand $4(6 + 3v)$

19. [Factorisation]
Factorise $8b + 10$

20. [Equations]
Solve for x: $\frac{x}{2} = 4$

21. [Coordinate Geometry]
Graph the line of equation $y = x - 3$ by first completing this table of values.
[Label the line with the rule.]

x	−2	−1	0	1	2
y	−5				



22. [Units of Measurement / Time]

The most appropriate unit for measuring the length of a piece of timber is:

A) milligrams
B) kilometres
C) square metres
D) millimetres

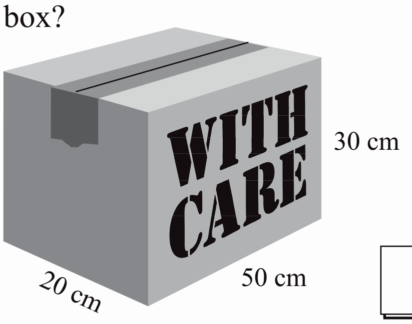
23. [Perimeter / Area]

A rectangular netball court measures approximately 15 m long and 30 m wide. What is its area?

m^2

24. [Surface Area]

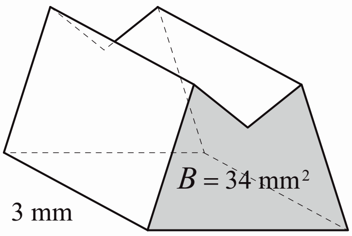
What is the total surface area of the cardboard box?



cm^2

25. [Volume]

Using $V = Bh$ find the volume of the prism.

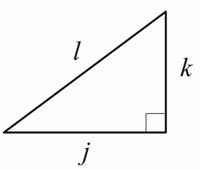


mm^3

26. [Pythagoras]

Which statements are true for the triangle below?

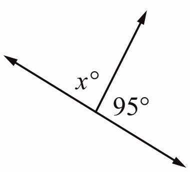
A) $k^2 = l^2 - j^2$
B) $l^2 = j^2 + k^2$
C) $j^2 = k^2 + l^2$



and

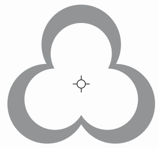
27. [Angles]

Find the value of $x°$.



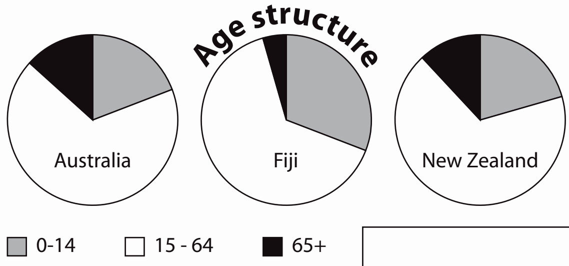
28. [Geometric Reasoning]

This shape has rotational symmetry. How many times during a full turn (360°) does the image of the shape exactly cover the original figure?



29. [Statistics]

Which country has the lowest proportion of over 65s in their population?



30. [Probability]

A 52-card deck of playing cards is shuffled, and one card is dealt from the top of the deck. What is the probability that it is a spade? [Give the answer as a fraction in simplest form.]

31. [Problem Solving 1]

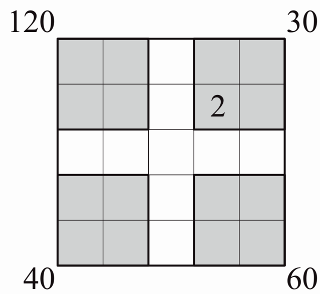
An archaeologist found some ancient numbers written as follows:

 for 52
 for 40
and  for 13.

What did  equal?

32. [Problem Solving 2]

Place all the digits 1 to 5 in each row and column, so that they are not repeated in any of the rows, columns, diagonals and shaded squares. The numbers outside the big square represent the products of the four digits in each shaded square.



MATHS MATE

Test 3

Covering worksheets 2.1 - 2.4

Name: ....

1. [Long ×,÷]
$25 \times 14 =$

2. [Decimal +,–]
$4.09 - 2.61 =$

3. [Decimal ×,÷]
$0.01 \times 5.3 =$

4. [Fraction +,–]
$\frac{3}{10} - \frac{1}{10} =$

5. [Fraction ×,÷]
$\frac{1}{2} \times \frac{5}{7} =$

6. [Percentages]
25% of 72 =

7. [Decimals / Fractions / Percentages]
Write 40% as a decimal.

8. [Integer +,–]
$(-4) + (+9) =$

9. [Integer ×,÷]
$(-4) \times (-6) =$

10. [Rates / Ratios]
Of the 100 g of jam, 65 g are sugars. Find the ratio of sugars to total jam quantity.

11. [Indices]
$\left(\frac{3}{5}\right)^2 =$

12. [Square Roots]
$\sqrt{0.64} =$

13. [Exploring Number]
Round 0.71 to 1 decimal place.

14. [Financial Mathematics]
The cost of a refrigerator repair was $176 including GST. If the GST is 10%, how much GST was included in the cost? $

15. [Number Patterns]
Complete the pattern:
$-25, -20, -15, -10, -5,$ ___ , ___

16. [Expressions]
Simplify $g \times 3 \times f$

17. [Substitution]
If $m = 5$ and $n = 3$,
find the value of $\frac{3m - n}{4}$

18. [Expansion]
Expand $t(5 - t)$

19. [Factorisation]
Factorise $2jk - 8k$

20. [Equations]
Solve for x: $\frac{x}{4} - 3 = 9$

21. [Coordinate Geometry]
Which line does the point (1,–7) lie on?
A) $y = x + 7$
B) $y = -x$
C) $y = -x - 6$

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

22. [Units of Measurement / Time]

Choose the most reasonable length for a newborn baby boy.

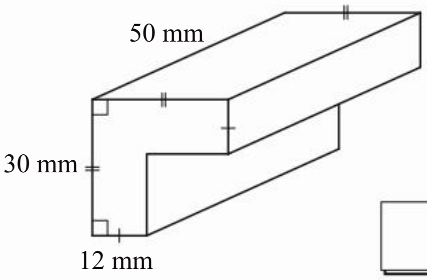
A) 70 cm
B) 30 cm
C) 50 cm

23. [Perimeter / Area]

Find the perimeter in millimetres of a parallelogram with side lengths measuring 8.5 cm and 115 mm.

24. [Surface Area]

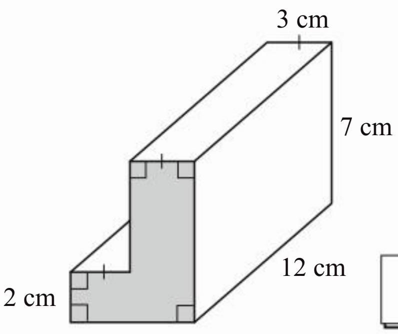
Find the total surface area of the shape.



mm^2

25. [Volume]

Find the volume of the prism.



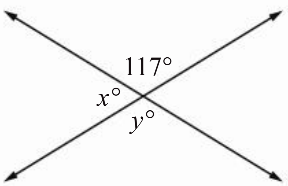
cm^3

26. [Pythagoras]

Find the positive solution for c:
$6^2 + 8^2 = c^2$

27. [Angles]

Find the values of $x°$ and $y°$.



$x° =$ $y° =$

28. [Geometric Reasoning]

Sketch a hexagonal prism. How many faces does a hexagonal prism have?

faces =

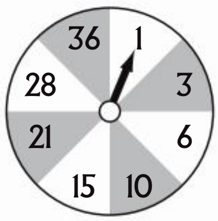
29. [Statistics]

Find the median and range of this set of data:
3, 7, 5, 5, 6, 9, 4, 4, 5

median = range =

30. [Probability]

This spinner is spun once. What is the probability of spinning a number less than 20?
[Give the answer as a fraction in simplest form.]



31. [Problem Solving 1]

The average of ten numbers is 12.5. A further four numbers are added and the average is still 12.5. What is the sum of these four numbers?

32. [Problem Solving 2]

The lines of a multiplication table are shown jumbled below. Which times table is it?

J	×	D	=	AB
J	×	H	=	AI
J	×	G	=	FG
J	×	J	=	H
J	×	B	=	FA
J	×	C	=	FD
J	×	I	=	AF
J	×	F	=	J
J	×	A	=	C

MATHS MATE

Test 3

Covering worksheets 2.1 - 2.4

Name: ....

1. [Long ×,÷]
$27 \times 15 =$

2. [Decimal +,–]
$5.03 - 3.82 =$

3. [Decimal ×,÷]
$7.4 \times 0.01 =$

4. [Fraction +,–]
$\frac{9}{10} - \frac{3}{10} =$

5. [Fraction ×,÷]
$\frac{1}{4} \times \frac{5}{9} =$

6. [Percentages]
75% of 28 =

7. [Decimals / Fractions / Percentages]
Write 70% as a decimal.

8. [Integer +,–]
$(-7) + (+6) =$

9. [Integer ×,÷]
$(-3) \times (-7) =$

10. [Rates / Ratios]
Of the 100 g of light cream, 18 g are fat. Find the ratio of fat to total light cream quantity.

11. [Indices]
$\left(\frac{3}{4}\right)^2 =$

12. [Square Roots]
$\sqrt{0.36} =$

13. [Exploring Number]
Round 0.952 to 2 decimal places.

14. [Financial Mathematics]
Brianna wants to buy kitchen cabinets that cost \$880 including GST. If the GST is 10%, how much GST is included in the cost? \$

15. [Number Patterns]
Complete the pattern:
$-24 , -18 , -12 , -6 ,$ ___ , ___

16. [Expressions]
Simplify $y \times 2 \times x$

17. [Substitution]
If $m = 1$ and $n = 7$,
find the value of $\frac{m + 2n}{5}$

18. [Expansion]
Expand $h(4 - h)$

19. [Factorisation]
Factorise $2xy - 6x$

20. [Equations]
Solve for x: $\frac{x}{2} - 3 = 5$

21. [Coordinate Geometry]
Which line does the point (1,7) lie on?
A) $y = 2x + 5$
B) $y = x$
C) $y = x - 7$

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

22. [Units of Measurement / Time]

Choose the most reasonable length for the diameter of a human eye.

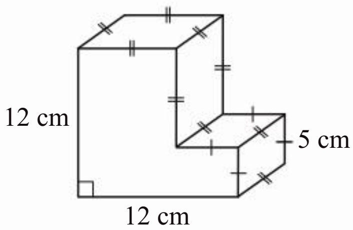
A) 12 mm
B) 25 mm
C) 40 mm

23. [Perimeter / Area]

Find the perimeter in millimetres of a parallelogram with side lengths measuring 65 cm and 1050 mm.

24. [Surface Area]

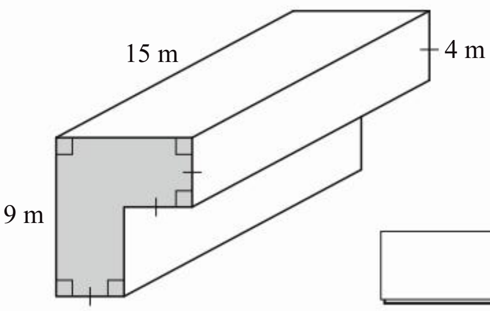
Find the total surface area of the prism.



cm^2

25. [Volume]

Find the volume of the prism.



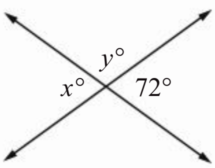
m^3

26. [Pythagoras]

Find the positive solution for c:
$c^2 + 16^2 = 20^2$

27. [Angles]

Find the values of $x°$ and $y°$.



$x° =$ $y° =$

28. [Geometric Reasoning]

Sketch a pentagonal prism. How many edges does a pentagonal prism have?

edges =

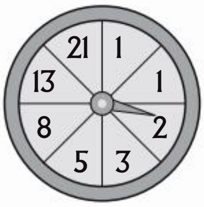
29. [Statistics]

Find the median and range of this set of data:
2, 6, 4, 9, 5, 5, 8, 6, 6

median = range =

30. [Probability]

This spinner is spun once. What is the probability of spinning an even number?
[Give the answer as a fraction in simplest form.]



31. [Problem Solving 1]

The average of five numbers is 18. A further three numbers are added and the average is still 18. What is the sum of these three numbers?

32. [Problem Solving 2]

The lines of a multiplication table are shown jumbled below. Which times table is it?

B	×	A	=	CI
B	×	J	=	EF
B	×	B	=	DF
B	×	C	=	I
B	×	F	=	CB
B	×	I	=	EC
B	×	E	=	DC
B	×	D	=	B
B	×	H	=	CG

MATHS MATE

Test 4
Covering worksheets 2.5 - 2.8

Name: ....

1. [Long ×,÷]
$7980 \div 20 =$

2. [Decimal +,–]
$1.07 + 0.892 =$

3. [Decimal ×,÷]
$3.7 \times 0.03 =$

4. [Fraction +,–]
$3\frac{3}{8} + 2\frac{4}{8} =$

5. [Fraction ×,÷]
$\frac{1}{10} \div \frac{1}{5} =$

6. [Percentages]
The recommended daily allowance of iron for teens is 12 mg. Uri consumes an extra 25%. What is Uri's total iron intake for the day?

mg

7. [Decimals / Fractions / Percentages]
Write 0.72 as a fraction in simplest form.

8. [Integer +,–]
$(-4) - (-5) =$

9. [Integer ×,÷]
$(-18) \div (+6) =$

10. [Rates / Ratios]
The American antelope can run 9 km in 10 minutes. What is its average speed?

km/h

11. [Indices]
Evaluate 4×4^2

12. [Square Roots]
$10\sqrt{9} =$

13. [Exploring Number]
5.6×10^6 is the scientific notation for:
A) 5.600000 B) 5 600 000 C) 56 000 000

14. [Financial Mathematics]
Kaya pays \$500 000 for a property and sells it for 12% more. How much profit does Kaya make?

\$

15. [Number Patterns]
Complete the pattern:
$-1, 4, -16, 64,$ ___ , ___

16. [Expressions]
Choose the like terms:
mn , $2n$, $2nm$

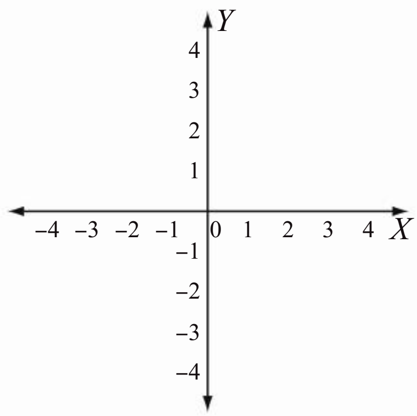
17. [Substitution]
If $y = 3x + 2$, find y when $x = 4$

18. [Expansion]
Expand $2a(2a + 3)$

19. [Factorisation]
Factorise and evaluate
$30 \times 16 + 30 \times 4$

20. [Equations]
Solve for x: $3(x + 8) = 12$

21. [Coordinate Geometry]
Sketch the line of equation $y = 3x - 3$ by marking the x-intercept and the y-intercept.
[Label the graph with the rule.]



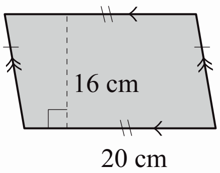
22. [Units of Measurement / Time]

Express in minutes:

6 hours and 57 minutes =

23. [Perimeter / Area]

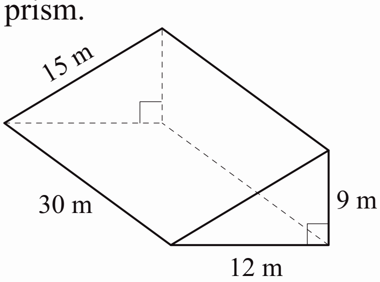
Find the area of the parallelogram.



cm^2

24. [Surface Area]

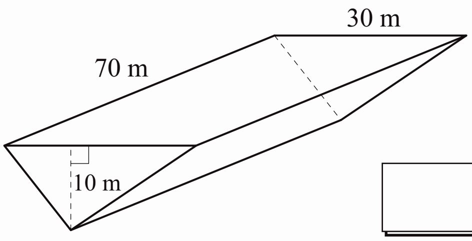
Find the total surface area of the triangular prism.



m^2

25. [Volume]

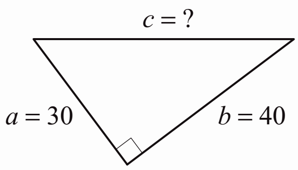
Find the volume of the triangular prism.



m^3

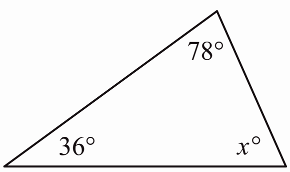
26. [Pythagoras]

For this triangle use Pythagoras' theorem $c^2 = a^2 + b^2$. Find the length of the hypotenuse.



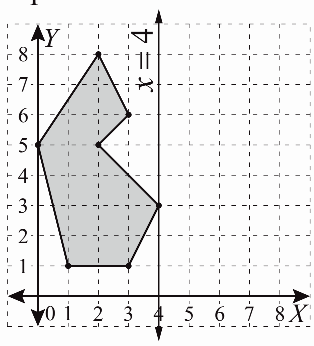
27. [Angles]

Find the value of $x°$.



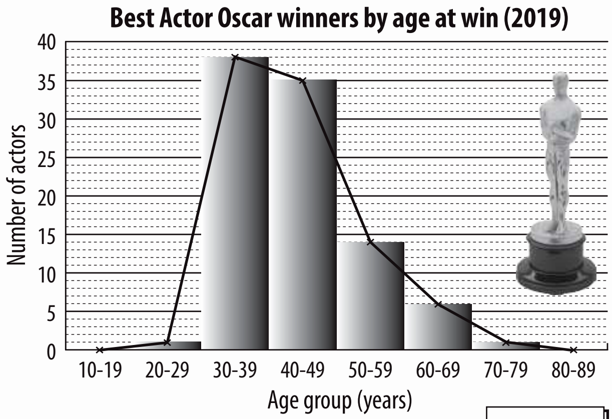
28. [Geometric Reasoning]

Draw the reflection of the shape in the line of equation $x = 4$.



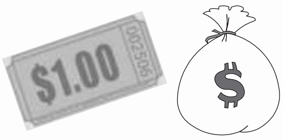
29. [Statistics]

How many Oscars have been won by actors aged less than 30 years?



30. [Probability]

A bag contains 12 red, 24 blue and 14 yellow raffle tickets. A ticket is randomly selected from the bag. What is the probability of a blue ticket being selected? [Give the answer as a fraction in simplest form.]

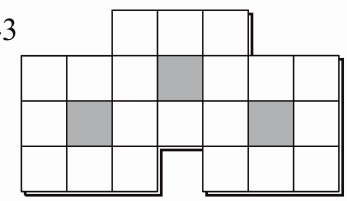


31. [Problem Solving 1]

Fill in the cross number puzzle using the following numbers:

3 digits: 263, 352, 355, 417, 469, 472, 572, 624

4 digits: 4963, 7343



32. [Problem Solving 2]

HE × HE = SHE

Find the value of SHE given that each letter represents a different digit.

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

MAUVE

Test 4

Covering worksheets 2.5 - 2.8

Name: ....

1. [Long ×,÷]

$9650 \div 50 =$

2. [Decimal +,–]

$0.56 + 12.8 =$

3. [Decimal ×,÷]

$4.8 \times 0.04 =$

4. [Fraction +,–]

$4\frac{2}{10} + 2\frac{7}{10} =$

5. [Fraction ×,÷]

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

6. [Percentages]

The recommended daily allowance of calcium is 800 mg. Sue consumes an extra 45%. What is Sue's total calcium intake?

mg

7. [Decimals / Fractions / Percentages]

Write 0.04 as a fraction in simplest form.

8. [Integer +,–]

$(-3) - (-7) =$

9. [Integer ×,÷]

$(-27) \div (+9) =$

10. [Rates / Ratios]

The fastest land bird, the ostrich, can run 24 km in 20 minutes. What is its average speed in kilometres per hour?

11. [Indices]

Evaluate $2^3 \times 2^2$

12. [Square Roots]

$3\sqrt{25} =$

13. [Exploring Number]

4.7×10^{-7} is the scientific notation for:

A) 0.00000047
B) 4.7000000
C) 0.0000047

14. [Financial Mathematics]

Fred sells a property for \$125 000 and earns 6% commission. What is Fred's commission?

\$

15. [Number Patterns]

Complete the pattern:

$-1, 3, -9, 27, -81,$ ___ , ___

16. [Expressions]

Choose the like terms:

$4h$, $4gh$, $2hg$

17. [Substitution]

If $y = 5x - 8$, find y when $x = 3$

18. [Expansion]

Expand $2r(4r + 5)$

19. [Factorisation]

Factorise and evaluate

$25 \times 14 + 25 \times 6$

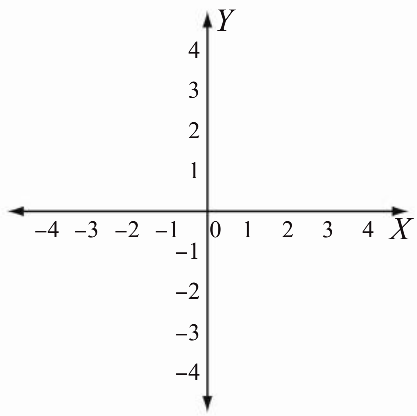
20. [Equations]

Solve for x: $2(x + 9) = 14$

21. [Coordinate Geometry]

Sketch the line of equation $y = 2x + 2$ by marking the x-intercept and the y-intercept.

[Label the graph with the rule.]



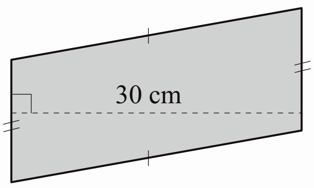
22. [Units of Measurement / Time]

Express in minutes:

2 hours and 58 minutes =

23. [Perimeter / Area]

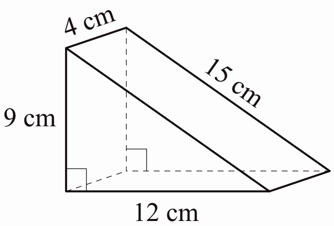
Find the area of the parallelogram.



cm^2

24. [Surface Area]

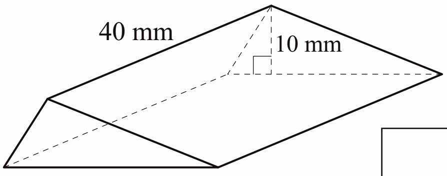
Find the total surface area of the triangular prism.



cm^2

25. [Volume]

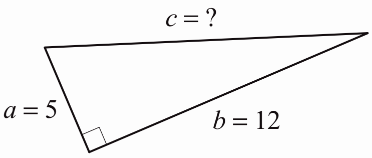
Find the volume of the triangular prism.



mm^3

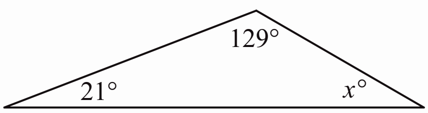
26. [Pythagoras]

For this triangle use Pythagoras' theorem $c^2 = a^2 + b^2$. Find the length of the hypotenuse.



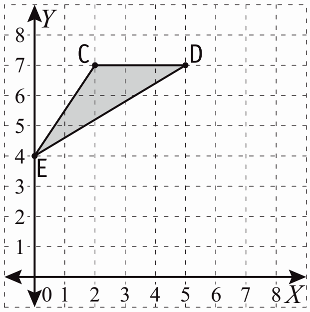
27. [Angles]

Find the value of $x°$.



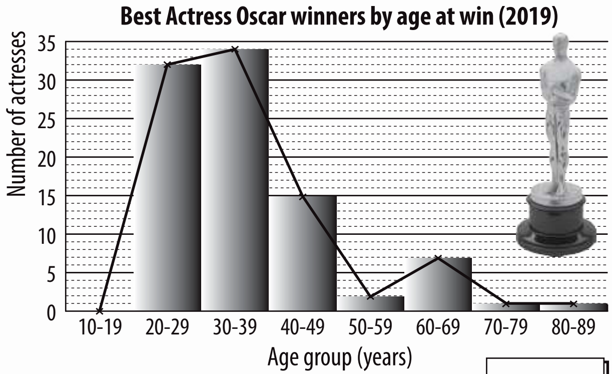
28. [Geometric Reasoning]

Redraw the triangle CDE after translating it 4 units horizontally and –2 units vertically.



29. [Statistics]

How many Oscars have been won by actresses aged 50 years or more?



30. [Probability]

A bowl contains 40 marbles numbered 1 to 40. A marble is drawn from the bowl. Find the probability of drawing a multiple of 9. [Give the answer as a fraction in simplest form.]

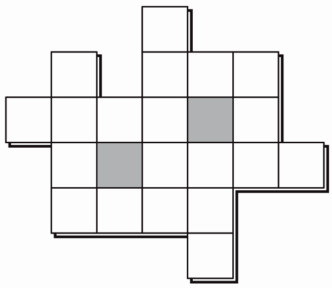
31. [Problem Solving 1]

Fill in the cross number puzzle using the following numbers:

3 digits: 489, 789, 949

4 digits: 3726, 4790, 5768, 6728

5 digits: 54 842



32. [Problem Solving 2]

ON + ON + ON + ON = GO

What digits do the letters O, N and G represent given that they are three different digits?

O = N = G =

MATHS MATE

Test 5

Covering worksheets 3.1 - 3.4

Name: ....

1. [Long ×,÷]

$464 \times 16 =$

2. [Decimal +,−]

$8.6 - 0.49 =$

3. [Decimal ×,÷]

$80.56 \div 8 =$

4. [Fraction +,−]

$2 - \frac{2}{5} =$

5. [Fraction ×,÷]

$\frac{7}{10} \times \frac{2}{3} =$

6. [Percentages]

150% of 200 =

7. [Decimals / Fractions / Percentages]

Write 45% as a fraction in simplest form.

8. [Integer +,−]

$(-14) + (-5) =$

9. [Integer ×,÷]

$(-10) \times (+40) =$

10. [Rates / Ratios]

Complete the missing term in the proportion:

$\square : 7 = 30 : 42$

11. [Indices]

Simplify $z^4 \times z^2$

12. [Square Roots]

$\sqrt{81} \times \sqrt{100} =$

13. [Exploring Number]

$3 - 6 \times (2 + 5) \div 3 - 7 =$

14. [Financial Mathematics]

Toni is paid \$11.80 per hour. She works a 6 hour shift, the last 2 hours being at a double time pay rate. What is Toni's wage before tax?

\$

15. [Number Patterns]

Complete the pattern:

$-1024 , 256 , -64 , 16 ,$ ___ , ___

16. [Expressions]

Simplify $2x - 3y + 5x$

17. [Substitution]

Use $A = lw$ to find the area A of a rectangle when $l = 6$ and $w = 12$

18. [Expansion]

Expand $-3(2a - 5)$

19. [Factorisation]

Factorise $2t^2 - 6t$

20. [Equations]

Solve for x: $12 - 3x = x$

21. [Coordinate Geometry]

Use $M = \left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2}\right)$ to find the coordinates of the midpoint M of the interval joining the points $(-1,-8)$ and $(7,2)$.

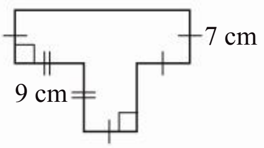
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

22. [Units of Measurement / Time]

'The Tan' walking track around Melbourne's Botanic Gardens measures 3.8 km. Express the length of 'The Tan' in metres.

23. [Perimeter / Area]

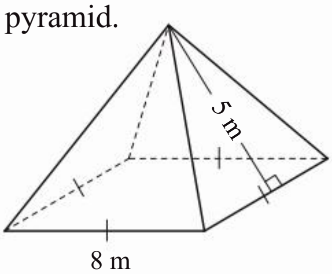
Find the perimeter of the shape.



cm

24. [Surface Area]

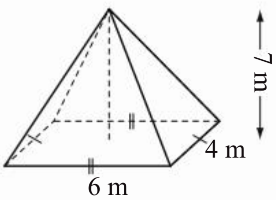
Find the total surface area of the regular square pyramid.



m^2

25. [Volume]

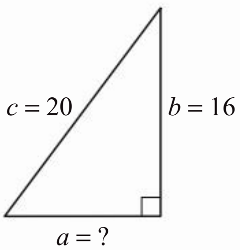
Using $V = \frac{Bh}{3}$ find the volume of the rectangular pyramid.



m^3

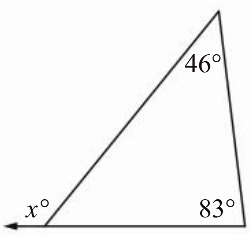
26. [Pythagoras]

For this triangle use Pythagoras' theorem $a^2 + b^2 = c^2$. Find the length of the side labelled a.



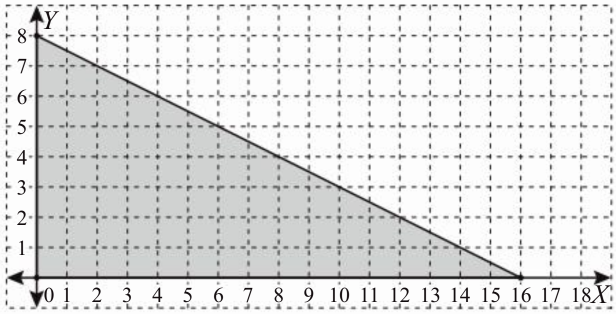
27. [Angles]

Find the value of $x°$.



28. [Geometric Reasoning]

Redraw the triangle reduced by a scale factor of $\frac{1}{4}$ about the origin of the axes.



29. [Statistics]

The stem plot shows the calories per piece of selected fruits. Find the median and range of the data.

stem	leaf
2	0 5 6 8
3	0 0 4 5 5 6
4	4 5
5	0
6	7

Key
3 | 8 = 38 calories

median = range =

30. [Probability]

The probability that Adrienne gets all her spelling correct in the next test is 0.68. What is the probability that she does not get them all correct?

31. [Problem Solving 1]

Find all the pairs of prime numbers that add to 24.

32. [Problem Solving 2]

Find the smallest 6-digit number which is divisible by 2, 3 and 4.

MATHS MATE

Test 5

Covering worksheets 3.1 - 3.4

Name: ....

1. [Long ×,÷]
$179 \times 14 =$

2. [Decimal +,–]
$7.7 - 0.83 =$

3. [Decimal ×,÷]
$105.3 \div 9 =$

4. [Fraction +,–]
$2 - \frac{4}{9} =$

5. [Fraction ×,÷]
$\frac{3}{8} \times \frac{4}{7} =$

6. [Percentages]
300% of 200 =

7. [Decimals / Fractions / Percentages]
Write 16% as a fraction in simplest form.

8. [Integer +,–]
$(-13) + (-2) =$

9. [Integer ×,÷]
$(-50) \times (+10) =$

10. [Rates / Ratios]
Complete the missing term in the proportion:
$32 : \boxed{} = 12 : 3$

11. [Indices]
Simplify $y^3 \times y^2$

12. [Square Roots]
$\sqrt{49} \times \sqrt{100} =$

13. [Exploring Number]
$-9 - 5 \div (8 - 3) \times 2 + 6 =$

14. [Financial Mathematics]
Gino is paid \$13.50 per hour. He works an 8 hour shift, the last 3 hours being at a double time pay rate. What is Gino's wage before tax?
\$

15. [Number Patterns]
Complete the pattern:
$-3125, 625, -125, 25,$ ___ , ___

16. [Expressions]
Simplify $4a - 5b + 3a$

17. [Substitution]
Use $F = ma$ to find the force F when $m = 35$ and $a = 10$

18. [Expansion]
Expand $-6(3 - 4x)$

19. [Factorisation]
Factorise $5f^2 - 10f$

20. [Equations]
Solve for x: $8 - 2x = 2x$

21. [Coordinate Geometry]
Use $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ to find the coordinates of the midpoint M of the interval joining the points (–2,6) and (2,2).

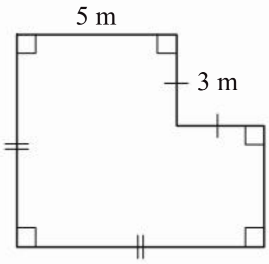
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

22. [Units of Measurement / Time]

The lungs of a typical person have 2400 km of airways. Express this in metres.

23. [Perimeter / Area]

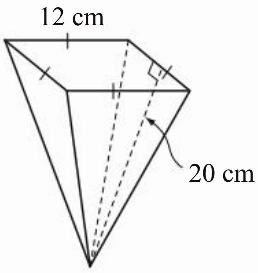
Find the perimeter of the shape.



m

24. [Surface Area]

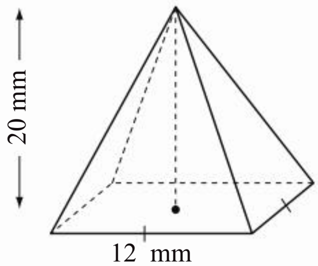
Find the total surface area of the regular square pyramid.



cm^2

25. [Volume]

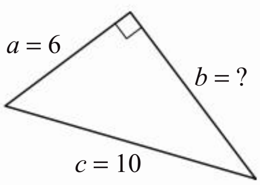
Using $V = \frac{Bh}{3}$ find the volume of the square pyramid.



mm^3

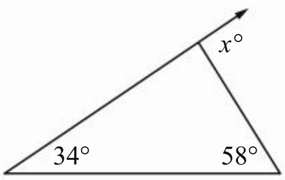
26. [Pythagoras]

For this triangle use Pythagoras' theorem $a^2 + b^2 = c^2$. Find the length of the side labelled b.



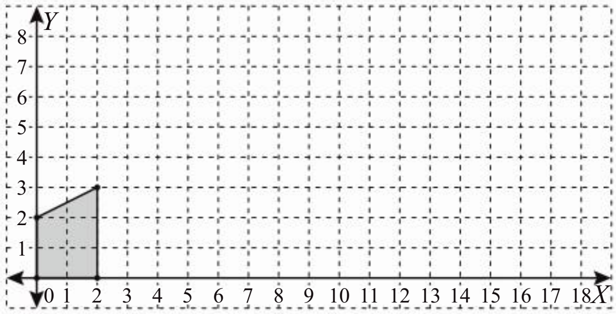
27. [Angles]

Find the value of $x°$.



28. [Geometric Reasoning]

Redraw the trapezium enlarged by a scale factor of 3 about the origin of the axes.



29. [Statistics]

The stem plot shows the percentage of water per piece of selected fruits. Find the median and range of the data.

stem	leaf
5	0
6	0 0
7	0 5 7 9
8	0 5 5 5 5 8
9	0

Key
8 | 5 = 85%

median = range =

30. [Probability]

The probability that Mia is late for school is 0.17. What is the probability that she is not late?

31. [Problem Solving 1]

Find all the pairs of prime numbers that add to 30.

32. [Problem Solving 2]

Find the largest 6-digit number which is divisible by 2, 3 and 4.

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

MAUVE

Test 6

Covering worksheets 3.5 - 3.8

Name: ....

1. [Long ×,÷]

$4074 \div 21 =$

2. [Decimal +,–]

$3.5 + 2.05 + 1.1 =$

3. [Decimal ×,÷]

$2.3 \div 100 =$

4. [Fraction +,–]

$\frac{2}{3} + \frac{1}{9} =$

5. [Fraction ×,÷]

$4 \div \frac{2}{3} =$

6. [Percentages]

Increase 200 by 50%.

7. [Decimals / Fractions / Percentages]

Complete the table:

Decimal	Fraction	Percentage
		80%

8. [Integer +,–]

$(-2) - (+11) =$

9. [Integer ×,÷]

$\frac{-18}{-6} =$

10. [Rates / Ratios]

The ratio of white keys to black keys on a piano is 13 : 9. If a piano has 88 keys, how many white keys are there?

11. [Indices]

Evaluate $4^5 \div 4^3$

12. [Square Roots]

$\sqrt{100} \div \sqrt{4} =$

13. [Exploring Number]

Write 52 million, the number of cells in an adult human body, in scientific notation.

14. [Financial Mathematics]

Abdenor is a foreign resident on a holiday working visa. His taxable income is $10,000. What is the amount of tax payable on his income?

Taxable Income	Tax on this income*
0-$90,000	32%
$90,001-$180,000	$29,250 + 37% of amounts over $90,000
$180,000 and over	$62,550 + 45% of amounts over $180,000

*Foreign resident tax rates 2019-2020 (Australia)

15. [Number Patterns]

Find the 12th term in the pattern:

0 , 3 , 6 , 9 , 12 , ...

16. [Expressions]

Simplify $-5j \times 7k$

17. [Substitution]

If $y = x(x - 3)$, find y when $x = 6$

18. [Expansion]

Expand and simplify

$2(3m + 1) - 4m$

19. [Factorisation]

Factorise $12jk + 15j^2k$

20. [Equations]

Solve for x: $\frac{9}{x} = 3$

21. [Coordinate Geometry]

Complete the table:

equation	gradient (m)	x-intercept	y-intercept (c)
$y = -3x - 2$			

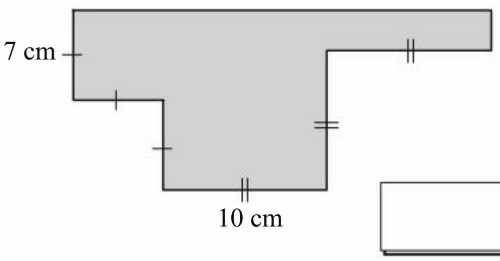
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

22. [Units of Measurement / Time]

The 'Star of Africa' diamond weighs 106 g. Express this in milligrams.

23. [Perimeter / Area]

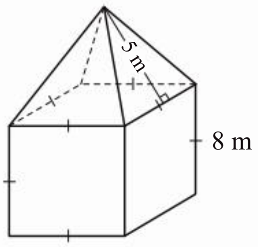
Find the area of the shape.



cm^2

24. [Surface Area]

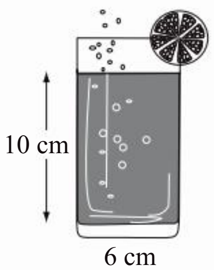
A block of wood has the shape of a regular square pyramid on top of a cube as shown below. Find its total surface area.



m^2

25. [Volume]

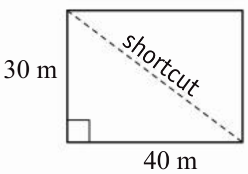
Using $V = \pi r^2 h$ and $\pi \approx 3.14$, find how much lemonade is in the glass. [Hint: $1 \text{ mL} = 1 \text{ cm}^3$]



mL

26. [Pythagoras]

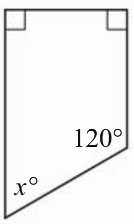
How much distance would you save by taking the shortcut across the paddock?



m

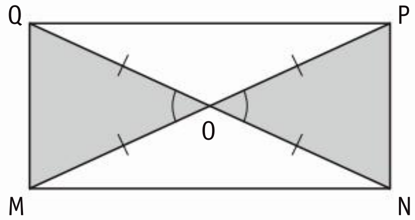
27. [Angles]

Find the value of $x°$.



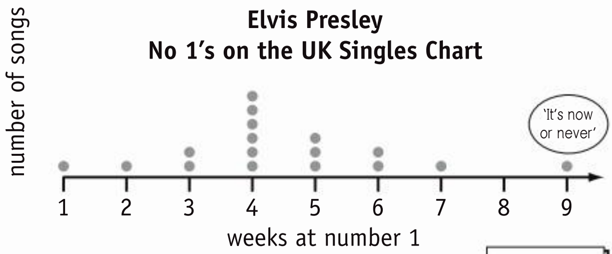
28. [Geometric Reasoning]

Which congruence test (SSS, SAS, AAS, RHS) can be applied to show that triangle MOQ is congruent to triangle NOP?



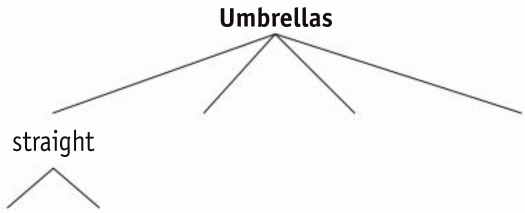
29. [Statistics]

What is the median number of weeks in which Elvis Presley's songs were at number one on the UK singles chart?



30. [Probability]

Umbrellas are sold in four styles: straight, golf, 2-folded and 3-folded. They can be manual (M) and automatic (A). Complete the tree diagram. What is the probability of choosing a golf umbrella? [Give the answer as a fraction in simplest form.]



31. [Problem Solving 1]

If you have 5¢, 10¢ and 20¢ coins, in how many ways can you make up 45 cents?

32. [Problem Solving 2]

How many numbers between 301 and 400 are divisible by both 3 and 5?

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

MAUVE

Test 6

Covering worksheets 3.5 - 3.8

Name: ....

1. [Long ×,÷]

$5447 \div 13 =$

2. [Decimal +,–]

$4.75 + 1.02 + 0.2 =$

3. [Decimal ×,÷]

$4.5 \div 100 =$

4. [Fraction +,–]

$\frac{1}{2} + \frac{3}{8} =$

5. [Fraction ×,÷]

$6 \div \frac{3}{5} =$

6. [Percentages]

Increase 60 by 10%.

7. [Decimals / Fractions / Percentages]

Complete the table:

Decimal	Fraction	Percentage
		40%

8. [Integer +,–]

$(-7) - (+12) =$

9. [Integer ×,÷]

$\frac{36}{-6} =$

10. [Rates / Ratios]

The ratio of wins to losses for Sydney Swans in the 2018 AFL home and away season was 7 : 4. If Sydney Swans played 22 games in total, how many did they lose?

11. [Indices]

Evaluate $6^4 \div 6^2$

12. [Square Roots]

$\sqrt{64} \div \sqrt{16} =$

13. [Exploring Number]

Dinosaurs became extinct 65 million years ago. Write this number in scientific notation.

14. [Financial Mathematics]

Will's taxable income is $27,200. What is the amount of tax payable on his income?

Taxable Income	Tax on this income*
0-$18,200	Nil
$18,201 - $37,000	19¢ for each $1 over $18,200
$37,001 - $90,000	$3,572 plus 32.5¢ for each dollar over $37,000
$90,001 - $180,000	$20,797 plus 37¢ for each dollar over $90,000
$180,001 and over	$54,097 plus 45¢ for each dollar over $180,000

*Resident tax rates 2019-2020 (Australia)

15. [Number Patterns]

Find the 15th term in the pattern:

3 , 5 , 7 , 9 , 11 , ...

16. [Expressions]

Simplify $-8g \times 6h$

17. [Substitution]

If $y = x(x - 5)$, find y when $x = 8$

18. [Expansion]

Expand and simplify

$3(4a + 5) - 6a$

19. [Factorisation]

Factorise $4lm + 10l^2m$

20. [Equations]

Solve for x: $\frac{8}{x} = 2$

21. [Coordinate Geometry]

Complete the table:

equation	gradient (m)	x-intercept	y-intercept (c)
$y = -6x - 5$			

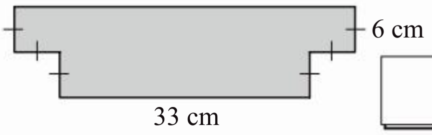
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

22. [Units of Measurement / Time]

The 'Welcome Stranger' gold nugget weighs 65.2 kg. Express this in grams.

23. [Perimeter / Area]

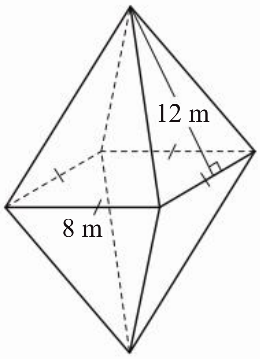
Find the area of the shape.



cm^2

24. [Surface Area]

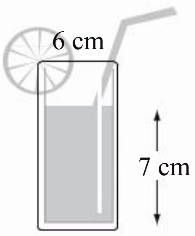
Find the total surface area of the octahedron.



m^2

25. [Volume]

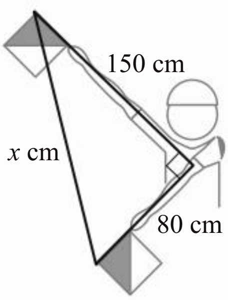
Using $V = \pi r^2 h$ and $\pi \approx \frac{22}{7}$, find how much lemonade is in the glass. [Hint: $1 \text{ mL} = 1 \text{ cm}^3$]



mL

26. [Pythagoras]

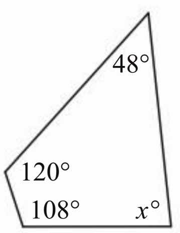
What is the distance between the flags when this semaphore is signalling the letter I as shown in the diagram?



cm

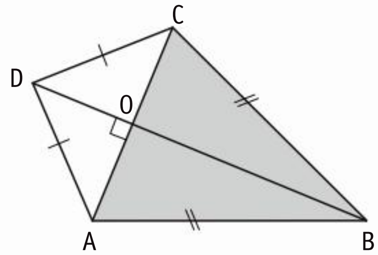
27. [Angles]

Find the value of $x°$.



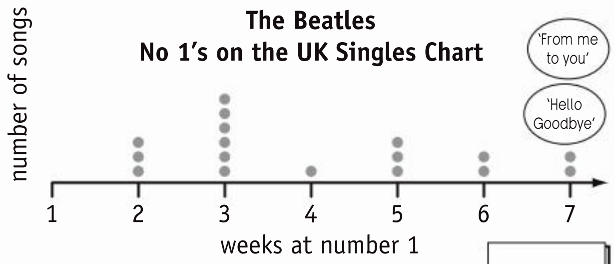
28. [Geometric Reasoning]

Which congruence test (SSS, SAS, AAS, RHS) can be applied to show that triangle ABO is congruent to triangle BCO?



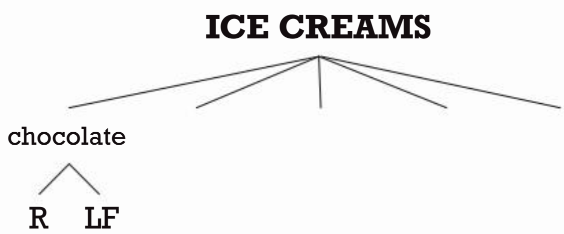
29. [Statistics]

What is the median number of weeks in which The Beatles' songs were at number one on the UK singles chart?



30. [Probability]

At the cinema, choc-top ice creams are sold in the following flavours: chocolate, vanilla, strawberry, mint and orange. There are regular and low fat options for all flavours. Liam chooses an ice cream at random. Complete the tree diagram. What is the probability he chooses a vanilla ice cream?
[Give the answer as a fraction in simplest form.]



31. [Problem Solving 1]

If you have 5¢, 10¢ and 20¢ coins, in how many ways can you make up 50 cents?

32. [Problem Solving 2]

How many numbers between 401 and 501 are divisible by both 4 and 5?

MATHS MATE

Test 7
Covering worksheets 4.1 - 4.4

Name: ....

1. [Long ×,÷]
$184 \times 130 =$

2. [Decimal +,−]
$1 - 0.083 =$

3. [Decimal ×,÷]
$0.31 \div 0.01 =$

4. [Fraction +,−]
$\frac{1}{2} + \frac{2}{5} =$

5. [Fraction ×,÷]
$\frac{3}{4} \times \frac{4}{6} =$

6. [Percentages]
Decrease 500 by 20%.

7. [Decimals / Fractions / Percentages]
Which is greater?
60% or $\frac{3}{4}$

8. [Integer +,−]
$(+8) + (-5) + (-9) =$

9. [Integer ×,÷]
$(+1) \times (-8) \times (-9) =$

10. [Rates / Ratios]
In the workplace an average typist can type 1200 words in 20 minutes. What is this rate in words per minute?

11. [Indices]
Simplify $n^5 \div n^2$

12. [Square Roots]
$2\sqrt{9} + \sqrt{9} =$

13. [Exploring Number]
Is −7.5 a whole number, an integer or a rational number?

14. [Financial Mathematics]
Marcie invests $500 for 3 years at an interest rate of 8% per year. Using $SI = PRT$, how much does Marcie have at the end of 3 years?
[Hint: Principal + interest.]

15. [Number Patterns]
If the general rule of a sequence is $3n - 4$ find the 18th term ($n = 18$).

16. [Expressions]
Simplify $10x \div 2x$

17. [Substitution]
If $y = -8 - x$, find y when $x = -5$

18. [Expansion]
Expand and simplify
$5(yz - 1) + 4(yz - 2)$

19. [Factorisation]
Factorise
$d(d + 3) - 7(d + 3)$

20. [Equations]
Solve the inequation:
$\frac{x}{2} + 4 < 8$

21. [Coordinate Geometry]
Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line passing through the points (−2,3) and (−1,−6).

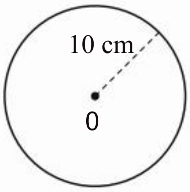
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

22. [Units of Measurement / Time]

The human body carries approximately 4.7 litres of blood. Express this in millilitres.

23. [Perimeter / Area]

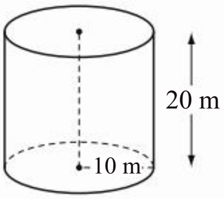
Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



cm

24. [Surface Area]

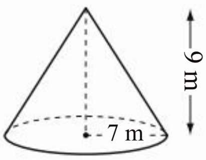
Using $TSA = 2\pi r(r + h)$ and $\pi \approx 3.14$, find the total surface area of the cylinder.



m^2

25. [Volume]

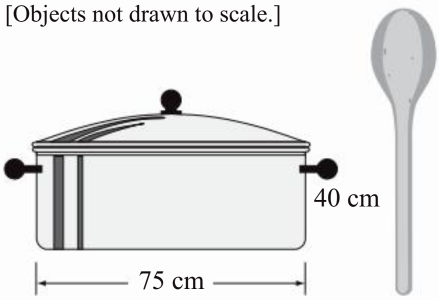
Using $V = \frac{\pi r^2 h}{3}$ and $\pi \approx \frac{22}{7}$, find the volume of the cone.



m^3

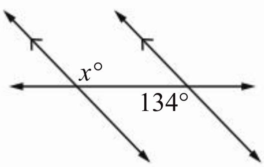
26. [Pythagoras]

Can a spoon, 80 cm long, fit inside the pot with its lid on?
[Objects not drawn to scale.]



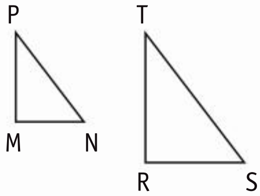
27. [Angles]

Find the value of $x°$.



28. [Geometric Reasoning]

Complete the ratios of corresponding sides for these similar triangles.



$\frac{MN}{\square} = \frac{NP}{\square} = \frac{PM}{\square}$

29. [Statistics]

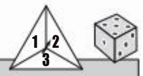
Find the median and range of the following distribution.

Score	0	1	2	3	4
Frequency	2	7	8	3	5

median = range =

30. [Probability]

A standard die is tossed and a spinner labelled 1, 2 and 3 is spun. Complete the table. What is the probability of obtaining a difference less than 2 when the die is tossed and the spinner is spun once? [Give the answer as a fraction in simplest form.]



Difference		Die					
		1	**2**	**3**	**4**	**5**	**6**
Spinner	**1**	0	1				
	2	1	0				
	3						

31. [Problem Solving 1]

How many numbers are there from 10 to 99 in which the digits differ by 3?

32. [Problem Solving 2]

What is the last digit of the number 2^{2012}?

MATHS MATE

Test 7
Covering worksheets 4.1 - 4.4

Name: ....

1. [Long ×, ÷]
$297 \times 120 =$

2. [Decimal +,−]
$1 - 0.039 =$

3. [Decimal ×,÷]
$0.12 \div 0.01 =$

4. [Fraction +,−]
$\frac{2}{3} + \frac{1}{4} =$

5. [Fraction ×,÷]
$\frac{3}{10} \times \frac{2}{3} =$

6. [Percentages]
Decrease 60 by 5%.

7. [Decimals / Fractions / Percentages]
Which is greater?
0.25 or $\frac{1}{2}$

8. [Integer +,−]
$(+9) + (-4) + (-7) =$

9. [Integer ×,÷]
$(+2) \times (-6) \times (-3) =$

10. [Rates / Ratios]
An adult breathes around 480 times per hour. What is the breathing rate of an adult in breaths per minute?

11. [Indices]
Simplify $t^6 \div t^3$

12. [Square Roots]
$2\sqrt{4} + 2\sqrt{4} =$

13. [Exploring Number]
Is $-\frac{9}{3}$ a whole number or an integer?

14. [Financial Mathematics]
Carl invests $500 for 4 years at an interest rate of 8% per year. Using $SI = PRT$, how much does Carl have at the end of that time?
[Hint: Principal + interest.]

15. [Number Patterns]
If the general rule of a sequence is $5n - 3$ find the 14th term ($n = 14$).

16. [Expressions]
Simplify $14q \div 2q$

17. [Substitution]
If $y = -9 - x$, find y when $x = -6$

18. [Expansion]
Expand and simplify
$5(ab - 5) + 3(ab + 9)$

19. [Factorisation]
Factorise
$k(k + 5) - 8(k + 5)$

20. [Equations]
Solve the inequation:
$\frac{x}{2} + 3 \geq 9$

21. [Coordinate Geometry]
Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line passing through the points (2,−1) and (−3,4).

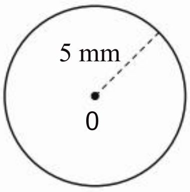
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

22. [Units of Measurement / Time]

It takes on average approximately 500 L of water to grow one orange. Write this in millilitres.

23. [Perimeter / Area]

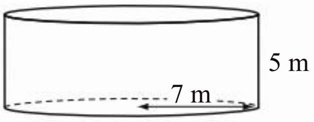
Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



mm

24. [Surface Area]

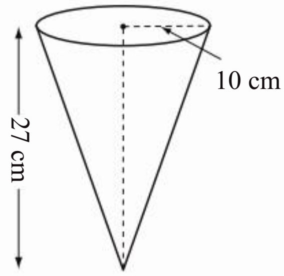
Using $TSA = 2\pi r(r + h)$ and $\pi \approx \frac{22}{7}$, find the total surface area of the cylinder.



m^2

25. [Volume]

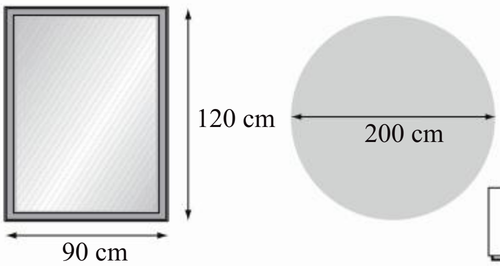
Using $V = \frac{\pi r^2 h}{3}$ and $\pi \approx 3.14$, find the volume of the cone.



cm^3

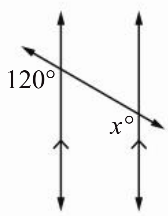
26. [Pythagoras]

Can a circular table top with a diameter of 200 cm fit through a rectangular window with dimensions 90 cm wide and 120 cm high?
[Objects not drawn to scale.]



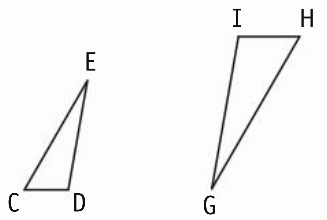
27. [Angles]

Find the value of $x°$.



28. [Geometric Reasoning]

Complete the pairs of equal angles for these similar triangles.



$\angle C =$, $\angle D =$, $\angle E =$

29. [Statistics]

Find the median and mode of the following distribution.

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

median = mode =

30. [Probability]

A pair of standard dice are rolled. Complete the table. What is the probability of rolling a total less than 8? [Give the answer as a fraction in simplest form.]

	Total value	Die 1					
		1	**2**	**3**	**4**	**5**	**6**
Die 2	**1**	2	3				
	2	3					
	3	4					
	4						
	5						
	6						

31. [Problem Solving 1]

How many numbers are there from 10 to 99 in which the digits differ by 5?

32. [Problem Solving 2]

What is the last digit of the number 3^{2012}?

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

Test 8

Covering worksheets 4.5 - 4.8

Name: ....

1. [Long ×,÷]

$982 \div 8 =$

2. [Decimal +,−]

$4 - 0.379 =$

3. [Decimal ×,÷]

$0.6 \div 0.3 =$

4. [Fraction +,−]

$2\frac{3}{4} + 3\frac{2}{4} =$

5. [Fraction ×,÷]

$\frac{5}{6} \div 10 =$

6. [Percentages]

The dried flowers weighed 45 g or 30% of their fresh weight. What was the fresh weight of the flowers in grams?

7. [Decimals / Fractions / Percentages]

$0.1\dot{6}$ is the notation for:

A) 0.16666.....
B) 0.161616.....
C) 0.111666.....

8. [Integer +,−]

$(-8) - (-9) + (-14) =$

9. [Integer ×,÷]

$(-4) \times (+5) \div (+5) =$

10. [Rates / Ratios]

If 9 m of fabric costs $120, what is the cost of 6 m of the same fabric?

$

11. [Indices]

Simplify $3z^4 \times 2z^2$

12. [Square Roots]

$\frac{6\sqrt{100}}{2\sqrt{25}} =$

13. [Exploring Number]

Which numbers are rational?

A) 2.172593498... B) $-\frac{8}{3}$
C) $\sqrt{7}$ D) $-4.\dot{7}\dot{6}$

14. [Financial Mathematics]

Qi's smart phone is now worth $80 or 40% of its original cost. How much did Qi originally pay for the phone?

15. [Number Patterns]

position	1	2	3	4	5	....	n
term	9	15	21	27	33	....	?

The rule for the term in position n is:

A) $3n + 6$ B) $9n - 3$
C) $6n + 3$ D) $3n + 3$

16. [Expressions]

Simplify $2c + d + c - 3d$

17. [Substitution]

If $a = 4$ and $b = 2$,

find the value of $\frac{a}{3} + \frac{b}{5}$

18. [Expansion]

Expand and simplify
$(a + 2)(a - 4)$

19. [Factorisation]

Factorise $t^2 - 49$

20. [Equations]

Solve for x:
$(x + 7)(x - 3) = 0$

21. [Coordinate Geometry]

Complete the table of values for the non-linear rule $y = x^2 - 1$ (parabola).

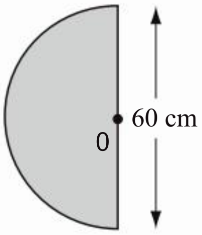
x	−2	−1	0	1	2
y	3				

22. [Units of Measurement / Time]

The area of the Red Square in Moscow is 2.3 hectares. Express the area in m^2.

23. [Perimeter / Area]

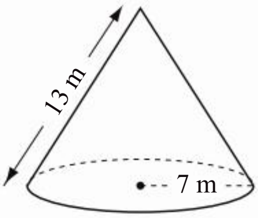
Using $A = \pi r^2$ where $\pi \approx 3.14$, find the area of the semicircle.



cm^2

24. [Surface Area]

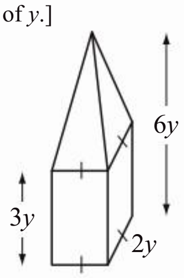
Use $TSA = \pi r(r + s)$ and $\pi \approx \frac{22}{7}$ to find the total surface area of the cone.



m^2

25. [Volume]

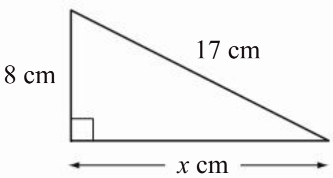
Write an algebraic expression for the volume V of the square prism which has a regular square pyramid on top. [Express the answer in terms of y.]



$V =$

26. [Pythagoras]

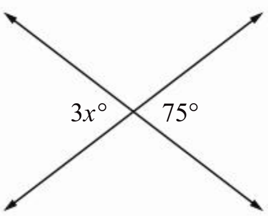
Find the perimeter of the right-angled triangle by first calculating the missing side length.



cm

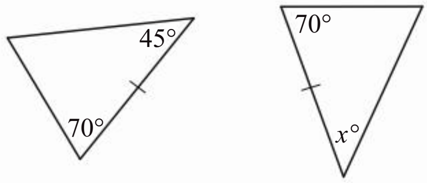
27. [Angles]

Find the value of $x°$.



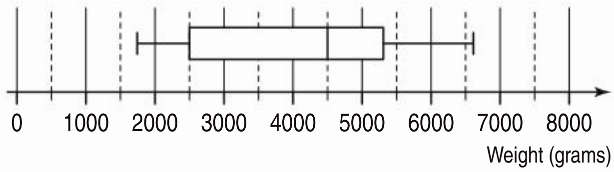
28. [Geometric Reasoning]

Find the value of $x°$ in this pair of congruent triangles.



29. [Statistics]

The box-and-whisker plot shows weights of a set of ten-pin bowling balls used in a game. Find the median and lower quartile (LQ).



median = LQ =

30. [Probability]

A bowl contains 20 marbles numbered 1 to 20. A marble is drawn from the bowl. Find the probability of drawing a multiple of 3 or a multiple of 8. [Give the answer as a fraction in simplest form.]

31. [Problem Solving 1]

The table below shows the team standings after 2 rounds of the 2018 Soccer World Cup. Who did Tunisia play in its third round robin game? [Each team plays each 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 G TEAMS	MP matches played	W wins	D draws	L losses	GF goals for	GA goals against	Pts points
Belgium	2	2	0	0	8	2	6
England	2	2	0	0	8	2	6
Tunisia	2	0	0	2	3	7	0
Panama	2	0	0	2	1	9	0

Tunisia **vs** ______________

32. [Problem Solving 2]

In a quiz, Martha starts with 100 points. She wins 10 points for each correct answer and loses 4 points for each incorrect answer. If Martha answers forty questions, what is the least number of questions she must answer correctly to finish with a score of over 300?

MATHS MATE

Test 8

Covering worksheets 4.5 - 4.8

Name: ....

1. [Long ×,÷]

$297 \div 4 =$

2. [Decimal +,−]

$3 - 0.746 =$

3. [Decimal ×,÷]

$0.9 \div 0.3 =$

4. [Fraction +,−]

$3\frac{5}{6} + 1\frac{2}{6} =$

5. [Fraction ×,÷]

$\frac{3}{8} \div 12 =$

6. [Percentages]

Of the total number of visitors, 33 or 55% paid full fare. How many visitors arrived altogether?

7. [Decimals / Fractions / Percentages]

$0.4\dot{3}$ is the notation for:

A) 0.434343.....
B) 0.4333.....
C) 0.444333.....

8. [Integer +,−]

$(-7) - (-9) + (-16) =$

9. [Integer ×,÷]

$(-10) \times (+3) \div (+6) =$

10. [Rates / Ratios]

I can buy four exercise books for $6. How many exercise books can I buy for $24?

11. [Indices]

Simplify $2z^5 \times 4z^3$

12. [Square Roots]

$\frac{12\sqrt{36}}{3\sqrt{4}} =$

13. [Exploring Number]

Which numbers are rational?

A) 3.141592653... B) $\frac{13}{100}$

C) −2.252525... D) $-\sqrt{80}$

14. [Financial Mathematics]

Jelena's car is now worth $2200 or 20% of its original cost. How much did Jelena originally pay for the car?

15. [Number Patterns]

position	1	2	3	4	5	....	n
term	3	7	11	15	19	....	?

The rule for the term in position n is:

A) $4n - 2$ B) $2n + 1$
C) $2n - 1$ D) $4n - 1$

16. [Expressions]

Simplify $4x - 4y - 2x + y$

17. [Substitution]

If $a = 1$ and $b = 9$,

find the value of $\frac{a}{4} + \frac{b}{7}$

18. [Expansion]

Expand and simplify

$(e - 3)(e + 2)$

19. [Factorisation]

Factorise $25 - k^2$

20. [Equations]

Solve for x:

$(x + 2)(x - 6) = 0$

21. [Coordinate Geometry]

Complete the table of values for the non-linear rule $y = x^2 - 4$ (parabola).

x	−2	−1	0	1	2
y	0				

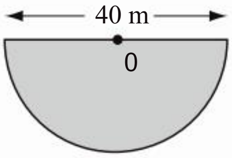
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

22. [Units of Measurement / Time]

Kakadu National Park has an area of 13 073 km^2. Express this in hectares (ha).

23. [Perimeter / Area]

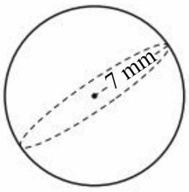
Using $A = \pi r^2$ where $\pi \approx 3.14$, find the area of the semicircle.



m^2

24. [Surface Area]

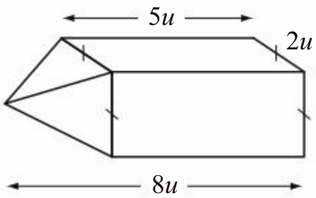
Using $TSA = 4\pi r^2$ and $\pi \approx \frac{22}{7}$, find the total surface area of the sphere.



mm^2

25. [Volume]

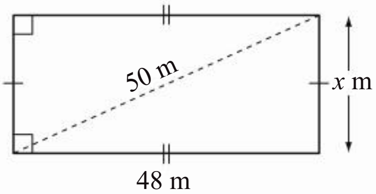
Write an algebraic expression for the volume V of the square prism which has a regular square pyramid on top. [Express the answer in terms of u.]



$V =$

26. [Pythagoras]

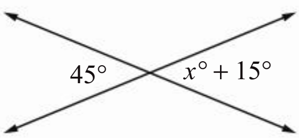
Find the perimeter of the rectangle by first calculating the missing side length.



m

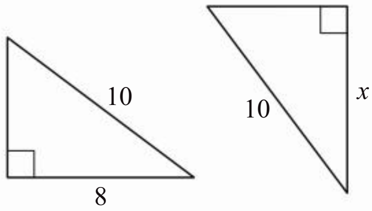
27. [Angles]

Find the value of $x°$.



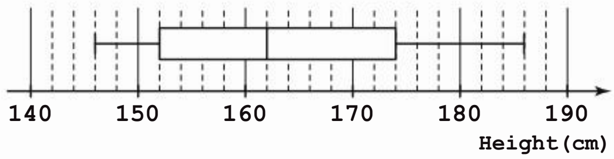
28. [Geometric Reasoning]

Find the value of x in this pair of congruent triangles. [All measurements are in cm.]



29. [Statistics]

The box-and-whisker plot shows a set of student heights. Find the median and upper quartile (UQ).



median = UQ =

30. [Probability]

A jar contains 8 black, 5 purple and 3 red jelly beans. Find the probability that a jelly bean drawn at random from the jar will be red or purple. [Give the answer as a fraction in simplest form.]

31. [Problem Solving 1]

The table below shows the team standings after 2 rounds of the 2018 Soccer World Cup. Who did Egypt play in its third round robin game? [Each team plays each 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 TEAMS	MP matches played	W wins	D draws	L losses	GF goals for	GA goals against	Pts points
Russia	2	2	0	0	8	1	6
Uruguay	2	2	0	0	2	0	6
Egypt	2	0	0	2	1	4	0
Saudi Arabia	2	0	0	2	0	6	0

Egypt **vs** ____________

32. [Problem Solving 2]

In a quiz show, Clara won 20 points for each correct answer and lost 30 points for each incorrect answer. After 30 questions her score was zero. How many correct answers did she have?

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

MAUVE

Teacher Resource

MATHS MATE

MAUVE

Test 1

Covering worksheets 1.1 - 1.4

Name: ....

1. [Long ×,÷]
$49 \times 20 =$ **980**

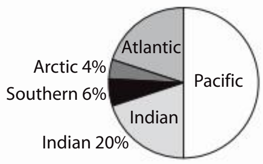
2. [Decimal +,–]
$5.38 + 0.08 =$ **5.46**

3. [Decimal ×,÷]
$13.27 \times 5 =$ **66.35**

4. [Fraction +,–]
$\frac{7}{10} - \frac{4}{10} =$ $\frac{3}{10}$

5. [Fraction ×,÷]
$\frac{5}{9} \times 3 =$ $1\frac{2}{3}$

6. [Percentages]
What percentage of the earth's ocean area is covered by the Atlantic Ocean?



20%

7. [Decimals / Fractions / Percentages]
Place in ascending order:
$\frac{2}{5}, \frac{1}{3}, \frac{4}{15}$

$\frac{4}{15}, \frac{1}{3}, \frac{2}{5}$

8. [Integer +,–]
$(+4) + (-9) =$ **–5**

9. [Integer ×,÷]
$(+11) \times (-2) =$ **–22**

10. [Rates / Ratios]
180 litres flow in 4 minutes =
45 litres per minute

11. [Indices]
$4^2 =$ **16**

12. [Square Roots]
$\sqrt{900} =$ **30**

13. [Exploring Number]
$7 \times 6 - 12 \div 6 =$ **40**

14. [Financial Mathematics]
Lou's home contents insurance direct debit is \$30.50 per month. How much does she save if she pays the up-front annual amount of \$318?

\$ **48**

15. [Number Patterns]
What is the value of the missing term in the pattern?

position	1	2	3	4	5	6
term	6	12	24	48	96	?

192

16. [Expressions]
Write as an expression:
p increased by 300

$p + 300$

17. [Substitution]
If $g = 0$, find the value of $9 + g$ **9**

18. [Expansion]
Expand $2(m - 3)$ $2m - 6$

19. [Factorisation]
Factorise $4h - 8$ $4(h - 2)$

20. [Equations]
Solve for x: $6 + x = 4$ **–2**

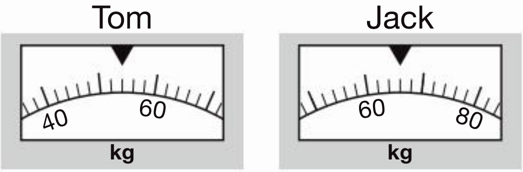
21. [Coordinate Geometry]
Complete the table of values for the linear rule $y = x - 6$

x	$y = x - 6$	y	(x, y)
–6	$y = -6 - 6$	–12	(–6 , –12)
–3	$y = -3 - 6$	–9	(–3 , –9)
0	$y = 0 - 6$	–6	(0 , –6)
3	$y = 3 - 6$	–3	(3 , –3)
6	$y = 6 - 6$	0	(6 , 0)

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

22. [Units of Measurement / Time]

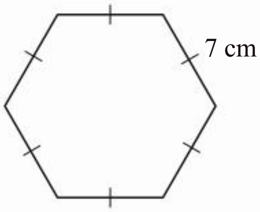
How much lighter in weight is Tom than Jack?



12 kg

23. [Perimeter / Area]

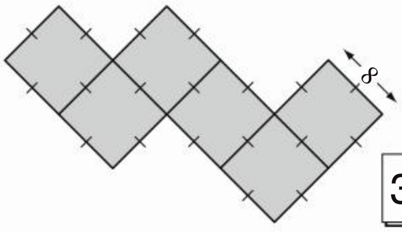
Find the perimeter of the hexagon.

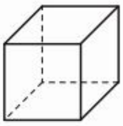


42 cm

24. [Surface Area]

Find the total surface area of the cube by finding the area of its net.

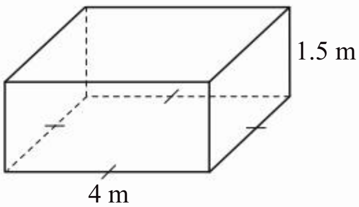




384 sq. units

25. [Volume]

Find the volume of the square prism.



24 m^3

26. [Pythagoras]

Find the positive solution for b:

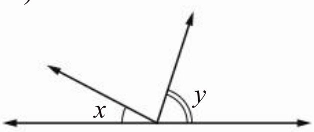
$b^2 = 144$

12

27. [Angles]

Which would describe the angles marked x and y in this diagram?

A) adjacent
B) supplementary
C) acute

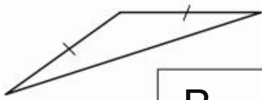


C

28. [Geometric Reasoning]

Which two options describe this triangle?

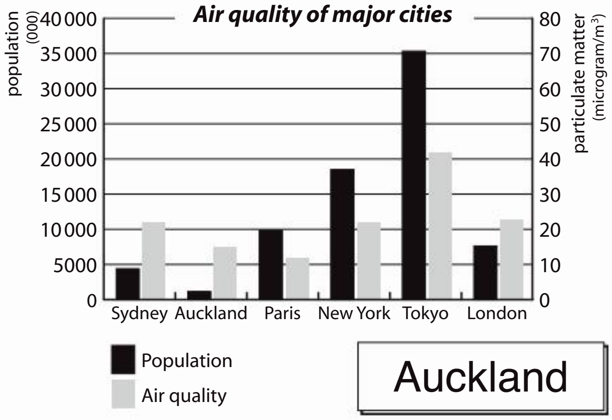
A) right-angled
B) obtuse-angled
C) isosceles



B and C

29. [Statistics]

Relative to its population, which of these cities has the worst air quality?

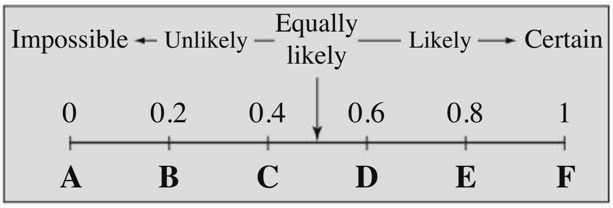


Auckland

30. [Probability]

Which letter A to F describes the probability of this event?

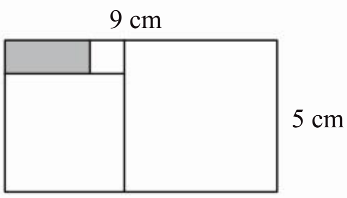
'A spinner numbered 1 to 5 is spun and an odd number is obtained.'



D

31. [Problem Solving 1]

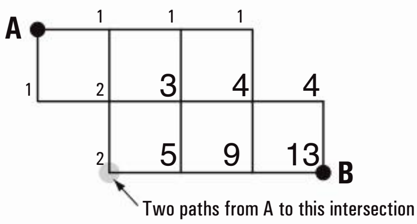
A 9 cm by 5 cm rectangle is divided into 3 squares and a rectangle as shown below. Find the area of the shaded rectangle.



3 cm^2

32. [Problem Solving 2]

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.]



13

MATHS MATE

Test 1

Covering worksheets 1.1 - 1.4

Name: ....

1. [Long ×,÷]

$54 \times 20 =$ **1080**

2. [Decimal +,–]

$4.67 + 0.07 =$ **4.74**

3. [Decimal ×,÷]

$11.54 \times 6 =$ **69.24**

4. [Fraction +,–]

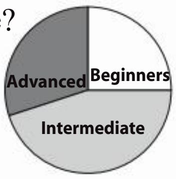
$\frac{13}{17} - \frac{8}{17} =$ $\frac{5}{17}$

5. [Fraction ×,÷]

$\frac{3}{4} \times 2 =$ $1\frac{1}{2}$

6. [Percentages]

Of the slopes at Mount Buller, 30% are classified Advanced. What percentage of slopes are Intermediate?



45%

7. [Decimals / Fractions / Percentages]

Place in descending order:

$\frac{2}{3}, \frac{5}{6}, \frac{5}{12}$ $\frac{5}{6}, \frac{2}{3}, \frac{5}{12}$

8. [Integer +,–]

$(+4) + (-8) =$ **–4**

9. [Integer ×,÷]

$(+6) \times (-3) =$ **–18**

10. [Rates / Ratios]

10°C drop in 4 hours =

2.5 °C per hour

11. [Indices]

$3^2 =$ **9**

12. [Square Roots]

$\sqrt{400} =$ **20**

13. [Exploring Number]

$18 - 5 - (18 - 6) =$ **1**

14. [Financial Mathematics]

Joe's car insurance direct debit is \$34.80 per month. How much does he save if he pays the up-front annual amount of \$337?

\$ 80.60

15. [Number Patterns]

What is the value of the missing term in the pattern?

term position	1	2	3	4	5	6
term value	4	12	36	108	324	?

972

16. [Expressions]

Write as an expression:

g decreased by 25 $g - 25$

17. [Substitution]

If $p = 0$, find the value of $16 - p$ **16**

18. [Expansion]

Expand $3(k - 2)$ $3k - 6$

19. [Factorisation]

Factorise $5s - 20$ $5(s - 4)$

20. [Equations]

Solve for x: $8 + x = 4$ **–4**

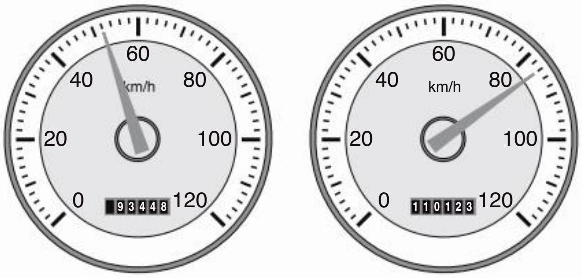
21. [Coordinate Geometry]

Complete the table of values for the linear rule $y = 3x$

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

22. [Units of Measurement / Time]

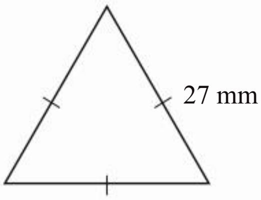
What is the difference in speed?



32 km/h

23. [Perimeter / Area]

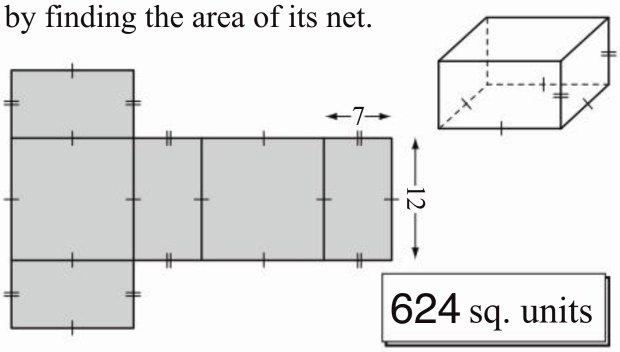
Find the perimeter of the equilateral triangle.



81 mm

24. [Surface Area]

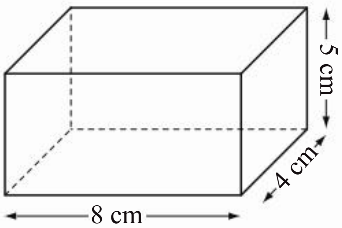
Find the total surface area of the square prism by finding the area of its net.



624 sq. units

25. [Volume]

Find the volume of the rectangular prism.



160 cm^3

26. [Pythagoras]

Find the positive solution for c:

$c^2 = 400$

20

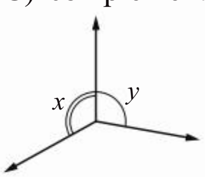
27. [Angles]

Which would describe the angles marked x and y in this diagram?

A) reflex

B) obtuse

C) complementary



B

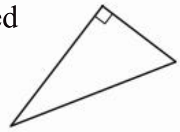
28. [Geometric Reasoning]

Which two options describe this triangle?

A) right-angled

B) scalene

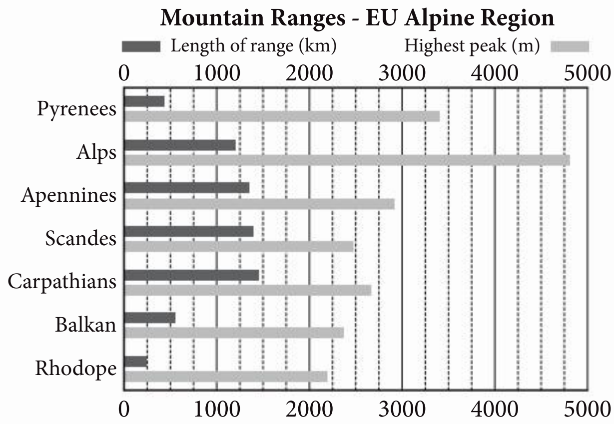
C) isosceles



A and B

29. [Statistics]

How many European mountain ranges have peaks between 2500 m and 3500 m?

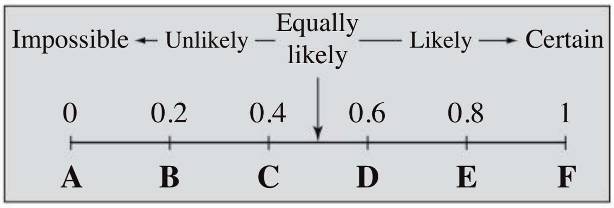


3

30. [Probability]

Which letter A to F describes the probability of this event?

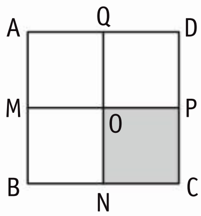
'A red marble will be drawn from a bag containing 8 white marbles and 2 red marbles.'



B

31. [Problem Solving 1]

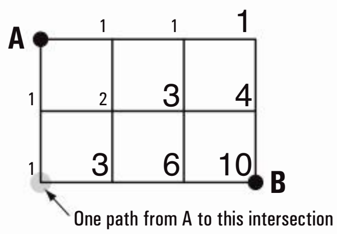
M, N, P and Q are the midpoints of the sides of the square ABCD. The shaded square has an area of 36 cm^2. What is the perimeter of the square ABCD?



48 cm

32. [Problem Solving 2]

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.]



10

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

Test 2

Covering worksheets 1.5 - 1.8

Name: ....

1. [Long ×,÷]
$57\,040 \div 100 =$ **570.4**

2. [Decimal +,–]
$13.753 + 4.258 =$ **18.011**

3. [Decimal ×,÷]
$100 \times 0.4 =$ **40**

4. [Fraction +,–]
$\frac{3}{5} + \frac{4}{5} =$ $1\frac{2}{5}$

5. [Fraction ×,÷]
$\frac{1}{4} \div \frac{2}{5} =$ $\frac{5}{8}$

6. [Percentages]
40% of \$600 = **\$ 240**

7. [Decimals / Fractions / Percentages]
Complete the equivalent fractions:
$\frac{8}{10} = \frac{\boxed{80}}{100}$

8. [Integer +,–]
$(+4) - (-2) =$ **6**

9. [Integer ×,÷]
$(+9) \div (-3) =$ **–3**

10. [Rates / Ratios]
Simplify 30 s : 3 min **1 : 6**

11. [Indices]
$1^8 =$ **1**

12. [Square Roots]
$\sqrt{6\frac{1}{4}} =$ $2\frac{1}{2}$

13. [Exploring Number]
$(3 \times 2 + 5)^2 =$ **121**

14. [Financial Mathematics]
An electricity bill is \$399.75. Your share of the bill is 20%. Estimate the size of your share.
Accept \$79 to \$81 **\$ 80**

15. [Number Patterns]
Complete the pattern:
0 , 1 , 3 , 6 , 10 , **15 , 21**

16. [Expressions]
Paul is y years old. Irene is 6 years younger than Paul. How old is Irene?
[Express your answer in terms of y.] $y - 6$

17. [Substitution]
If $b = 4$, find the value of $3b$ **12**

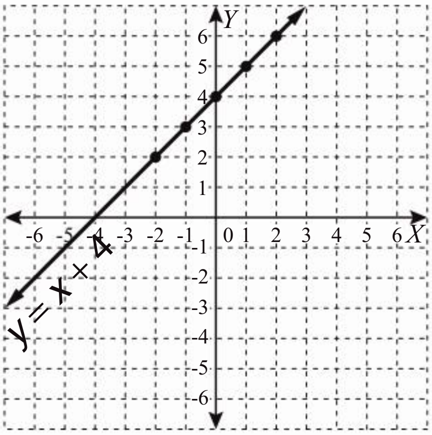
18. [Expansion]
Expand $3(2w + 6)$ $6w + 18$

19. [Factorisation]
Factorise $4n + 6$ $2(2n + 3)$

20. [Equations]
Solve for x: $\frac{x}{4} = 4$ **16**

21. [Coordinate Geometry]
Graph the line of equation $y = x + 4$ by first completing this table of values.
[Label the line with the rule.]

x	–2	–1	0	1	2
y	2	3	4	5	6



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

22. [Units of Measurement / Time]

The most appropriate unit for measuring the height of a tree is:

A) millimetres
B) kilometres
C) square metres
D) metres

D

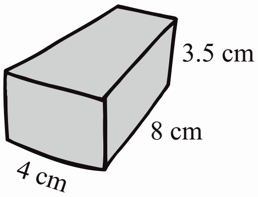
23. [Perimeter / Area]

The rectangular screen size of a computer is 50 cm wide and 32 cm high. What is its area?

1600 cm^2

24. [Surface Area]

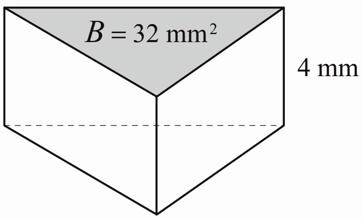
Find the total surface area of the brick.



148 cm^2

25. [Volume]

Using $V = Bh$ find the volume of the triangular prism.

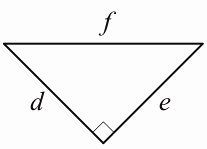


128 mm^3

26. [Pythagoras]

Which statements are true for the triangle below?

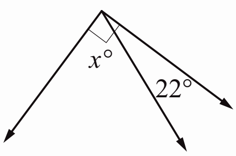
A) $e^2 = f^2 - d^2$
B) $e^2 = d^2 + f^2$
C) $d^2 + e^2 = f^2$



A and C

27. [Angles]

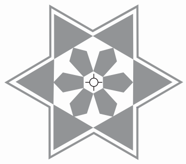
Find the value of $x°$.



68°

28. [Geometric Reasoning]

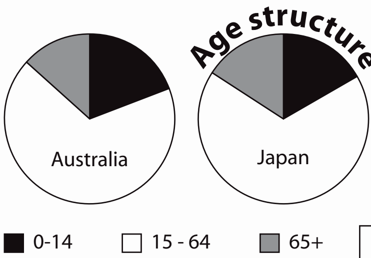
This shape has rotational symmetry. How many times during a full turn (360°) does the image of the shape exactly cover the original figure?



6

29. [Statistics]

Which country has the greatest proportion of over 65s in their population?

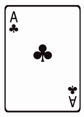


Japan

30. [Probability]

A 52-card deck of playing cards is shuffled, and one card is dealt from the top of the deck. What is the probability that it is an ace?

[Give the answer as a fraction in simplest form.]



$\frac{1}{13}$

31. [Problem Solving 1]

An archaeologist found some ancient numbers written as follows:

 for 33

 for 28

and  for 6.

What did  equal?

25

32. [Problem Solving 2]

Place all the digits 1 to 5 in each row and column, so that they are not repeated in any of the rows, columns, diagonals and shaded squares. The numbers outside the big square represent the products of the four digits in each shaded square.

120 (top left), 60 (top right)

4	2	1	5	3
5	3	2	1	4
3	1	5	4	2
1	4	3	2	5
2	5	4	3	1

40 (bottom left), 30 (bottom right)

MATHS MATE

MAUVE

Test 2

Covering worksheets 1.5 - 1.8

Name: ....

1. [Long ×,÷]

$7450 \div 100 =$ **74.5**

2. [Decimal +,–]

$10.476 + 7.524 =$ **18**

3. [Decimal ×,÷]

$100 \times 0.7 =$ **70**

4. [Fraction +,–]

$\frac{4}{7} + \frac{6}{7} =$ $1\frac{3}{7}$

5. [Fraction ×,÷]

$\frac{3}{4} \div \frac{10}{3} =$ $\frac{9}{40}$

6. [Percentages]

80% of \$400 = **\$ 320**

7. [Decimals / Fractions / Percentages]

Complete the equivalent fractions: $\frac{20}{100} = \frac{1}{\boxed{5}}$

8. [Integer +,–]

$(+3) - (-2) =$ **5**

9. [Integer ×,÷]

$(+8) \div (-2) =$ **–4**

10. [Rates / Ratios]

Simplify 30 min : 2 h **1 : 4**

11. [Indices]

$0^3 =$ **0**

12. [Square Roots]

$\sqrt{7\frac{1}{9}} =$ $2\frac{2}{3}$

13. [Exploring Number]

$1 + (3 + 6)^2 =$ **82**

14. [Financial Mathematics]

A phone bill is \$259.50. Your share of the bill is 25%. Estimate the size of your share.

Accept \$64.50 to \$65.50 **\$ 65**

15. [Number Patterns]

Complete the pattern:

4 , 5 , 7 , 10 , 14 , **19** , **25**

16. [Expressions]

Alex earned \$100 and spent x dollars. How much money does he have left?

[Express your answer in terms of x.] **$100 - x$**

17. [Substitution]

If $c = 6$, find the value of $5c$ **30**

18. [Expansion]

Expand $4(6 + 3v)$ **$24 + 12v$**

19. [Factorisation]

Factorise $8b + 10$ **$2(4b + 5)$**

20. [Equations]

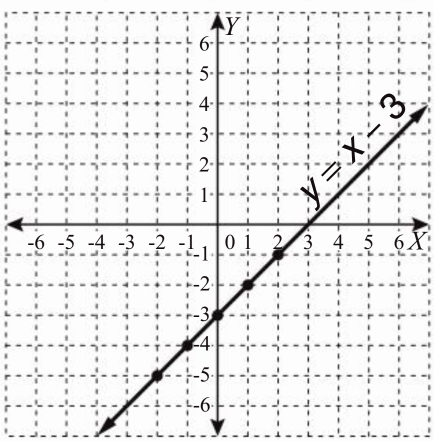
Solve for x: $\frac{x}{2} = 4$ **8**

21. [Coordinate Geometry]

Graph the line of equation $y = x - 3$ by first completing this table of values.

[Label the line with the rule.]

x	–2	–1	0	1	2
y	–5	–4	–3	–2	–1



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

22. [Units of Measurement / Time]

The most appropriate unit for measuring the length of a piece of timber is:

A) milligrams
B) kilometres
C) square metres
D) millimetres

D

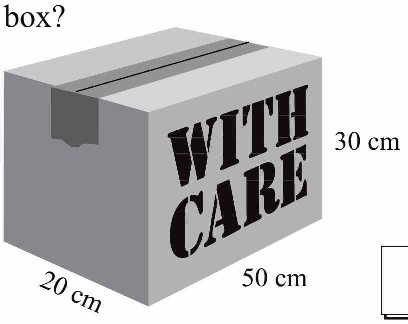
23. [Perimeter / Area]

A rectangular netball court measures approximately 15 m long and 30 m wide. What is its area?

450 m^2

24. [Surface Area]

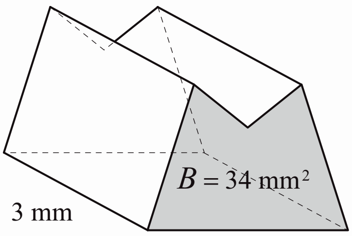
What is the total surface area of the cardboard box?



6200 cm^2

25. [Volume]

Using $V = Bh$ find the volume of the prism.

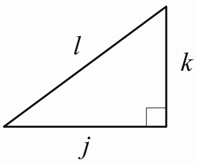


102 mm^3

26. [Pythagoras]

Which statements are true for the triangle below?

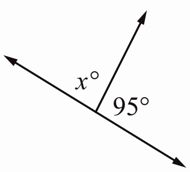
A) $k^2 = l^2 - j^2$
B) $l^2 = j^2 + k^2$
C) $j^2 = k^2 + l^2$



A and B

27. [Angles]

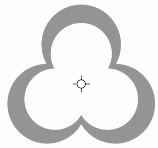
Find the value of $x°$.



85°

28. [Geometric Reasoning]

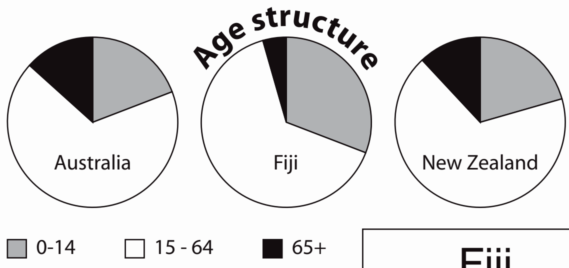
This shape has rotational symmetry. How many times during a full turn (360°) does the image of the shape exactly cover the original figure?



3

29. [Statistics]

Which country has the lowest proportion of over 65s in their population?



Fiji

30. [Probability]

A 52-card deck of playing cards is shuffled, and one card is dealt from the top of the deck. What is the probability that it is a spade? [Give the answer as a fraction in simplest form.]

$\frac{1}{4}$

31. [Problem Solving 1]

An archaeologist found some ancient numbers written as follows:

 for 52
 for 40
and  for 13.

What did  equal?

33

32. [Problem Solving 2]

Place all the digits 1 to 5 in each row and column, so that they are not repeated in any of the rows, columns, diagonals and shaded squares. The numbers outside the big square represent the products of the four digits in each shaded square.

120 (top left), 30 (top right), 40 (bottom left), 60 (bottom right)

2	5	4	1	3
3	4	1	2	5
1	3	5	4	2
5	1	2	3	4
4	2	3	5	1

MATHS MATE

MAUVE

Test 3

Covering worksheets 2.1 - 2.4

Name: ....

1. [Long ×,÷]

$25 \times 14 =$ **350**

2. [Decimal +,–]

$4.09 - 2.61 =$ **1.48**

3. [Decimal ×,÷]

$0.01 \times 5.3 =$ **0.053**

4. [Fraction +,–]

$\frac{3}{10} - \frac{1}{10} =$ $\frac{1}{5}$

5. [Fraction ×,÷]

$\frac{1}{2} \times \frac{5}{7} =$ $\frac{5}{14}$

6. [Percentages]

25% of $72 =$ **18**

7. [Decimals / Fractions / Percentages]

Write 40% as a decimal. **0.4**

8. [Integer +,–]

$(-4) + (+9) =$ **5**

9. [Integer ×,÷]

$(-4) \times (-6) =$ **24**

10. [Rates / Ratios]

Of the 100 g of jam, 65 g are sugars. Find the ratio of sugars to total jam quantity. **13 : 20**

11. [Indices]

$\left(\frac{3}{5}\right)^2 =$ $\frac{9}{25}$

12. [Square Roots]

$\sqrt{0.64} =$ **0.8**

13. [Exploring Number]

Round 0.71 to 1 decimal place. **0.7**

14. [Financial Mathematics]

The cost of a refrigerator repair was \$176 including GST. If the GST is 10%, how much GST was included in the cost? **\$ 16**

15. [Number Patterns]

Complete the pattern:

$-25, -20, -15, -10, -5,$ **0** , **5**

16. [Expressions]

Simplify $g \times 3 \times f$ $3fg$

17. [Substitution]

If $m = 5$ and $n = 3$, find the value of $\frac{3m - n}{4}$ **3**

18. [Expansion]

Expand $t(5 - t)$ $5t - t^2$

19. [Factorisation]

Factorise $2jk - 8k$ $2k(j - 4)$

20. [Equations]

Solve for x: $\frac{x}{4} - 3 = 9$ **48**

21. [Coordinate Geometry]

Which line does the point (1,–7) lie on?

A) $y = x + 7$

B) $y = -x$

C) $y = -x - 6$

C

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

22. [Units of Measurement / Time]

Choose the most reasonable length for a newborn baby boy.

A) 70 cm
B) 30 cm
C) 50 cm

C

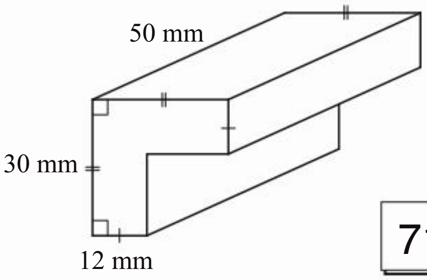
23. [Perimeter / Area]

Find the perimeter in millimetres of a parallelogram with side lengths measuring 8.5 cm and 115 mm.

400 mm

24. [Surface Area]

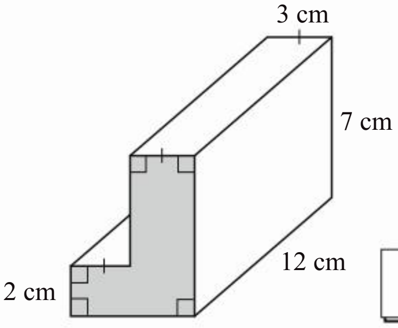
Find the total surface area of the shape.



7152 mm^2

25. [Volume]

Find the volume of the prism.



324 cm^3

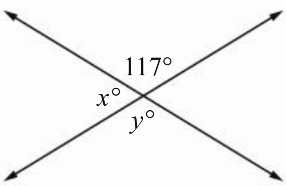
26. [Pythagoras]

Find the positive solution for c:
$6^2 + 8^2 = c^2$

10

27. [Angles]

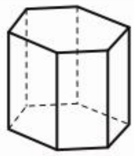
Find the values of $x°$ and $y°$.



$x° = 63°$ $y° = 117°$

28. [Geometric Reasoning]

Sketch a hexagonal prism. How many faces does a hexagonal prism have?



faces = 8

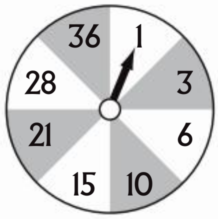
29. [Statistics]

Find the median and range of this set of data:
3, 7, 5, 5, 6, 9, 4, 4, 5

median = 5 range = 6

30. [Probability]

This spinner is spun once. What is the probability of spinning a number less than 20?
[Give the answer as a fraction in simplest form.]



$\frac{5}{8}$

31. [Problem Solving 1]

The average of ten numbers is 12.5. A further four numbers are added and the average is still 12.5. What is the sum of these four numbers?

50

32. [Problem Solving 2]

The lines of a multiplication table are shown jumbled below. Which times table is it?

J	×	D	=	AB
J	×	H	=	AI
J	×	G	=	FG
J	×	J	=	H
J	×	B	=	FA
J	×	C	=	FD
J	×	I	=	AF
J	×	F	=	J
J	×	A	=	C

3

MATHS MATE

Test 3

Covering worksheets 2.1 - 2.4

Name: ....

1. [Long ×,÷]
$27 \times 15 =$ **405**

2. [Decimal +,–]
$5.03 - 3.82 =$ **1.21**

3. [Decimal ×,÷]
$7.4 \times 0.01 =$ **0.074**

4. [Fraction +,–]
$\frac{9}{10} - \frac{3}{10} =$ $\frac{3}{5}$

5. [Fraction ×,÷]
$\frac{1}{4} \times \frac{5}{9} =$ $\frac{5}{36}$

6. [Percentages]
75% of 28 = **21**

7. [Decimals / Fractions / Percentages]
Write 70% as a decimal. **0.7**

8. [Integer +,–]
$(-7) + (+6) =$ **–1**

9. [Integer ×,÷]
$(-3) \times (-7) =$ **21**

10. [Rates / Ratios]
Of the 100 g of light cream, 18 g are fat. Find the ratio of fat to total light cream quantity. **9 : 50**

11. [Indices]
$\left(\frac{3}{4}\right)^2 =$ $\frac{9}{16}$

12. [Square Roots]
$\sqrt{0.36} =$ **0.6**

13. [Exploring Number]
Round 0.952 to 2 decimal places. **0.95**

14. [Financial Mathematics]
Brianna wants to buy kitchen cabinets that cost $880 including GST. If the GST is 10%, how much GST is included in the cost? **$ 80**

15. [Number Patterns]
Complete the pattern:
$-24, -18, -12, -6,$ **0 , 6**

16. [Expressions]
Simplify $y \times 2 \times x$ $2xy$

17. [Substitution]
If $m = 1$ and $n = 7$,
find the value of $\frac{m + 2n}{5}$ **3**

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

19. [Factorisation]
Factorise $2xy - 6x$ $2x(y - 3)$

20. [Equations]
Solve for x: $\frac{x}{2} - 3 = 5$ **16**

21. [Coordinate Geometry]
Which line does the point (1,7) lie on?
A) $y = 2x + 5$
B) $y = x$
C) $y = x - 7$

A

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

22. [Units of Measurement / Time]

Choose the most reasonable length for the diameter of a human eye.

A) 12 mm
B) 25 mm
C) 40 mm

B

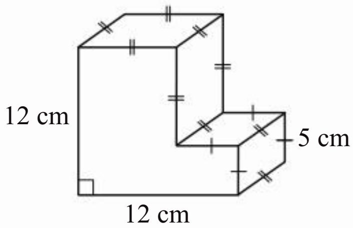
23. [Perimeter / Area]

Find the perimeter in millimetres of a parallelogram with side lengths measuring 65 cm and 1050 mm.

3400 mm

24. [Surface Area]

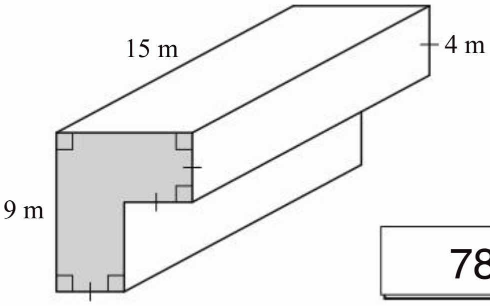
Find the total surface area of the prism.



554 cm^2

25. [Volume]

Find the volume of the prism.



780 m^3

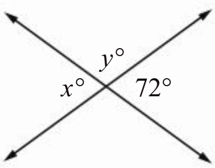
26. [Pythagoras]

Find the positive solution for c:
$c^2 + 16^2 = 20^2$

12

27. [Angles]

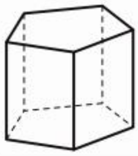
Find the values of $x°$ and $y°$.



$x° = 72°$ $y° = 108°$

28. [Geometric Reasoning]

Sketch a pentagonal prism. How many edges does a pentagonal prism have?



edges = 15

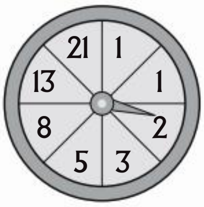
29. [Statistics]

Find the median and range of this set of data:
2, 6, 4, 9, 5, 5, 8, 6, 6

median = 6 range = 7

30. [Probability]

This spinner is spun once. What is the probability of spinning an even number?
[Give the answer as a fraction in simplest form.]



$\frac{1}{4}$

31. [Problem Solving 1]

The average of five numbers is 18. A further three numbers are added and the average is still 18. What is the sum of these three numbers?

54

32. [Problem Solving 2]

The lines of a multiplication table are shown jumbled below. Which times table is it?

B	×	A	=	CI
B	×	J	=	EF
B	×	B	=	DF
B	×	C	=	I
B	×	F	=	CB
B	×	I	=	EC
B	×	E	=	DC
B	×	D	=	B
B	×	H	=	CG

4

MATHS MATE

Test 4
Covering worksheets 2.5 - 2.8

Name: ....

1. [Long ×,÷]
$7980 \div 20 =$ **399**

2. [Decimal +,–]
$1.07 + 0.892 =$ **1.962**

3. [Decimal ×,÷]
$3.7 \times 0.03 =$ **0.111**

4. [Fraction +,–]
$3\frac{3}{8} + 2\frac{4}{8} =$ $5\frac{7}{8}$

5. [Fraction ×,÷]
$\frac{1}{10} \div \frac{1}{5} =$ $\frac{1}{2}$

6. [Percentages]
The recommended daily allowance of iron for teens is 12 mg. Uri consumes an extra 25%. What is Uri's total iron intake for the day?
15 mg

7. [Decimals / Fractions / Percentages]
Write 0.72 as a fraction in simplest form.
$\frac{18}{25}$

8. [Integer +,–]
$(-4) - (-5) =$ **1**

9. [Integer ×,÷]
$(-18) \div (+6) =$ **–3**

10. [Rates / Ratios]
The American antelope can run 9 km in 10 minutes. What is its average speed?
54 km/h

11. [Indices]
Evaluate 4×4^2 **64**

12. [Square Roots]
$10\sqrt{9} =$ **30**

13. [Exploring Number]
5.6×10^6 is the scientific notation for:
A) 5.600000 B) 5 600 000 C) 56 000 000
B

14. [Financial Mathematics]
Kaya pays $500 000 for a property and sells it for 12% more. How much profit does Kaya make?
$ 60 000

15. [Number Patterns]
Complete the pattern:
$-1 , 4 , -16 , 64 ,$ **–256 , 1024**

16. [Expressions]
Choose the like terms:
mn , 2*n* , 2*nm* **mn, 2nm**

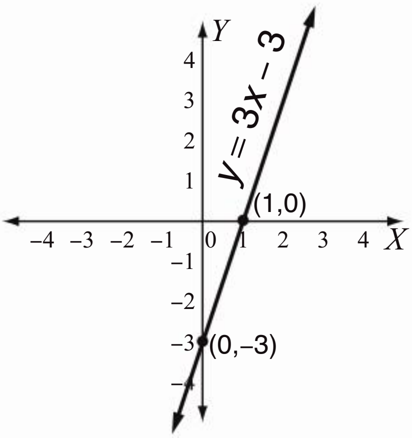
17. [Substitution]
If $y = 3x + 2$, find y when $x = 4$ **14**

18. [Expansion]
Expand $2a(2a + 3)$ $4a^2 + 6a$

19. [Factorisation]
Factorise and evaluate
$30 \times 16 + 30 \times 4$ **600**

20. [Equations]
Solve for x: $3(x + 8) = 12$ **–4**

21. [Coordinate Geometry]
Sketch the line of equation $y = 3x - 3$ by marking the x-intercept and the y-intercept.
[Label the graph with the rule.]



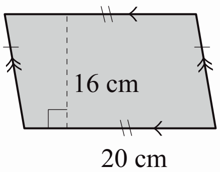
22. [Units of Measurement / Time]

Express in minutes:

6 hours and 57 minutes = **417 min**

23. [Perimeter / Area]

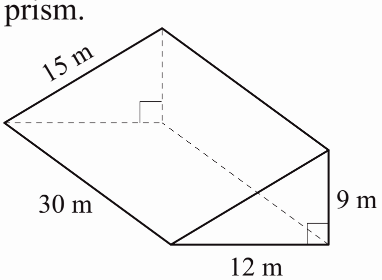
Find the area of the parallelogram.



320 cm^2

24. [Surface Area]

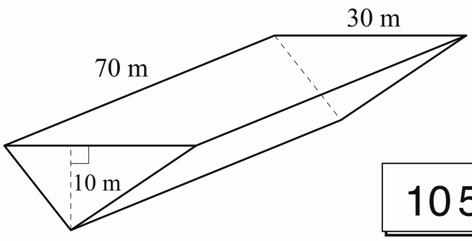
Find the total surface area of the triangular prism.



1188 m^2

25. [Volume]

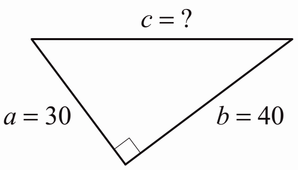
Find the volume of the triangular prism.



10 500 m^3

26. [Pythagoras]

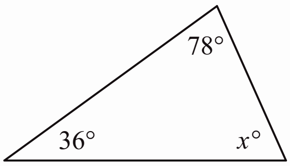
For this triangle use Pythagoras' theorem $c^2 = a^2 + b^2$. Find the length of the hypotenuse.



50

27. [Angles]

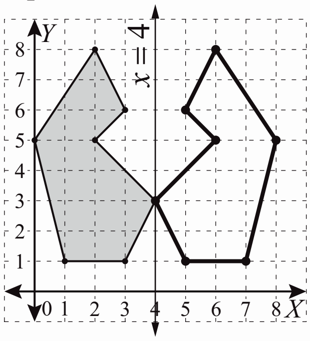
Find the value of $x°$.



66°

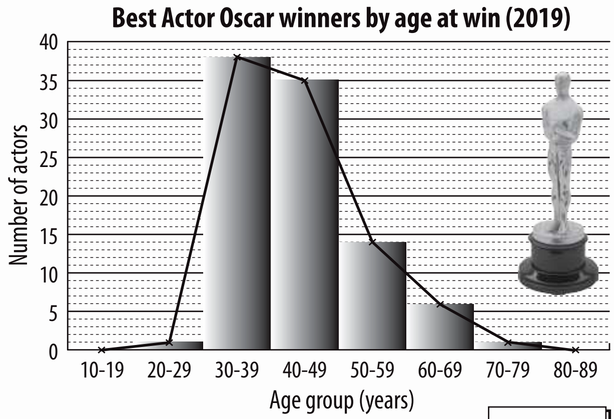
28. [Geometric Reasoning]

Draw the reflection of the shape in the line of equation $x = 4$.



29. [Statistics]

How many Oscars have been won by actors aged less than 30 years?



1

30. [Probability]

A bag contains 12 red, 24 blue and 14 yellow raffle tickets. A ticket is randomly selected from the bag. What is the probability of a blue ticket being selected? [Give the answer as a fraction in simplest form.]

$\frac{12}{25}$

31. [Problem Solving 1]

Fill in the cross number puzzle using the following numbers:

3 digits: 263, 352, 355, 417, 469, 472, 572, 624

4 digits: 4963, 7343

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

32. [Problem Solving 2]

HE × HE = SHE

Find the value of SHE given that each letter represents a different digit.

625

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

Test 4

Covering worksheets 2.5 - 2.8

Name: ....

1. [Long ×,÷]

$9650 \div 50 =$ **193**

2. [Decimal +,–]

$0.56 + 12.8 =$ **13.36**

3. [Decimal ×,÷]

$4.8 \times 0.04 =$ **0.192**

4. [Fraction +,–]

$4\frac{2}{10} + 2\frac{7}{10} =$ $6\frac{9}{10}$

5. [Fraction ×,÷]

$\frac{1}{8} \div \frac{1}{4} =$ $\frac{1}{2}$

6. [Percentages]

The recommended daily allowance of calcium is 800 mg. Sue consumes an extra 45%. What is Sue's total calcium intake? **1160 mg**

7. [Decimals / Fractions / Percentages]

Write 0.04 as a fraction in simplest form. $\frac{1}{25}$

8. [Integer +,–]

$(-3) - (-7) =$ **4**

9. [Integer ×,÷]

$(-27) \div (+9) =$ **–3**

10. [Rates / Ratios]

The fastest land bird, the ostrich, can run 24 km in 20 minutes. What is its average speed in kilometres per hour? **72 km/h**

11. [Indices]

Evaluate $2^3 \times 2^2$ **32**

12. [Square Roots]

$3\sqrt{25} =$ **15**

13. [Exploring Number]

4.7×10^{-7} is the scientific notation for:

A) 0.00000047
B) 4.7000000
C) 0.0000047

A

14. [Financial Mathematics]

Fred sells a property for \$125 000 and earns 6% commission. What is Fred's commission? **\$ 7500**

15. [Number Patterns]

Complete the pattern:

$-1, 3, -9, 27, -81,$ **243 , –729**

16. [Expressions]

Choose the like terms:
$4h$, $4gh$, $2hg$ **$4gh$, $2hg$**

17. [Substitution]

If $y = 5x - 8$, find y when $x = 3$ **7**

18. [Expansion]

Expand $2r(4r + 5)$ **$8r^2 + 10r$**

19. [Factorisation]

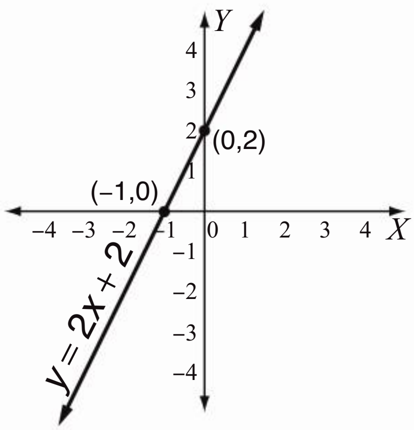
Factorise and evaluate
$25 \times 14 + 25 \times 6$ **500**

20. [Equations]

Solve for x: $2(x + 9) = 14$ **–2**

21. [Coordinate Geometry]

Sketch the line of equation $y = 2x + 2$ by marking the x-intercept and the y-intercept.
[Label the graph with the rule.]



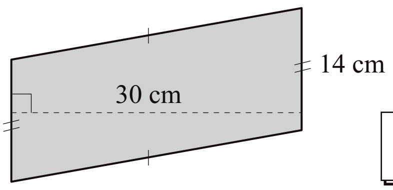
22. [Units of Measurement / Time]

Express in minutes:

2 hours and 58 minutes = **178 min**

23. [Perimeter / Area]

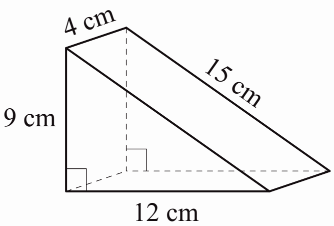
Find the area of the parallelogram.



420 cm^2

24. [Surface Area]

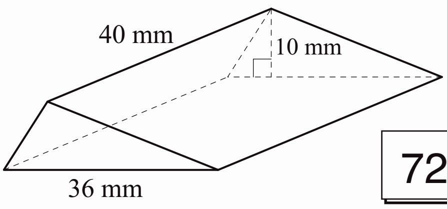
Find the total surface area of the triangular prism.



252 cm^2

25. [Volume]

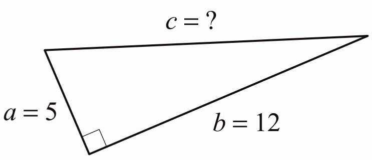
Find the volume of the triangular prism.



7200 mm^3

26. [Pythagoras]

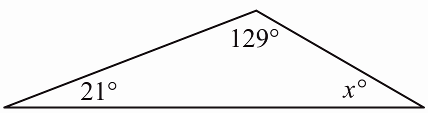
For this triangle use Pythagoras' theorem $c^2 = a^2 + b^2$. Find the length of the hypotenuse.



13

27. [Angles]

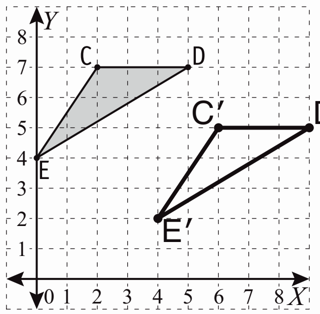
Find the value of $x°$.



30°

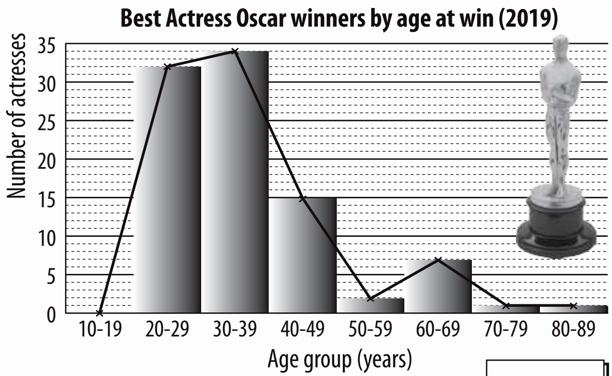
28. [Geometric Reasoning]

Redraw the triangle CDE after translating it 4 units horizontally and –2 units vertically.



29. [Statistics]

How many Oscars have been won by actresses aged 50 years or more?



11

30. [Probability]

A bowl contains 40 marbles numbered 1 to 40. A marble is drawn from the bowl. Find the probability of drawing a multiple of 9. [Give the answer as a fraction in simplest form.]

$\frac{1}{10}$

31. [Problem Solving 1]

Fill in the cross number puzzle using the following numbers:

3 digits: 489, 789, 949

4 digits: 3726, 4790, 5768, 6728

5 digits: 54 842

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

32. [Problem Solving 2]

ON + ON + ON + ON = GO

What digits do the letters O, N and G represent given that they are three different digits?

O = 2 N = 3 G = 9

(22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32)

MATHS MATE

MAUVE

Test 5

Covering worksheets 3.1 - 3.4

Name: ....

1. [Long ×,÷]

$464 \times 16 =$ **7424**

2. [Decimal +,–]

$8.6 - 0.49 =$ **8.11**

3. [Decimal ×,÷]

$80.56 \div 8 =$ **10.07**

4. [Fraction +,–]

$2 - \frac{2}{5} =$ $1\frac{3}{5}$

5. [Fraction ×,÷]

$\frac{7}{10} \times \frac{2}{3} =$ $\frac{7}{15}$

6. [Percentages]

150% of 200 = **300**

7. [Decimals / Fractions / Percentages]

Write 45% as a fraction in simplest form. $\frac{9}{20}$

8. [Integer +,–]

$(-14) + (-5) =$ **–19**

9. [Integer ×,÷]

$(-10) \times (+40) =$ **–400**

10. [Rates / Ratios]

Complete the missing term in the proportion:

5 : 7 = 30 : 42

11. [Indices]

Simplify $z^4 \times z^2$ z^6

12. [Square Roots]

$\sqrt{81} \times \sqrt{100} =$ **90**

13. [Exploring Number]

$3 - 6 \times (2 + 5) \div 3 - 7 =$ **–18**

14. [Financial Mathematics]

Toni is paid $11.80 per hour. She works a 6 hour shift, the last 2 hours being at a double time pay rate. What is Toni's wage before tax?

$ 94.40

15. [Number Patterns]

Complete the pattern:

–1024 , 256 , –64 , 16 , **–4** , **1**

16. [Expressions]

Simplify $2x - 3y + 5x$ $7x - 3y$

17. [Substitution]

Use $A = lw$ to find the area A of a rectangle when $l = 6$ and $w = 12$ **72**

18. [Expansion]

Expand $-3(2a - 5)$ $-6a + 15$

19. [Factorisation]

Factorise $2t^2 - 6t$ $2t(t - 3)$

20. [Equations]

Solve for x: $12 - 3x = x$ **3**

21. [Coordinate Geometry]

Use $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ to find the coordinates of the midpoint M of the interval joining the points (–1,–8) and (7,2).

(3,–3)

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

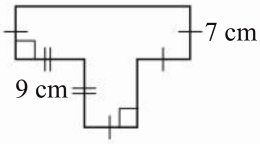
22. [Units of Measurement / Time]

'The Tan' walking track around Melbourne's Botanic Gardens measures 3.8 km. Express the length of 'The Tan' in metres.

3800 m

23. [Perimeter / Area]

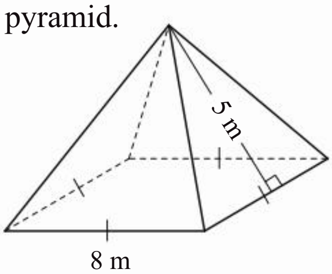
Find the perimeter of the shape.



78 cm

24. [Surface Area]

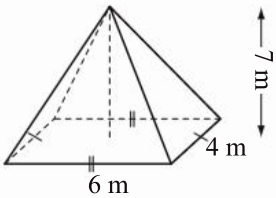
Find the total surface area of the regular square pyramid.



144 m^2

25. [Volume]

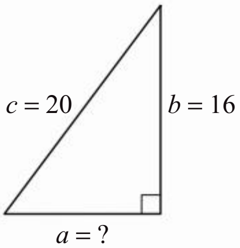
Using $V = \frac{Bh}{3}$ find the volume of the rectangular pyramid.



56 m^3

26. [Pythagoras]

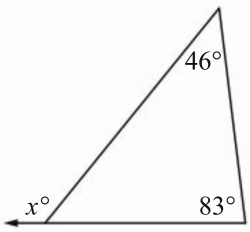
For this triangle use Pythagoras' theorem $a^2 + b^2 = c^2$. Find the length of the side labelled a.



12

27. [Angles]

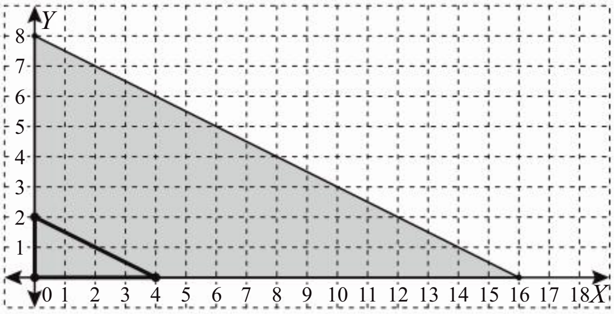
Find the value of $x°$.



129°

28. [Geometric Reasoning]

Redraw the triangle reduced by a scale factor of $\frac{1}{4}$ about the origin of the axes.



29. [Statistics]

The stem plot shows the calories per piece of selected fruits. Find the median and range of the data.

stem	leaf
2	0 5 6 8
3	0 0 4 5 5 6
4	4 5
5	0
6	7

Key
3 | 8 = 38 calories

median = 34.5 range = 47

30. [Probability]

The probability that Adrienne gets all her spelling correct in the next test is 0.68. What is the probability that she does not get them all correct?

0.32

31. [Problem Solving 1]

Find all the pairs of prime numbers that add to 24.

(5,19) (7,17) (11,13)

32. [Problem Solving 2]

Find the smallest 6-digit number which is divisible by 2, 3 and 4.

100 008

MATHS MATE

MAUVE

Test 5

Covering worksheets 3.1 - 3.4

Name: ....

1. [Long ×,÷]
$179 \times 14 =$ **2506**

2. [Decimal +,–]
$7.7 - 0.83 =$ **6.87**

3. [Decimal ×,÷]
$105.3 \div 9 =$ **11.7**

4. [Fraction +,–]
$2 - \frac{4}{9} =$ $1\frac{5}{9}$

5. [Fraction ×,÷]
$\frac{3}{8} \times \frac{4}{7} =$ $\frac{3}{14}$

6. [Percentages]
300% of 200 = **600**

7. [Decimals / Fractions / Percentages]
Write 16% as a fraction in simplest form. $\frac{4}{25}$

8. [Integer +,–]
$(-13) + (-2) =$ **–15**

9. [Integer ×,÷]
$(-50) \times (+10) =$ **–500**

10. [Rates / Ratios]
Complete the missing term in the proportion:
$32 : \boxed{8} = 12 : 3$

11. [Indices]
Simplify $y^3 \times y^2$ y^5

12. [Square Roots]
$\sqrt{49} \times \sqrt{100} =$ **70**

13. [Exploring Number]
$-9 - 5 \div (8 - 3) \times 2 + 6 =$ **–5**

14. [Financial Mathematics]
Gino is paid $13.50 per hour. He works an 8 hour shift, the last 3 hours being at a double time pay rate. What is Gino's wage before tax? **$148.50**

15. [Number Patterns]
Complete the pattern:
-3125 , 625 , -125 , 25 , **–5** , **1**

16. [Expressions]
Simplify $4a - 5b + 3a$ $7a - 5b$

17. [Substitution]
Use $F = ma$ to find the force F when $m = 35$ and $a = 10$ **350**

18. [Expansion]
Expand $-6(3 - 4x)$ $-18 + 24x$

19. [Factorisation]
Factorise $5f^2 - 10f$ $5f(f - 2)$

20. [Equations]
Solve for x: $8 - 2x = 2x$ **2**

21. [Coordinate Geometry]
Use $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ to find the coordinates of the midpoint M of the interval joining the points (–2,6) and (2,2). **(0,4)**

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

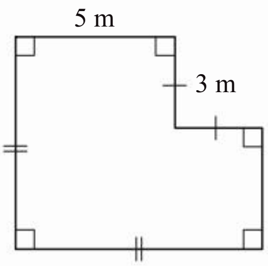
22. [Units of Measurement / Time]

The lungs of a typical person have 2400 km of airways. Express this in metres.

2 400 000 m

23. [Perimeter / Area]

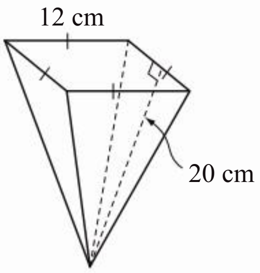
Find the perimeter of the shape.



32 m

24. [Surface Area]

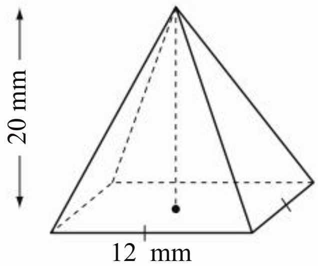
Find the total surface area of the regular square pyramid.



624 cm^2

25. [Volume]

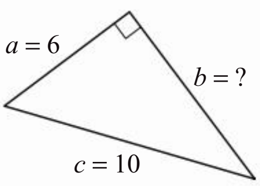
Using $V = \frac{Bh}{3}$ find the volume of the square pyramid.



960 mm^3

26. [Pythagoras]

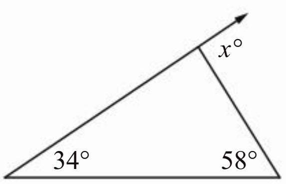
For this triangle use Pythagoras' theorem $a^2 + b^2 = c^2$. Find the length of the side labelled b.



8

27. [Angles]

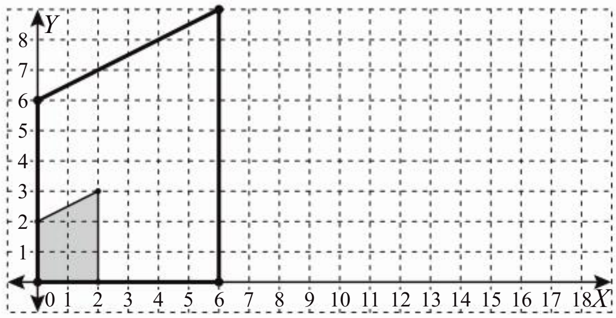
Find the value of $x°$.



92°

28. [Geometric Reasoning]

Redraw the trapezium enlarged by a scale factor of 3 about the origin of the axes.



29. [Statistics]

The stem plot shows the percentage of water per piece of selected fruits. Find the median and range of the data.

stem	leaf
5	0
6	0 0
7	0 5 7 9
8	0 5 5 5 5 8
9	0

Key
8 | 5 = 85%

median = 79.5 range = 40

30. [Probability]

The probability that Mia is late for school is 0.17. What is the probability that she is not late?

0.83

31. [Problem Solving 1]

Find all the pairs of prime numbers that add to 30.

(7,23) (11,19) (13,17)

32. [Problem Solving 2]

Find the largest 6-digit number which is divisible by 2, 3 and 4.

999 996

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

MAUVE

Test 6

Covering worksheets 3.5 - 3.8

Name: ....

1. [Long ×,÷]

$4074 \div 21 =$ **194**

2. [Decimal +,−]

$3.5 + 2.05 + 1.1 =$ **6.65**

3. [Decimal ×,÷]

$2.3 \div 100 =$ **0.023**

4. [Fraction +,−]

$\frac{2}{3} + \frac{1}{9} =$ $\frac{7}{9}$

5. [Fraction ×,÷]

$4 \div \frac{2}{3} =$ **6**

6. [Percentages]

Increase 200 by 50%. **300**

7. [Decimals / Fractions / Percentages]

Complete the table:

Decimal	Fraction	Percentage
0.8	$\frac{8}{10} = \frac{4}{5}$	80%

8. [Integer +,−]

$(-2) - (+11) =$ **−13**

9. [Integer ×,÷]

$\frac{-18}{-6} =$ **3**

10. [Rates / Ratios]

The ratio of white keys to black keys on a piano is 13 : 9. If a piano has 88 keys, how many white keys are there? **52**

11. [Indices]

Evaluate $4^5 \div 4^3$ **16**

12. [Square Roots]

$\sqrt{100} \div \sqrt{4} =$ **5**

13. [Exploring Number]

Write 52 million, the number of cells in an adult human body, in scientific notation. 5.2×10^7

14. [Financial Mathematics]

Abdenor is a foreign resident on a holiday working visa. His taxable income is $10,000. What is the amount of tax payable on his income?

Taxable Income	Tax on this income*
0-$90,000	32%
$90,001-$180,000	$29,250 + 37% of amounts over $90,000
$180,000 and over	$62,550 + 45% of amounts over $180,000

*Foreign resident tax rates 2019-2020 (Australia)

$3200

15. [Number Patterns]

Find the 12th term in the pattern:

0 , 3 , 6 , 9 , 12 , ... **33**

16. [Expressions]

Simplify $-5j \times 7k$ $-35jk$

17. [Substitution]

If $y = x(x - 3)$, find y when $x = 6$ **18**

18. [Expansion]

Expand and simplify $2(3m + 1) - 4m$ $2m + 2$

19. [Factorisation]

Factorise $12jk + 15j^2k$ $3jk(4 + 5j)$

20. [Equations]

Solve for x: $\frac{9}{x} = 3$ **3**

21. [Coordinate Geometry]

Complete the table:

equation	gradient (m)	x-intercept	y-intercept (c)
$y = -3x - 2$	-3	$(-\frac{2}{3}, 0)$	$(0, -2)$

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

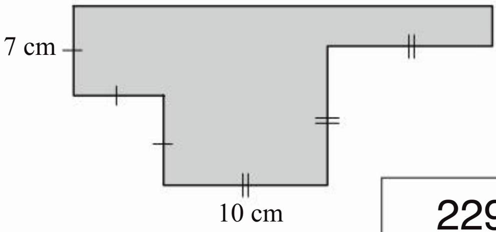
22. [Units of Measurement / Time]

The 'Star of Africa' diamond weighs 106 g. Express this in milligrams.

106 000 mg

23. [Perimeter / Area]

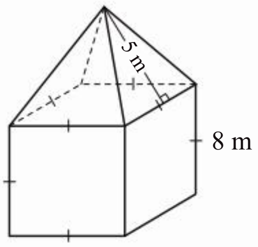
Find the area of the shape.



229 cm^2

24. [Surface Area]

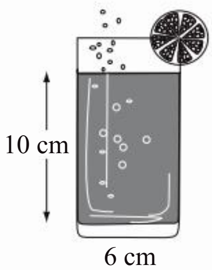
A block of wood has the shape of a regular square pyramid on top of a cube as shown below. Find its total surface area.



400 m^2

25. [Volume]

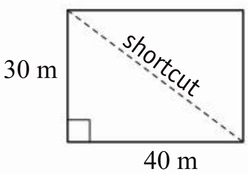
Using $V = \pi r^2 h$ and $\pi \approx 3.14$, find how much lemonade is in the glass. [Hint: 1 mL = 1 cm^3]



282.6 mL

26. [Pythagoras]

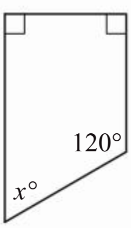
How much distance would you save by taking the shortcut across the paddock?



20 m

27. [Angles]

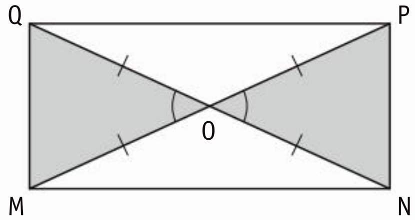
Find the value of $x°$.



60°

28. [Geometric Reasoning]

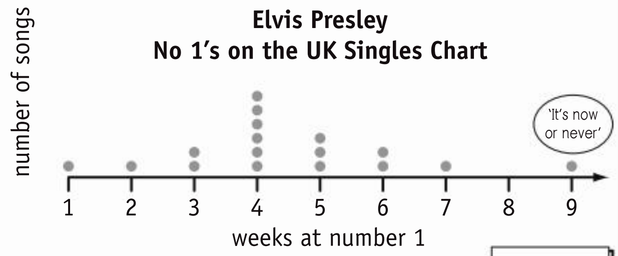
Which congruence test (SSS, SAS, AAS, RHS) can be applied to show that triangle MOQ is congruent to triangle NOP?



SAS

29. [Statistics]

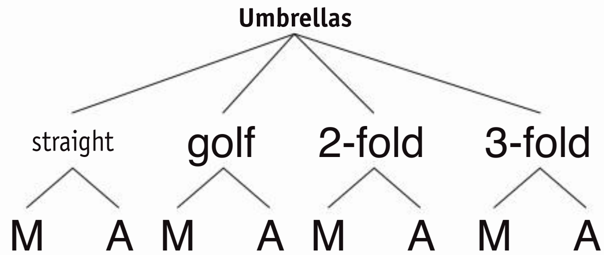
What is the median number of weeks in which Elvis Presley's songs were at number one on the UK singles chart?



4

30. [Probability]

Umbrellas are sold in four styles: straight, golf, 2-folded and 3-folded. They can be manual (M) and automatic (A). Complete the tree diagram. What is the probability of choosing a golf umbrella? [Give the answer as a fraction in simplest form.]



$\frac{1}{4}$

31. [Problem Solving 1]

If you have 5¢, 10¢ and 20¢ coins, in how many ways can you make up 45 cents?

9

32. [Problem Solving 2]

How many numbers between 301 and 400 are divisible by both 3 and 5?

6

MATHS MATE

Test 6

Covering worksheets 3.5 - 3.8

Name: ....

1. [Long ×,÷]
$5447 \div 13 =$ **419**

2. [Decimal +,−]
$4.75 + 1.02 + 0.2 =$ **5.97**

3. [Decimal ×,÷]
$4.5 \div 100 =$ **0.045**

4. [Fraction +,−]
$\frac{1}{2} + \frac{3}{8} =$ $\frac{7}{8}$

5. [Fraction ×,÷]
$6 \div \frac{3}{5} =$ **10**

6. [Percentages]
Increase 60 by 10%. **66**

7. [Decimals / Fractions / Percentages]
Complete the table:

Decimal	Fraction	Percentage
0.4	$\frac{4}{10} = \frac{2}{5}$	40%

8. [Integer +,−]
$(-7) - (+12) =$ **−19**

9. [Integer ×,÷]
$\frac{36}{-6} =$ **−6**

10. [Rates / Ratios]
The ratio of wins to losses for Sydney Swans in the 2018 AFL home and away season was 7 : 4. If Sydney Swans played 22 games in total, how many did they lose? **8**

11. [Indices]
Evaluate $6^4 \div 6^2$ **36**

12. [Square Roots]
$\sqrt{64} \div \sqrt{16} =$ **2**

13. [Exploring Number]
Dinosaurs became extinct 65 million years ago. Write this number in scientific notation. 6.5×10^7

14. [Financial Mathematics]
Will's taxable income is \$27,200. What is the amount of tax payable on his income?

Taxable Income	Tax on this income*
0-\$18,200	Nil
\$18,201 - \$37,000	19¢ for each \$1 over \$18,200
\$37,001 - \$90,000	\$3,572 plus 32.5¢ for each dollar over \$37,000
\$90,001 - \$180,000	\$20,797 plus 37¢ for each dollar over \$90,000
\$180,001 and over	\$54,097 plus 45¢ for each dollar over \$180,000

*Resident tax rates 2019-2020 (Australia)

\$1710

15. [Number Patterns]
Find the 15th term in the pattern:
3 , 5 , 7 , 9 , 11 , ... **31**

16. [Expressions]
Simplify $-8g \times 6h$ $-48gh$

17. [Substitution]
If $y = x(x - 5)$, find y when $x = 8$ **24**

18. [Expansion]
Expand and simplify
$3(4a + 5) - 6a$ $6a + 15$

19. [Factorisation]
Factorise $4lm + 10l^2m$ $2lm(2 + 5l)$

20. [Equations]
Solve for x: $\frac{8}{x} = 2$ **4**

21. [Coordinate Geometry]
Complete the table:

equation	gradient (m)	x-intercept	y-intercept (c)
$y = -6x - 5$	-6	$(-\frac{5}{6}, 0)$	$(0, -5)$

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

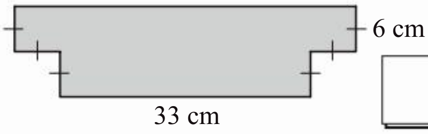
22. [Units of Measurement / Time]

The 'Welcome Stranger' gold nugget weighs 65.2 kg. Express this in grams.

65 200 g

23. [Perimeter / Area]

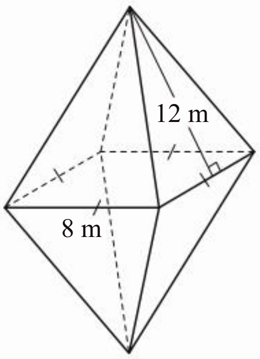
Find the area of the shape.



468 cm^2

24. [Surface Area]

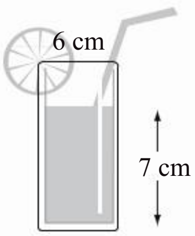
Find the total surface area of the octahedron.



384 m^2

25. [Volume]

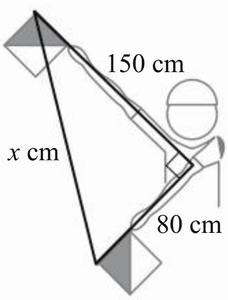
Using $V = \pi r^2 h$ and $\pi \approx \frac{22}{7}$, find how much lemonade is in the glass. [Hint: 1 mL = 1 cm^3]



198 mL

26. [Pythagoras]

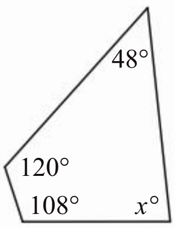
What is the distance between the flags when this semaphore is signalling the letter I as shown in the diagram?



170 cm

27. [Angles]

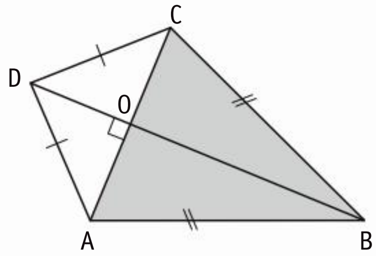
Find the value of $x°$.



84°

28. [Geometric Reasoning]

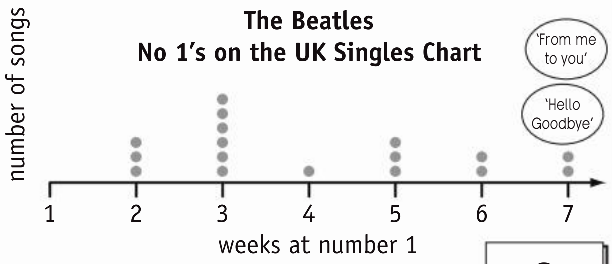
Which congruence test (SSS, SAS, AAS, RHS) can be applied to show that triangle ABO is congruent to triangle BCO?



RHS

29. [Statistics]

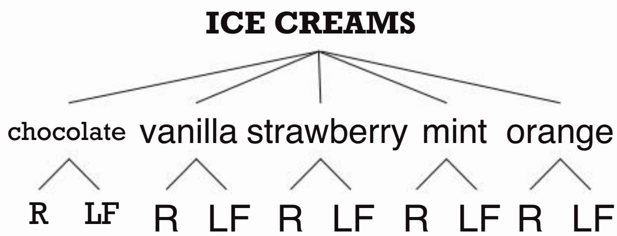
What is the median number of weeks in which The Beatles' songs were at number one on the UK singles chart?



3

30. [Probability]

At the cinema, choc-top ice creams are sold in the following flavours: chocolate, vanilla, strawberry, mint and orange. There are regular and low fat options for all flavours. Liam chooses an ice cream at random. Complete the tree diagram. What is the probability he chooses a vanilla ice cream? [Give the answer as a fraction in simplest form.]



$\frac{1}{5}$

31. [Problem Solving 1]

If you have 5¢, 10¢ and 20¢ coins, in how many ways can you make up 50 cents?

12

32. [Problem Solving 2]

How many numbers between 401 and 501 are divisible by both 4 and 5?

5

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

Test 7

Covering worksheets 4.1 - 4.4

Name: ....

1. [Long ×,÷]
$184 \times 130 =$
23 920

2. [Decimal +,−]
$1 - 0.083 =$
0.917

3. [Decimal ×,÷]
$0.31 \div 0.01 =$
31

4. [Fraction +,−]
$\frac{1}{2} + \frac{2}{5} =$
$\frac{9}{10}$

5. [Fraction ×,÷]
$\frac{3}{4} \times \frac{4}{6} =$
$\frac{1}{2}$

6. [Percentages]
Decrease 500 by 20%.
400

7. [Decimals / Fractions / Percentages]
Which is greater?
60% or $\frac{3}{4}$
$\frac{3}{4}$

8. [Integer +,−]
$(+8) + (-5) + (-9) =$
−6

9. [Integer ×,÷]
$(+1) \times (-8) \times (-9) =$
72

10. [Rates / Ratios]
In the workplace an average typist can type 1200 words in 20 minutes. What is this rate in words per minute?
60 words/min

11. [Indices]
Simplify $n^5 \div n^2$
n^3

12. [Square Roots]
$2\sqrt{9} + \sqrt{9} =$
9

13. [Exploring Number]
Is −7.5 a whole number, an integer or a rational number?
rational

14. [Financial Mathematics]
Marcie invests \$500 for 3 years at an interest rate of 8% per year. Using $SI = PRT$, how much does Marcie have at the end of 3 years?
[Hint: Principal + interest.]
\$620

15. [Number Patterns]
If the general rule of a sequence is $3n - 4$ find the 18th term ($n = 18$).
50

16. [Expressions]
Simplify $10x \div 2x$
5

17. [Substitution]
If $y = -8 - x$, find y when $x = -5$
−3

18. [Expansion]
Expand and simplify
$5(yz - 1) + 4(yz - 2)$
$9yz - 13$

19. [Factorisation]
Factorise
$d(d + 3) - 7(d + 3)$
$(d + 3)(d - 7)$

20. [Equations]
Solve the inequation:
$\frac{x}{2} + 4 < 8$
$x < 8$

21. [Coordinate Geometry]
Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line passing through the points (−2,3) and (−1,−6).
−9

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

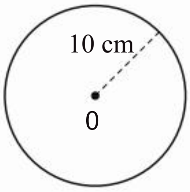
22. [Units of Measurement / Time]

The human body carries approximately 4.7 litres of blood. Express this in millilitres.

4700 mL

23. [Perimeter / Area]

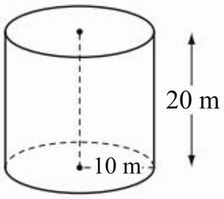
Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



62.8 cm

24. [Surface Area]

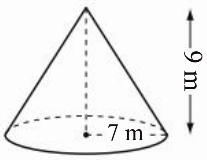
Using $TSA = 2\pi r(r + h)$ and $\pi \approx 3.14$, find the total surface area of the cylinder.



1884 m^2

25. [Volume]

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

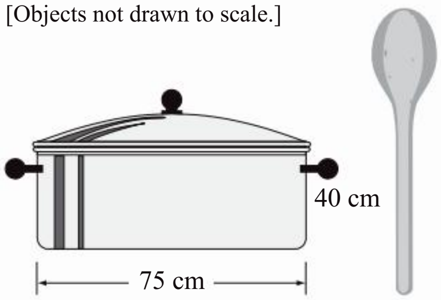


462 m^3

26. [Pythagoras]

Can a spoon, 80 cm long, fit inside the pot with its lid on?

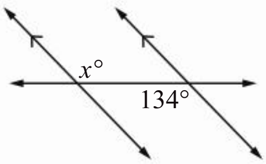
[Objects not drawn to scale.]



yes

27. [Angles]

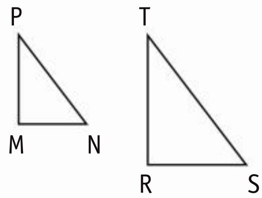
Find the value of $x°$.



134°

28. [Geometric Reasoning]

Complete the ratios of corresponding sides for these similar triangles.



$$\frac{MN}{RS} = \frac{NP}{ST} = \frac{PM}{TR}$$

29. [Statistics]

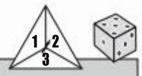
Find the median and range of the following distribution.

Score	0	1	2	3	4
Frequency	2	7	8	3	5

median = 2 range = 4

30. [Probability]

A standard die is tossed and a spinner labelled 1, 2 and 3 is spun. Complete the table. What is the probability of obtaining a difference less than 2 when the die is tossed and the spinner is spun once? [Give the answer as a fraction in simplest form.]



Difference		Die					
		1	**2**	**3**	**4**	**5**	**6**
Spinner	**1**	0	1	2	3	4	5
	2	1	0	1	2	3	4
	3	2	1	0	1	2	3

$\frac{4}{9}$

31. [Problem Solving 1]

How many numbers are there from 10 to 99 in which the digits differ by 3?

13

32. [Problem Solving 2]

What is the last digit of the number 2^{2012}?

6

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

MAUVE

Test 7

Covering worksheets 4.1 - 4.4

Name: ....

1. [Long ×, ÷]
$297 \times 120 =$
35 640

2. [Decimal +,–]
$1 - 0.039 =$
0.961

3. [Decimal ×,÷]
$0.12 \div 0.01 =$
12

4. [Fraction +,–]
$\frac{2}{3} + \frac{1}{4} =$
$\frac{11}{12}$

5. [Fraction ×,÷]
$\frac{3}{10} \times \frac{2}{3} =$
$\frac{1}{5}$

6. [Percentages]
Decrease 60 by 5%.
57

7. [Decimals / Fractions / Percentages]
Which is greater?
0.25 or $\frac{1}{2}$
$\frac{1}{2}$

8. [Integer +,–]
$(+9) + (-4) + (-7) =$
–2

9. [Integer ×,÷]
$(+2) \times (-6) \times (-3) =$
36

10. [Rates / Ratios]
An adult breathes around 480 times per hour. What is the breathing rate of an adult in breaths per minute?
8 breaths/min

11. [Indices]
Simplify $t^6 \div t^3$
t^3

12. [Square Roots]
$2\sqrt{4} + 2\sqrt{4} =$
8

13. [Exploring Number]
Is $-\frac{9}{3}$ a whole number or an integer?
integer

14. [Financial Mathematics]
Carl invests $500 for 4 years at an interest rate of 8% per year. Using $SI = PRT$, how much does Carl have at the end of that time?
[Hint: Principal + interest.]
$660

15. [Number Patterns]
If the general rule of a sequence is $5n - 3$ find the 14th term ($n = 14$).
67

16. [Expressions]
Simplify $14q \div 2q$
7

17. [Substitution]
If $y = -9 - x$, find y when $x = -6$
–3

18. [Expansion]
Expand and simplify
$5(ab - 5) + 3(ab + 9)$
$8ab + 2$

19. [Factorisation]
Factorise
$k(k + 5) - 8(k + 5)$
$(k + 5)(k - 8)$

20. [Equations]
Solve the inequation:
$\frac{x}{2} + 3 \geq 9$
$x \geq 12$

21. [Coordinate Geometry]
Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the gradient of the line passing through the points (2,–1) and (–3,4).
–1

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

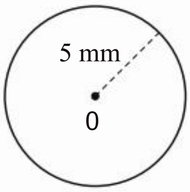
22. [Units of Measurement / Time]

It takes on average approximately 500 L of water to grow one orange. Write this in millilitres.

500 000 mL

23. [Perimeter / Area]

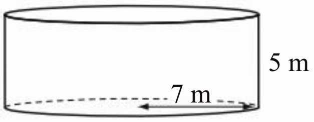
Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



31.4 mm

24. [Surface Area]

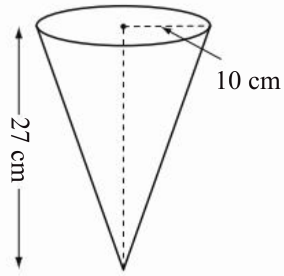
Using $TSA = 2\pi r(r + h)$ and $\pi \approx \frac{22}{7}$, find the total surface area of the cylinder.



528 m^2

25. [Volume]

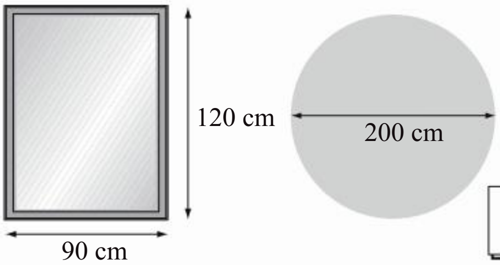
Using $V = \frac{\pi r^2 h}{3}$ and $\pi \approx 3.14$, find the volume of the cone.



2826 cm^3

26. [Pythagoras]

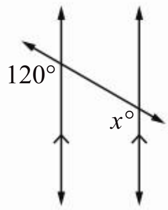
Can a circular table top with a diameter of 200 cm fit through a rectangular window with dimensions 90 cm wide and 120 cm high?
[Objects not drawn to scale.]



no

27. [Angles]

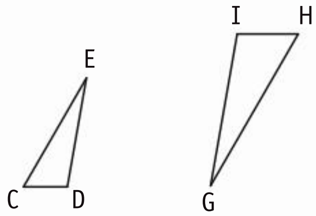
Find the value of $x°$.



120°

28. [Geometric Reasoning]

Complete the pairs of equal angles for these similar triangles.



$\angle C = \angle H$, $\angle D = \angle I$, $\angle E = \angle G$

29. [Statistics]

Find the median and mode of the following distribution.

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

median = 5 mode = 6

30. [Probability]

A pair of standard dice are rolled. Complete the table. What is the probability of rolling a total less than 8? [Give the answer as a fraction in simplest form.]

Total value		Die 1					
		1	**2**	**3**	**4**	**5**	**6**
Die 2	**1**	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

$\frac{7}{12}$

31. [Problem Solving 1]

How many numbers are there from 10 to 99 in which the digits differ by 5?

9

32. [Problem Solving 2]

What is the last digit of the number 3^{2012}?

1

MATHS MATE

MAUVE

Test 8

Covering worksheets 4.5 - 4.8

Name: ....

1. [Long ×,÷]

$982 \div 8 =$ **122.75**

2. [Decimal +,−]

$4 - 0.379 =$ **3.621**

3. [Decimal ×,÷]

$0.6 \div 0.3 =$ **2**

4. [Fraction +,−]

$2\frac{3}{4} + 3\frac{2}{4} =$ $6\frac{1}{4}$

5. [Fraction ×,÷]

$\frac{5}{6} \div 10 =$ $\frac{1}{12}$

6. [Percentages]

The dried flowers weighed 45 g or 30% of their fresh weight. What was the fresh weight of the flowers in grams?

150 g

7. [Decimals / Fractions / Percentages]

$0.1\dot{6}$ is the notation for:

A) 0.16666.....
B) 0.161616.....
C) 0.111666.....

A

8. [Integer +,−]

$(-8) - (-9) + (-14) =$ **−13**

9. [Integer ×,÷]

$(-4) \times (+5) \div (+5) =$ **−4**

10. [Rates / Ratios]

If 9 m of fabric costs \$120, what is the cost of 6 m of the same fabric?

\$ 80

11. [Indices]

Simplify $3z^4 \times 2z^2$ $6z^6$

12. [Square Roots]

$\frac{6\sqrt{100}}{2\sqrt{25}} =$ **6**

13. [Exploring Number]

Which numbers are rational?

A) 2.172593498... B) $-\frac{8}{3}$

C) $\sqrt{7}$ D) $-4.\dot{7}\dot{6}$

B and D

14. [Financial Mathematics]

Qi's smart phone is now worth \$80 or 40% of its original cost. How much did Qi originally pay for the phone?

\$200

15. [Number Patterns]

position	1	2	3	4	5	....	n
term	9	15	21	27	33	....	?

The rule for the term in position n is:

A) $3n + 6$ B) $9n - 3$
C) $6n + 3$ D) $3n + 3$

C

16. [Expressions]

Simplify $2c + d + c - 3d$ $3c - 2d$

17. [Substitution]

If $a = 4$ and $b = 2$,

find the value of $\frac{a}{3} + \frac{b}{5}$ $1\frac{11}{15}$

18. [Expansion]

Expand and simplify $(a + 2)(a - 4)$ $a^2 - 2a - 8$

19. [Factorisation]

Factorise $t^2 - 49$ $(t + 7)(t - 7)$

20. [Equations]

Solve for x: $(x + 7)(x - 3) = 0$ **−7, 3**

21. [Coordinate Geometry]

Complete the table of values for the non-linear rule $y = x^2 - 1$ (parabola).

x	−2	−1	0	1	2
y	3	0	−1	0	3

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

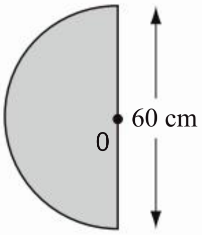
22. [Units of Measurement / Time]

The area of the Red Square in Moscow is 2.3 hectares. Express the area in m^2.

$23\,000\ m^2$

23. [Perimeter / Area]

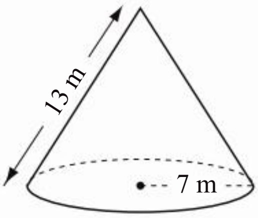
Using $A = \pi r^2$ where $\pi \approx 3.14$, find the area of the semicircle.



$1413\ cm^2$

24. [Surface Area]

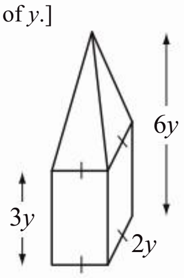
Use $TSA = \pi r(r + s)$ and $\pi \approx \frac{22}{7}$ to find the total surface area of the cone.



$440\ m^2$

25. [Volume]

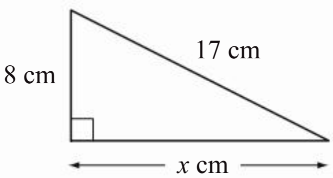
Write an algebraic expression for the volume V of the square prism which has a regular square pyramid on top. [Express the answer in terms of y.]



$V = 16y^3$

26. [Pythagoras]

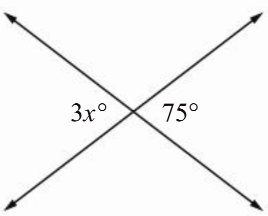
Find the perimeter of the right-angled triangle by first calculating the missing side length.



40 cm

27. [Angles]

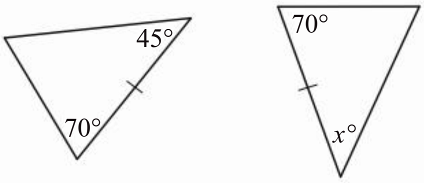
Find the value of $x°$.



25°

28. [Geometric Reasoning]

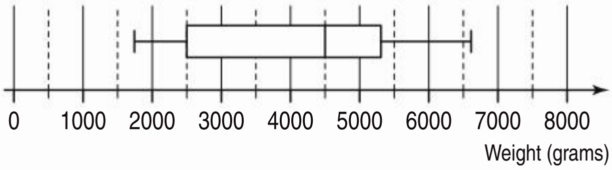
Find the value of $x°$ in this pair of congruent triangles.



45°

29. [Statistics]

The box-and-whisker plot shows weights of a set of ten-pin bowling balls used in a game. Find the median and lower quartile (LQ).



median = 4500 LQ = 2500

30. [Probability]

A bowl contains 20 marbles numbered 1 to 20. A marble is drawn from the bowl. Find the probability of drawing a multiple of 3 or a multiple of 8. [Give the answer as a fraction in simplest form.]

$\frac{2}{5}$

31. [Problem Solving 1]

The table below shows the team standings after 2 rounds of the 2018 Soccer World Cup. Who did Tunisia play in its third round robin game? [Each team plays each 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 G TEAMS	MP matches played	W wins	D draws	L losses	GF goals for	GA goals against	Pts points
Belgium	2	2	0	0	8	2	6
England	2	2	0	0	8	2	6
Tunisia	2	0	0	2	3	7	0
Panama	2	0	0	2	1	9	0

Tunisia **vs** Panama

32. [Problem Solving 2]

In a quiz, Martha starts with 100 points. She wins 10 points for each correct answer and loses 4 points for each incorrect answer. If Martha answers forty questions, what is the least number of questions she must answer correctly to finish with a score of over 300?

26

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

Test 8

Covering worksheets 4.5 - 4.8

Name: ....

1. [Long ×,÷]
$297 \div 4 =$ **74.25**

2. [Decimal +,–]
$3 - 0.746 =$ **2.254**

3. [Decimal ×,÷]
$0.9 \div 0.3 =$ **3**

4. [Fraction +,–]
$3\frac{5}{6} + 1\frac{2}{6} =$ $\mathbf{5\frac{1}{6}}$

5. [Fraction ×,÷]
$\frac{3}{8} \div 12 =$ $\mathbf{\frac{1}{32}}$

6. [Percentages]
Of the total number of visitors, 33 or 55% paid full fare. How many visitors arrived altogether? **60**

7. [Decimals / Fractions / Percentages]
$0.4\dot{3}$ is the notation for:
A) 0.434343.....
B) 0.4333.....
C) 0.444333.....
B

8. [Integer +,–]
$(-7) - (-9) + (-16) =$ **–14**

9. [Integer ×,÷]
$(-10) \times (+3) \div (+6) =$ **–5**

10. [Rates / Ratios]
I can buy four exercise books for \$6. How many exercise books can I buy for \$24? **16**

11. [Indices]
Simplify $2z^5 \times 4z^3$ $\mathbf{8z^8}$

12. [Square Roots]
$\frac{12\sqrt{36}}{3\sqrt{4}} =$ **12**

13. [Exploring Number]
Which numbers are rational?
A) 3.141592653... B) $\frac{13}{100}$
C) –2.252525... D) $-\sqrt{80}$
B and C

14. [Financial Mathematics]
Jelena's car is now worth \$2200 or 20% of its original cost. How much did Jelena originally pay for the car? **\$11 000**

15. [Number Patterns]

position	1	2	3	4	5	....	n
term	3	7	11	15	19	....	?

The rule for the term in position n is:
A) $4n - 2$ B) $2n + 1$
C) $2n - 1$ D) $4n - 1$
D

16. [Expressions]
Simplify $4x - 4y - 2x + y$ $\mathbf{2x - 3y}$

17. [Substitution]
If $a = 1$ and $b = 9$,
find the value of $\frac{a}{4} + \frac{b}{7}$ $\mathbf{1\frac{15}{28}}$

18. [Expansion]
Expand and simplify
$(e - 3)(e + 2)$ $\mathbf{e^2 - e - 6}$

19. [Factorisation]
Factorise $25 - k^2$ $\mathbf{(5 + k)(5 - k)}$

20. [Equations]
Solve for x:
$(x + 2)(x - 6) = 0$ **–2, 6**

21. [Coordinate Geometry]
Complete the table of values for the non-linear rule $y = x^2 - 4$ (parabola).

x	–2	–1	0	1	2
y	0	–3	–4	–3	0

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

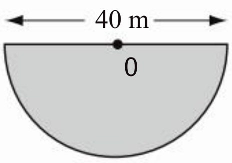
22. [Units of Measurement / Time]

Kakadu National Park has an area of 13 073 km^2. Express this in hectares (ha).

1 307 300 ha

23. [Perimeter / Area]

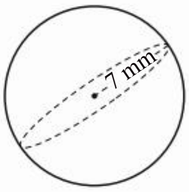
Using $A = \pi r^2$ where $\pi \approx 3.14$, find the area of the semicircle.



628 m^2

24. [Surface Area]

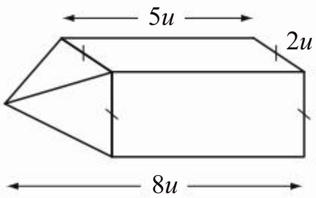
Using $TSA = 4\pi r^2$ and $\pi \approx \frac{22}{7}$, find the total surface area of the sphere.



616 mm^2

25. [Volume]

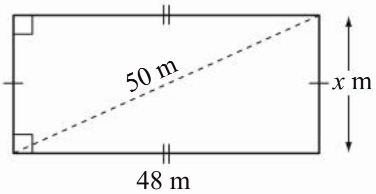
Write an algebraic expression for the volume V of the square prism which has a regular square pyramid on top. [Express the answer in terms of u.]



$V = 24u^3$

26. [Pythagoras]

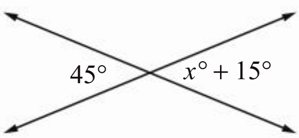
Find the perimeter of the rectangle by first calculating the missing side length.



124 m

27. [Angles]

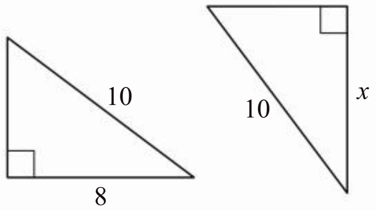
Find the value of $x°$.



30°

28. [Geometric Reasoning]

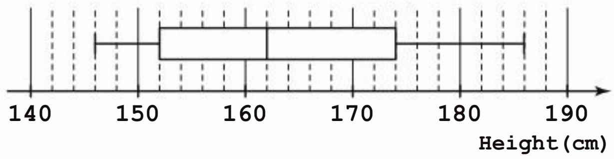
Find the value of x in this pair of congruent triangles. [All measurements are in cm.]



8

29. [Statistics]

The box-and-whisker plot shows a set of student heights. Find the median and upper quartile (UQ).



median = 162 UQ = 174

30. [Probability]

A jar contains 8 black, 5 purple and 3 red jelly beans. Find the probability that a jelly bean drawn at random from the jar will be red or purple. [Give the answer as a fraction in simplest form.]

$\frac{1}{2}$

31. [Problem Solving 1]

The table below shows the team standings after 2 rounds of the 2018 Soccer World Cup. Who did Egypt play in its third round robin game? [Each team plays each 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 TEAMS	MP matches played	W wins	D draws	L losses	GF goals for	GA goals against	Pts points
Russia	2	2	0	0	8	1	6
Uruguay	2	2	0	0	2	0	6
Egypt	2	0	0	2	1	4	0
Saudi Arabia	2	0	0	2	0	6	0

Egypt vs Saudi Arabia

32. [Problem Solving 2]

In a quiz show, Clara won 20 points for each correct answer and lost 30 points for each incorrect answer. After 30 questions her score was zero. How many correct answers did she have?

18

22 23 24 25 26 27 28 29 30 31 32

MATHS MATE

MAUVE

Teacher Resource

MATHS MATE

MAUVE

Name: ....

Class: ....

Teacher: ....

Worksheet Results

Term 1

Strand	Topic	Sheet 1	Sheet 2	Sheet 3	Sheet 4	Skill Builder links	Sheet 5	Sheet 6	Sheet 7	Sheet 8	Skill Builder links
NUMBER	1. [Long ×,÷]	1	1	1	1	1.1	1	1	1	1	1.5
	2. [Decimal +,–]	2	2	2	2	2.1	2	2	2	2	2.1
	3. [Decimal ×,÷]	3	3	3	3	3.1	3	3	3	3	3.2
	4. [Fraction +,–]	4	4	4	4	4.1,2	4	4	4	4	4.1,2
	5. [Fraction ×,÷]	5	5	5	5	5.1	5	5	5	5	5.5
	6. [Percentages]	6	6	6	6	6.1,2	6	6	6	6	6.3
	7. [Decimals / Fractions / Percentages]	7	7	7	7	7.1,2	7	7	7	7	7.3
	8. [Integer +,–]	8	8	8	8	8.1	8	8	8	8	8.2
	9. [Integer ×,÷]	9	9	9	9	9.1	9	9	9	9	9.2
	10. [Rates / Ratios]	10	10	10	10	10.1	10	10	10	10	10.2,3
	11. [Indices]	11	11	11	11	11.1	11	11	11	11	11.1
	12. [Square Roots]	12	12	12	12	12.1	12	12	12	12	12.2
	13. [Exploring Number]	13	13	13	13	13.1	13	13	13	13	13.2
	14. [Financial Mathematics]	14	14	14	14	14.1	14	14	14	14	14.2
	15. [Number Patterns]	15	15	15	15	15.1	15	15	15	15	15.2
ALGEBRA	16. [Expressions]	16	16	16	16	16.1	16	16	16	16	16.1
	17. [Substitution]	17	17	17	17	17.1	17	17	17	17	17.2
	18. [Expansion]	18	18	18	18	18.1	18	18	18	18	18.1
	19. [Factorisation]	19	19	19	19	19.1	19	19	19	19	19.1
	20. [Equations]	20	20	20	20	20.1	20	20	20	20	20.2
	21. [Coordinate Geometry]	21	21	21	21	21.1	21	21	21	21	21.2,3
MEASUREMENT	22. [Units of Measurement / Time]	22	22	22	22	22.1	22	22	22	22	22.2
	23. [Perimeter / Area]	23	23	23	23	23.1	23	23	23	23	23.5
	24. [Surface Area]	24	24	24	24	24.1	24	24	24	24	24.2
	25. [Volume]	25	25	25	25	25.1	25	25	25	25	25.2
	26. [Pythagoras]	26	26	26	26	26.1	26	26	26	26	26.2
SPACE	27. [Angles]	27	27	27	27	27.1	27	27	27	27	27.2
	28. [Geometric Reasoning]	28	28	28	28	28.1,2,3	28	28	28	28	28.4
STAT.	29. [Statistics]	29	29	29	29	29.1,3,4	29	29	29	29	29.2,3,4
PROB.	30. [Probability]	30	30	30	30	30.1	30	30	30	30	30.2
PROBLEM SOLVING	31. [Problem Solving 1]	31	31	31	31	Hints & Solutions	31	31	31	31	Hints & Solutions
	32. [Problem Solving 2]	32	32	32	32	Hints & Solutions	32	32	32	32	Hints & Solutions
	Total Correct										

MATHS MATE

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Name: ....

Class: ....

Teacher: ....

Worksheet Results

Term 2

		Sheet 1	Sheet 2	Sheet 3	Sheet 4	Skill Builder links	Sheet 5	Sheet 6	Sheet 7	Sheet 8	Skill Builder links
NUMBER	1. [Long ×,÷]	1	1	1	1	1.2	1	1	1	1	1.4,6
	2. [Decimal +,–]	2	2	2	2	2.2	2	2	2	2	2.1
	3. [Decimal ×,÷]	3	3	3	3	3.3	3	3	3	3	3.4
	4. [Fraction +,–]	4	4	4	4	4.1,2	4	4	4	4	4.3,4
	5. [Fraction ×,÷]	5	5	5	5	5.2	5	5	5	5	5.5
	6. [Percentages]	6	6	6	6	6.4	6	6	6	6	6.5
	7. [Decimals / Fractions / Percentages]	7	7	7	7	7.4,5	7	7	7	7	7.6,7
	8. [Integer +,–]	8	8	8	8	8.1	8	8	8	8	8.2
	9. [Integer ×,÷]	9	9	9	9	9.1	9	9	9	9	9.2
	10. [Rates / Ratios]	10	10	10	10	10.4	10	10	10	10	10.5,6,7
	11. [Indices]	11	11	11	11	11.2	11	11	11	11	11.3
	12. [Square Roots]	12	12	12	12	12.3	12	12	12	12	12.4
	13. [Exploring Number]	13	13	13	13	13.3,4	13	13	13	13	13.5,6
	14. [Financial Mathematics]	14	14	14	14	14.3	14	14	14	14	14.4
	15. [Number Patterns]	15	15	15	15	15.3	15	15	15	15	15.4
ALGEBRA	16. [Expressions]	16	16	16	16	16.2	16	16	16	16	16.3
	17. [Substitution]	17	17	17	17	17.3	17	17	17	17	17.4
	18. [Expansion]	18	18	18	18	18.2	18	18	18	18	18.3
	19. [Factorisation]	19	19	19	19	19.2	19	19	19	19	19.3
	20. [Equations]	20	20	20	20	20.3	20	20	20	20	20.4
	21. [Coordinate Geometry]	21	21	21	21	21.4,5	21	21	21	21	21.6,7
MEASUREMENT	22. [Units of Measurement / Time]	22	22	22	22	22.2,4	22	22	22	22	22.5
	23. [Perimeter / Area]	23	23	23	23	23.1	23	23	23	23	23.6,7,9
	24. [Surface Area]	24	24	24	24	24.3	24	24	24	24	24.4
	25. [Volume]	25	25	25	25	25.2	25	25	25	25	25.2
	26. [Pythagoras]	26	26	26	26	26.3	26	26	26	26	26.4
SPACE	27. [Angles]	27	27	27	27	27.3	27	27	27	27	27.4
	28. [Geometric Reasoning]	28	28	28	28	28.5,7	28	28	28	28	28.8
STAT.	29. [Statistics]	29	29	29	29	29.5,6,7	29	29	29	29	29.9
PROB.	30. [Probability]	30	30	30	30	30.2	30	30	30	30	30.2
PROBLEM SOLVING	31. [Problem Solving 1]	31	31	31	31	Hints & Solutions	31	31	31	31	Hints & Solutions
	32. [Problem Solving 2]	32	32	32	32	Hints & Solutions	32	32	32	32	Hints & Solutions
	Total Correct										

MATHS MATE

Name: ....

Class: ....

Teacher: ....

Worksheet Results

Term 3

		Sheet 1	Sheet 2	Sheet 3	Sheet 4	Skill Builder links	Sheet 5	Sheet 6	Sheet 7	Sheet 8	Skill Builder links
NUMBER	1. [Long ×,÷]	1	1	1	1	1.2	1	1	1	1	1.4,7
	2. [Decimal +,–]	2	2	2	2	2.2	2	2	2	2	2.4
	3. [Decimal ×,÷]	3	3	3	3	3.5	3	3	3	3	3.6
	4. [Fraction +,–]	4	4	4	4	4.5	4	4	4	4	4.6,9
	5. [Fraction ×,÷]	5	5	5	5	5.2	5	5	5	5	5.6
	6. [Percentages]	6	6	6	6	6.4,6	6	6	6	6	6.7
	7. [Decimals / Fractions / Percentages]	7	7	7	7	7.8,9	7	7	7	7	7.10,11
	8. [Integer +,–]	8	8	8	8	8.1	8	8	8	8	8.2
	9. [Integer ×,÷]	9	9	9	9	9.3	9	9	9	9	9.2
	10. [Rates / Ratios]	10	10	10	10	10.8,9	10	10	10	10	10.10,11
	11. [Indices]	11	11	11	11	11.3	11	11	11	11	11.4
	12. [Square Roots]	12	12	12	12	12.5	12	12	12	12	12.6
	13. [Exploring Number]	13	13	13	13	13.7	13	13	13	13	13.5,6
	14. [Financial Mathematics]	14	14	14	14	14.5	14	14	14	14	14.6
	15. [Number Patterns]	15	15	15	15	15.5	15	15	15	15	15.6
ALGEBRA	16. [Expressions]	16	16	16	16	16.4	16	16	16	16	16.5
	17. [Substitution]	17	17	17	17	17.5	17	17	17	17	17.6
	18. [Expansion]	18	18	18	18	18.4	18	18	18	18	18.5
	19. [Factorisation]	19	19	19	19	19.4	19	19	19	19	19.4
	20. [Equations]	20	20	20	20	20.5	20	20	20	20	20.6
	21. [Coordinate Geometry]	21	21	21	21	21.8,9	21	21	21	21	21.10,11
MEASUREMENT	22. [Units of Measurement / Time]	22	22	22	22	22.6	22	22	22	22	22.7
	23. [Perimeter / Area]	23	23	23	23	23.1,2	23	23	23	23	23.10
	24. [Surface Area]	24	24	24	24	24.5	24	24	24	24	24.6
	25. [Volume]	25	25	25	25	25.3	25	25	25	25	25.4
	26. [Pythagoras]	26	26	26	26	26.6	26	26	26	26	26.7
SPACE	27. [Angles]	27	27	27	27	27.5	27	27	27	27	27.6
	28. [Geometric Reasoning]	28	28	28	28	28.9	28	28	28	28	28.10
STAT.	29. [Statistics]	29	29	29	29	29.10	29	29	29	29	29.11
PROB.	30. [Probability]	30	30	30	30	30.3	30	30	30	30	30.4
PROBLEM SOLVING	31. [Problem Solving 1]	31	31	31	31	Hints & Solutions	31	31	31	31	Hints & Solutions
	32. [Problem Solving 2]	32	32	32	32	Hints & Solutions	32	32	32	32	Hints & Solutions
	Total Correct										

MATHS MATE

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Name: ....

Class: ....

Teacher: ....

Worksheet Results

Term 4

		Sheet 1	Sheet 2	Sheet 3	Sheet 4	Skill Builder links	Sheet 5	Sheet 6	Sheet 7	Sheet 8	Skill Builder links
NUMBER	1. [Long ×,÷]	1	1	1	1	1.3	1	1	1	1	1.4,8
	2. [Decimal +,–]	2	2	2	2	2.3	2	2	2	2	2.3
	3. [Decimal ×,÷]	3	3	3	3	3.7	3	3	3	3	3.8
	4. [Fraction +,–]	4	4	4	4	4.7,8,10,11	4	4	4	4	4.3,4
	5. [Fraction ×,÷]	5	5	5	5	5.2	5	5	5	5	5.7
	6. [Percentages]	6	6	6	6	6.8	6	6	6	6	6.9
	7. [Decimals / Fractions / Percentages]	7	7	7	7	7.12	7	7	7	7	7.13,14
	8. [Integer +,–]	8	8	8	8	8.3	8	8	8	8	8.3
	9. [Integer ×,÷]	9	9	9	9	9.1	9	9	9	9	9.4
	10. [Rates / Ratios]	10	10	10	10	10.12,13	10	10	10	10	10.14
	11. [Indices]	11	11	11	11	11.4	11	11	11	11	11.5,6
	12. [Square Roots]	12	12	12	12	12.7	12	12	12	12	12.5,6,7
	13. [Exploring Number]	13	13	13	13	13.8,9	13	13	13	13	13.9
	14. [Financial Mathematics]	14	14	14	14	14.7	14	14	14	14	14.8
	15. [Number Patterns]	15	15	15	15	15.7	15	15	15	15	15.8,9
ALGEBRA	16. [Expressions]	16	16	16	16	16.6	16	16	16	16	16.4
	17. [Substitution]	17	17	17	17	17.7	17	17	17	17	17.8
	18. [Expansion]	18	18	18	18	18.5	18	18	18	18	18.7
	19. [Factorisation]	19	19	19	19	19.6,7	19	19	19	19	19.8
	20. [Equations]	20	20	20	20	20.7	20	20	20	20	20.8,10
	21. [Coordinate Geometry]	21	21	21	21	21.12,13	21	21	21	21	21.14
MEASUREMENT	22. [Units of Measurement / Time]	22	22	22	22	22.8	22	22	22	22	22.9
	23. [Perimeter / Area]	23	23	23	23	23.3,4	23	23	23	23	23.11,12
	24. [Surface Area]	24	24	24	24	24.7	24	24	24	24	24.7
	25. [Volume]	25	25	25	25	25.4	25	25	25	25	25.5
	26. [Pythagoras]	26	26	26	26	26.8	26	26	26	26	26.9
SPACE	27. [Angles]	27	27	27	27	27.7	27	27	27	27	27.8
	28. [Geometric Reasoning]	28	28	28	28	28.11	28	28	28	28	28.12,13
STAT.	29. [Statistics]	29	29	29	29	29.12	29	29	29	29	29.13,14
PROB.	30. [Probability]	30	30	30	30	30.5	30	30	30	30	30.6
PROBLEM SOLVING	31. [Problem Solving 1]	31	31	31	31	Hints & Solutions	31	31	31	31	Hints & Solutions
	32. [Problem Solving 2]	32	32	32	32	Hints & Solutions	32	32	32	32	Hints & Solutions
	Total Correct										

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Name: ....

Class: ....

Teacher: ....

Test Results

Strand	Topic	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
NUMBER	1. [Long ×,÷]	1	1	1	1	1	1	1	1
	2. [Decimal +,–]	2	2	2	2	2	2	2	2
	3. [Decimal ×,÷]	3	3	3	3	3	3	3	3
	4. [Fraction +,–]	4	4	4	4	4	4	4	4
	5. [Fraction ×,÷]	5	5	5	5	5	5	5	5
	6. [Percentages]	6	6	6	6	6	6	6	6
	7. [Decimals / Fractions / Percentages]	7	7	7	7	7	7	7	7
	8. [Integer +,–]	8	8	8	8	8	8	8	8
	9. [Integer ×,÷]	9	9	9	9	9	9	9	9
	10. [Rates / Ratios]	10	10	10	10	10	10	10	10
	11. [Indices]	11	11	11	11	11	11	11	11
	12. [Square Roots]	12	12	12	12	12	12	12	12
	13. [Exploring Number]	13	13	13	13	13	13	13	13
	14. [Financial Mathematics]	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. [Coordinate Geometry]	21	21	21	21	21	21	21	21
MEASUREMENT	22. [Units of Measurement / Time]	22	22	22	22	22	22	22	22
	23. [Perimeter / Area]	23	23	23	23	23	23	23	23
	24. [Surface Area]	24	24	24	24	24	24	24	24
	25. [Volume]	25	25	25	25	25	25	25	25
	26. [Pythagoras]	26	26	26	26	26	26	26	26
SPACE	27. [Angles]	27	27	27	27	27	27	27	27
	28. [Geometric Reasoning]	28	28	28	28	28	28	28	28
STAT.	29. [Statistics]	29	29	29	29	29	29	29	29
PROB.	30. [Probability]	30	30	30	30	30	30	30	30
PROBLEM SOLVING	31. [Problem Solving 1]	31	31	31	31	31	31	31	31
	32. [Problem Solving 2]	32	32	32	32	32	32	32	32
	Total Correct								

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Worksheet Record

Term 1

Class: ....

Teacher: ....

	Worksheet Number	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
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Worksheet Record

Term 2

Class: .... **Teacher**: ....

Worksheet Number	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8
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Worksheet Record

Term 3

Class: .... **Teacher:** ....

Worksheet Number	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
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MATHS MATE

Worksheet Record

Term 4

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