OXFORD
UNIVERSITY PRESS

Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research,
scholarship, and education by publishing worldwide. Oxford is a registered
trademark of Oxford University Press in the UK and in certain other countries.

Published in Australia by
Oxford University Press
253 Normanby Road, South Melbourne, Victoria 3205, Australia

© Harry O'Brien 2018

The moral right of the author has been asserted

First published 2018

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior permission in writing of Oxford University Press, or as expressly permitted by law, by licence, or nnder terms agreed with the reprographics rights organisation. Enquiries concerning reproduction outside the scope of the above should be sent to the Rights Department, Oxford University Press, at the address above.

Yon must not circulate this work in any other form and you must impose this same condition on any acquirer.

ISBN 978 0 19 031074 5

Reproduction and communication for other purposes
The Australian *Copyright Act 1968* (the Act) allows a maximum of one chapter or 10% of the pages of this work, whichever is the greater, to be reproduced and/or communicated by any educational institution for its educational purposes provided that the educational institution (or the body that administers it) has given a remuneration notice to Copyright Agency Limited (CAL) under the Act.



For details of the CAL licence for educational institutions contact:

Copyright Agency Limited
Level 15, 233 Castlereagh Street
Sydney NSW 2000
Telephone: (02) 9394 7600
Facsimile: (02) 9394 7601
Email: info@copyright.com.au

Edited by Rema Gnanadickam, Zodiac Publishing Services
Cover photo by Shutterstock
Text design by Sarah Hazell and Kim Ferguson
Typeset by Newgen KnowledgeWorks Pvt. Ltd., Chennai, India
Illustrated by Gregory Baldwin
Printed in China by Leo Paper Products Ltd

Acknowledgements

All material identified by AC is material subject to copyright under the Copyright Act 1968 (Cth) and is owned by the Australian Curriculum, Assessment and Reporting Authority 2016. For all Australian Curriculum material except elaborations: This is an extract from the Australian Curriculum. Elaborations: This may be a modified extract from the Australian Curriculum and may include the work of other authors. Disclaimer: ACARA neither endorses nor verifies the accuracy of the information provided and accepts no responsibility for incomplete or iuaccurate information. In particular, ACARA does not endorse or verify that: The content descriptions are solely for a particular year and subject; All the content descriptions for that year have been used; and The author's material aligns with the Australian Curriculum content descriptions for the relevant year and subject. You can find the unaltered and most up to date version of this material at http://www.australiancurriculum.edu.au This material is reproduced with the permission of ACARA.

The Victorian Curriculum F–10 content elements are © VCAA, reproduced by permission. Victorian Curriculum F–10 elements accurate at time of publication. The VCAA does not endorse or make any warranties regarding this resource. The Victorian Curriculum F–10 and related content can be accessed directly at the VCAA website.

NSW Mathematics K–10 Syllabus © The Board of Studies, Teaching and Educational Standards NSW for and on behalf of the Crown in the right of the State of New South Wales 2017.

SAMPLE

Fourth Edition

Advanced primary maths

Harry O'Brien

6

SAMPLE

OXFORD
UNIVERSITY PRESS
AUSTRALIA & NEW ZEALAND

CONTENTS

TERM 1

Unit 1

Mental strategies 2
6-digit subtraction 3
Super problem solving 4
Triangles 5

Unit 2

6-digit addition 6
Equivalent fractions 7
Super problem solving/elapsed time 8
Nets of 3D objects 9

Unit 3

Reading and ordering numbers 10
Mental multiplying 11
Super problem solving 12
Dot plot graphs 13

Unit 4

Estimating multiplication 14
Improper fractions and mixed numerals 15
Super problem solving 16
Scale and direction 17
Millimetres/perimeter 18

Unit 5

Roman numerals 19
Order of operations 20
Super problem solving 21
Line graphs 22
Square centimetres and metres 23

Unit 6

Division with fractional remainders 24
Geometric patterns 25
Super problem solving 26
Top, front and side views 27

Unit 7

Finding equivalent fractions 28
Prime and composite numbers 29
Super problem solving 30
Chance 31

Unit 8

Dividing decimals 32
Adding and subtracting like fractions 33
Super problem solving 34
Angles 35
24-hour time/elapsed time 36

Unit 9

Finding unit fractions 37
Strategies 38
Super problem solving 39
Drawing 2D shapes 40
Isometric drawing 41

DIAGNOSTIC Review 1 42

TERM 2

Unit 10

Subtracting decimals 44
Calculator calculating 45
Super problem solving 46
Side-by-side column graphs 47

Unit 11

Adding and subtracting decimals 48
Ordering fractions 49
Super problem solving 50
Drawing 3D objects 51

Unit 12

Multiplying decimals 52
Calculator percentages 53
Super problem solving 54
Chance experiment/posing questions 55

Unit 13

Division to 6 digits 56
Factors and multiples 57
Super problem solving 58
Mapping 59
Tonnes 60

Unit 14

Expanding numbers 61
Decimal place value 62
Super problem solving 63
Diagonals 64
24-hour timetable/elapsed time 65

Unit 15

Reducing fractions 66
Flow charts/branching 67
Super problem solving 68
Square numbers 69

Unit 16

Multiplication by 2 digits 70
Graphing number patterns 71
Super problem solving 72
Rotational symmetry and tessellation 73

Unit 17

Dividing decimals 74
Strategies 75
Super problem solving 76
Chance—tree diagram 77
Circumference and length conversions 78

Unit 18

Larger additions 79
Percentages 80
Super problem solving 81
Investigating 3D objects 82
Scaled square metres 83

DIAGNOSTIC Review 2 84

SAMPLE

CONTENTS

TERM 3

Unit 19

Multiplying fractions by whole numbers 86
Spreadsheets 87
Super problem solving 88
Grid references 89

Unit 20

Subtraction 90
Adding and subtracting mixed numerals 91
Super problem solving 92
Angles 93

Unit 21

Multiplication by 2 digits 94
Triangular numbers/Pascal's triangle 95
Super problem solving 96
Chance predictions 97

Unit 22

Goods and Services Tax (GST) 98
Inverse operations 99
Super problem solving 100
Reflect, translate, rotate 101
Capacity units 102

Unit 23

Decimal remainders 103
Number patterns 104
Super problem solving 105
Negative numbers 106
Grams 107

Unit 24

Geometric patterns 108
Scale problems 109
Super problem solving 110
Two-way tables 111

Unit 25

Multiplications 112
Fractional quantities 113
Super problem solving 114
Potentially misleading data 115

Unit 26

Equal number sentences 116
Purchasing 117
Super problem solving 118
Negative numbers 119
Meridians of longitude 120

Unit 27

Multiplication by 2 digits 121
Number patterns 122
Super problem solving 123
Enlargements 124
Cubic metres 125

DIAGNOSTIC Review 3 126

TERM 4

Unit 28

Expanding numbers 128
Multiplying fractions 129
Super problem solving 130
Range and median 131

Unit 29

Multiplying and dividing decimals 132
Data variation/posing questions 133
Super problem solving 134
Hectares and square kilometres 135

Unit 30

Missing numbers 136
Reasonable or unreasonable 137
Super problem solving 138
Misleading data 139
Metric relationships 140

Unit 31

Multiplication by 3 digits 141
The Cartesian plane 142
Super problem solving 143
The circle 144
Rates 145

Unit 32

Division by 2 digits 146
Describing problems 147
Super problem solving 148
Calculating angles 149

Unit 33

Pronumerals 150
Estimation 151
Super problem solving 152
Mean and mode 153

Unit 34

Long division 154
The Cartesian plane 155
Super problem solving 156
Explaining graphs 157
Timelines 158

Unit 35

Finding percentages 159
Dividing by fractions 160
Super problem solving 161
Making maps 162
Area of triangles 163

DIAGNOSTIC Review 4 164

ANSWERS 166

SAMPLE

A MESSAGE TO TEACHERS

Advanced Primary Maths Fourth Edition is a series of four books for Years 3 to 6 that provide interesting and challenging activities that work towards the achievement standards of the Australian Curriculum and the Victorian Curriculum and the objectives of the NSW Mathematics Syllabus for the Australian Curriculum.

The series provides for an accelerated program of Mathematics that extends itself both horizontally and vertically and addresses all forms of problem solving, including open-ended problem solving.

The books are designed to improve and extend the mathematical ability and knowledge of the majority of students and are not only for those displaying a strong aptitude for mathematics.

For the students

The book extends the ability of the more able students by encouraging them to use their initiative through a variety of exercises such as the Open-ended Challengers that appear in every unit. It also offers solid practice in traditional calculations. Examples are drawn from a broad range of situations and backgrounds of interest to students and presented with clarity throughout.

For the teacher

Advanced Primary Maths Fourth Edition includes features designed to offer teachers maximum flexibility of approach:

- **Term Planners (pages xii to xv):** organise course work, working through the book from beginning to end, following a graded and spiralling approach. This allows for great variety in both presenting work and revisiting concepts throughout the year.
- **Find a topic (page v):** select specific components and tailor them to a more individual teaching program.
- **Australian Curriculum, NSW Syllabus and Victorian Curriculum cross-reference charts (pages vi to xi):** identify where each content description or Outcome is covered in the book.
- **Diagnostic Reviews** at the end of each term can be used to assess the understanding of concepts covered in the preceding units. Every unit also has a ready-made Weekly Tester question for quick assessment.
- **Super Problem Solving pages:** The Australian Curriculum and Victorian Curriculum proficiency strands of Problem Solving and Reasoning, and the NSW Working Mathematically Outcomes, have been specifically addressed in Super Problem Solving pages within every unit.
- **Answers:** included at the back of each book for constant support in any teaching and learning situation.

Teachers in any state in Australia will find the series a valuable resource for the more able sections of their classes.

Coding for this book

Strands

- Number and Algebra
- Measurement and Geometry
- Statistics and Probability
- Problem Solving

Substrands

- Whole Numbers
- Addition and Subtraction
- Multiplication and Division
- Fractions and Decimals
- Patterns and Algebra
- Length
- Area
- Volume and Capacity
- Mass
- Time
- Three-Dimensional Space
- Two-Dimensional Space
- Angles
- Position
- Data
- Chance
- Problem Solving

SAMPLE

Number and Algebra

Whole numbers

Place value 10
Expanding numbers 61, 128
Roman numerals 19, 26, 58
Negative numbers 106, 119
Strategies 2
Square numbers 69
Triangular numbers 95
Factors and multiples 57, 118, 134

Addition and subtraction

Adding 2-, 3-, 4-, 5- and 6-digit numbers 6, 54, 79
Subtracting 2-, 3-, 4-, 5- and 6-digit numbers 3, 90
Money 87, 98, 117, 133, 159

Multiplication and division

Prime and composite numbers 29
Order of operations 20, 30
Multiplication 11, 14, 70, 94, 99, 112, 121, 137, 141
Multiplication by tens 11
Division of 3-, 4- and 5-digit numbers 56, 146, 154
Division with fractional remainders 24, 103
Division with decimal remainders 103

Fractions and decimals

Equivalent fractions 7, 28, 66
Fractions of a collection 37, 38, 113
Adding and subtracting fractions 33, 66
Improper fractions 15
Mixed numerals 15, 91
Multiplying fractions 86, 129
Decimals 62
Adding and subtracting decimals 44, 48
Multiplying and dividing decimals 32, 45, 52, 74, 117, 132
Percentages 53, 80, 96, 98, 156, 159

Problem solving

Problem solving 8, 12, 16, 21, 26, 34, 39, 46, 50, 63, 76, 81, 100, 110, 123, 130, 143, 147, 148, 161

Patterns and algebra

Number patterns 25, 71, 88, 104, 122, 150
Geometric patterns 25, 88, 108
Missing numbers 81, 114, 116, 136, 150
Branching and iteration (some examples) 8, 20, 24, 50, 67, 77, 81, 94, 95, 122, 128, 136, 141, 154, 156
Flow charts 67

Statistics and Probability

Chance

Chance 31, 55, 75, 77, 97

Data representation and interpretation

Column graphs 47, 111
Dot plot graphs 13
Line graphs 22, 71, 139, 157
Rates 145
Data investigations 115, 139
Range and median 131
Mean and mode 153
Spreadsheets 87
Misleading data 115, 139
Posing questions 55, 133

Measurement and Geometry

Units of measurement

Millimetres 18
Metres 83
Kilometres 79
Perimeter 18, 26, 72
Square centimetres 23, 26, 72, 109
Square metres 23, 83, 109
Square kilometres 135
Area of triangles 163
Applying a scale 17, 89
Litres and millilitres 68, 81, 102, 140
Cubic centimetres and cubic metres 125, 140
Kilolitre 102
Megalitre 102
Grams, kilograms and tonnes 60, 107, 140
Mass and capacity 60

Time

24-hour time 36, 65
Timetables 36, 65
Timelines 158
am and pm time notation 36
Time zones 120
Elapsed time 8, 36, 65

Three-dimensional space

Names and properties of 3D objects 9, 82
Nets 9, 82
Top, front and side views 27, 51, 82
Drawing 3D objects 41, 51

Two-dimensional space

Names and properties of 2D shapes 5
Reflect, translate, rotate 101
Rotational symmetry 73
Drawing 2D shapes 40
Enlargements and reductions 124
Measuring angles 5, 35, 59
Circles 78, 144
Diagonals 64, 138
Angles 35, 93, 149, 152

Position

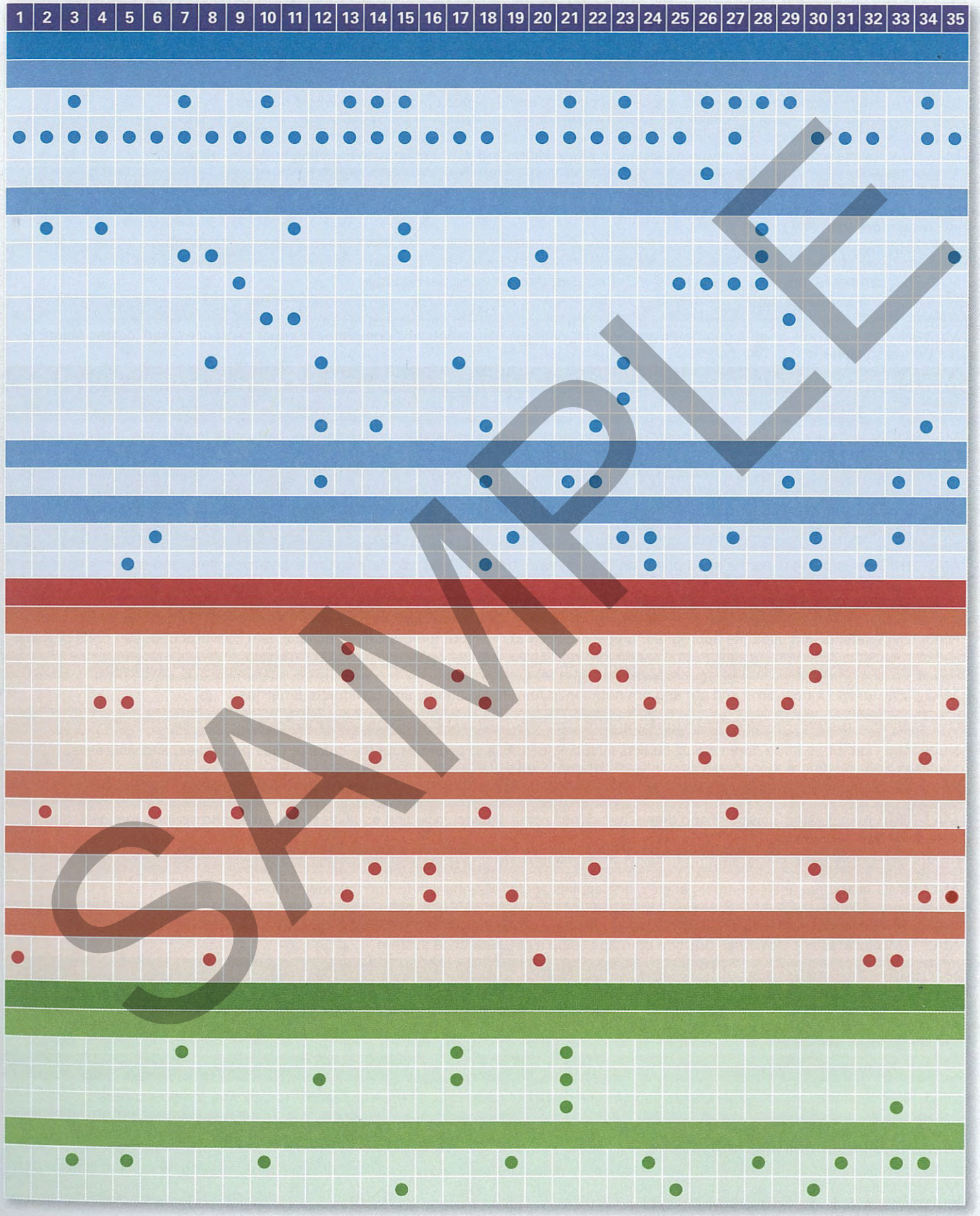
Applying a scale 17
Coordinates 59, 89, 142
Plans and maps 59, 89, 162
Compass points 17, 59
Cartesian plane 142, 155

SAMPLE

AUSTRALIAN CURRICULUM CROSS-REFERENCE CHART

UNIT
Number and Algebra
Number and place value
Identify and describe properties of prime, composite, square and triangular numbers (ACMNA122)
Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
Investigate everyday situations that use integers. Locate and represent these numbers on a number line (ACMNA124)
Fractions and decimals
Compare fractions with related denominators and locate and represent them on a number line (ACMNA125)
Solve problems involving addition and subtraction of fractions with the same or related denominators (ACMNA126)
Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies (ACMNA127)
Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128)
Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (ACMNA129)
Multiply and divide decimals by powers of 10 (ACMNA130)
Make connections between equivalent fractions, decimals and percentages (ACMNA131)
Money and financial mathematics
Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies (ACMNA132)
Patterns and algebra
Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (ACMNA133)
Explore the use of brackets and order of operations to write number sentences (ACMNA134)
Measurement and Geometry
Using units of measurement
Connect decimal representations to the metric system (ACMMG135)
Convert between common metric units of length, mass and capacity (ACMMG136)
Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)
Connect volume and capacity and their units of measurement (ACMMG138)
Interpret and use timetables (ACMMG139)
Shape
Construct simple prisms and pyramids (ACMMG140)
Location and transformation
Investigate combinations of translations, reflections and rotations, with and without the use of digital technologies (ACMMG142)
Introduce the Cartesian coordinate system using all four quadrants (ACMMG143)
Geometric reasoning
Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles (ACMMG141)
Statistics and Probability
Chance
Describe probabilities using fractions, decimals and percentages (ACMSP144)
Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies (ACMSP145)
Compare observed frequencies across experiments with expected frequencies (ACMSP146)
Data representation and interpretation
Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
Interpret secondary data presented in digital media and elsewhere (ACMSP148)

SAMPLE


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

SAMPLE

NSW SYLLABUS CROSS-REFERENCE CHART

UNIT	
Number and Algebra	
Whole Number	**Working Mathematically MA3-1WM MA3-2WM**
MA3-4NA orders, reads and represents integers of any size and describes properties of whole numbers	
Addition and Subtraction	**Working Mathematically MA3-1WM MA3-2WM MA3-3WM**
MA3-5NA selects and applies appropriate strategies for addition and subtraction with counting numbers of any size	
Multiplication and Division	**Working Mathematically MA3 -1WM MA3-2WM MA3-3WM**
MA3-6NA selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation	
Fractions and Decimals	**Working Mathematically MA3 -1WM MA3-2WM MA3-3WM**
MA3-7NA compares, orders and calculates with fractions, decimals and percentages	
Patterns and Algebra	**Working Mathematically MA3-1WM MA3-2WM MA3-3WM**
MA3-8NA analyses and creates geometric and number patterns, constructs and completes number sentences, and locates points on the Cartesian plane	
Measurement and Geometry	
Length	**Working Mathematically MA3-1WM MA3-3WM**
MA3-9MG selects and uses the appropriate unit and device to measure lengths and distances, calculates perimeters, and converts between units of length	
Area	**Working Mathematically MA3-1WM MA3-2WM**
MA3-10MG selects and uses the appropriate unit to calculate areas, including the areas of squares, rectangles and triangles	
Volume and Capacity	**Working Mathematically MA3-1WM MA3-2WM**
MA3-11MG selects and uses the appropriate unit to estimate, measure and calculate volumes and capacities, and converts between units of capacity	
Mass	**Working Mathematically MA3-1WM MA3-2WM MA3-3WM**
MA3-12MG selects and uses the appropriate unit and device to measure the masses of objects, and converts between units of mass	
Time	**Working Mathematically MA3-1WM**
MA3-13MG uses 24-hour time and am and pm notation in real-life situations, and constructs timelines	
Three-Dimensional Space	**Working Mathematically MA3-1WM**
MA3-14MG identifies three-dimensional objects including prisms and pyramids on the basis of their properties, and visualises, sketches and constructs them given drawings of different views	
Two-Dimensional Space	**Working Mathematically MA3-1WM MA3-2WM MA3-3WM**
MA3-15MG manipulates, classifies and draws two-dimensional shapes, including equilateral, isosceles and scalene triangles, and describes their properties	
Angles	**Working Mathematically MA3-1WM**
MA3-16MG measures and constructs angles, and applies angle relationships to find unknown angles	
Position	**Working Mathematically MA3-1WM**
MA3-17MG locates and describes position on maps using a grid-reference system	
Statistics and Probability	
Data	**Working Mathematically MA3-1WM MA3-3WM**
MA3-18SP uses appropriate methods to collect data and constructs, interprets and evaluates data displays, including dot plots, line graphs and two-way tables	
Chance	**Working Mathematically MA3-1WM MA3-3WM**
MA3-19SP conducts chance experiments and assigns probabilities as values between 0 and 1 to describe their outcomes	

Working Mathematically Outcomes

MA3-1WM describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions
MA3-2WM selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations
MA3-3WM gives a valid reason for supporting one possible solution over another

SAMPLE

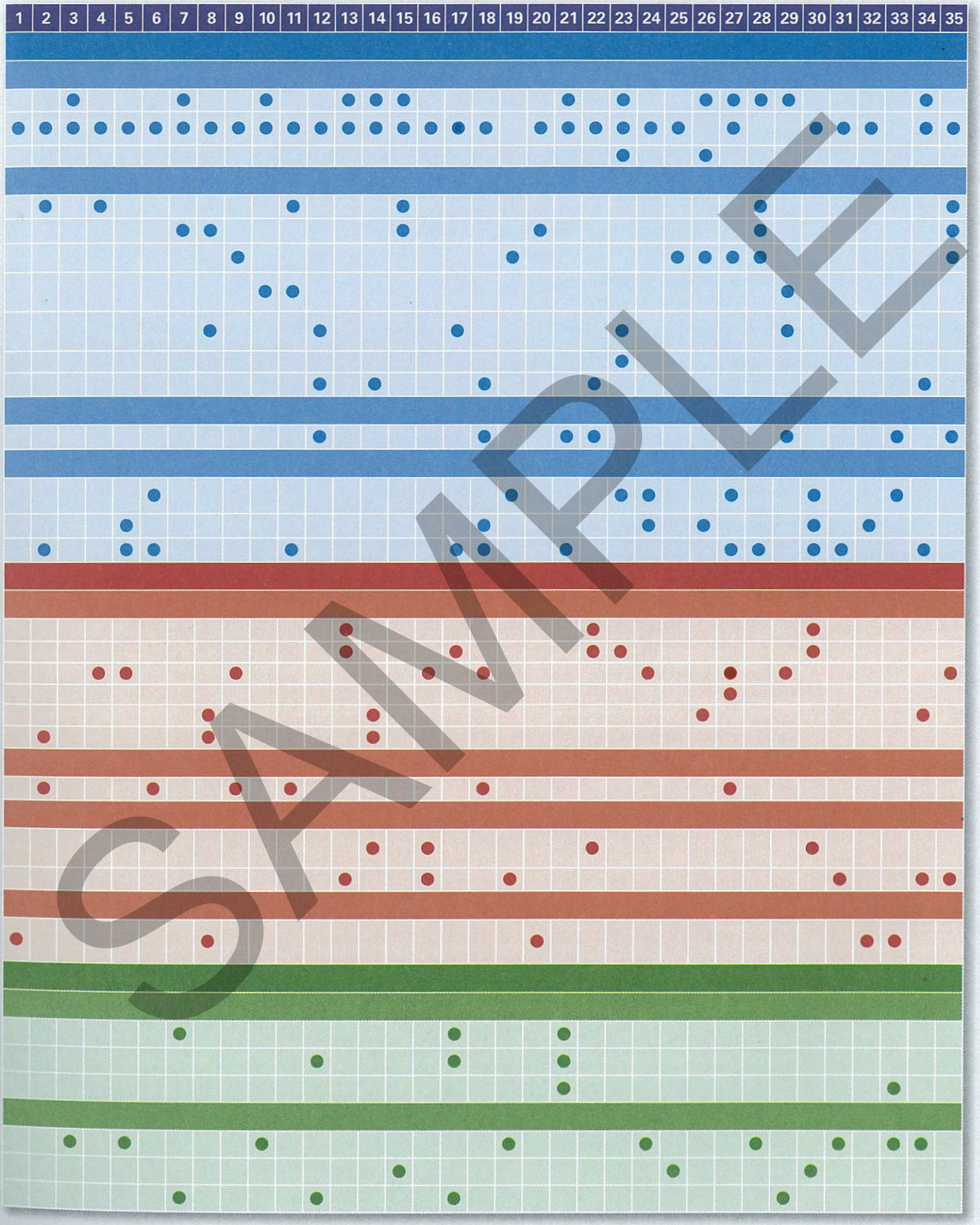

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

SAMPLE

VICTORIAN CURRICULUM CROSS-REFERENCE CHART

UNIT
Number and Algebra
Number and place value
Identify and describe properties of prime, composite, square and triangular numbers (VCMNA208)
Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (VCMNA209)
Investigate everyday situations that use integers. Locate and represent these numbers on a number line (VCMNA210)
Fractions and decimals
Compare fractions with related denominators and locate and represent them on a number line (VCMNA211)
Solve problems involving addition and subtraction of fractions with the same or related denominators (VCMNA212)
Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies (VCMNA213)
Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (VCMNA214)
Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (VCMNA215)
Multiply and divide decimals by powers of 10 (VCMNA216)
Make connections between equivalent fractions, decimals and percentages (VCMNA217)
Money and financial mathematics
Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies (VCMNA218)
Patterns and algebra
Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (VCMNA219)
Explore the use of brackets and order of operations to write number sentences (VCMNA220)
Design algorithms involving branching and iteration to solve specific classes of mathematical problems (VCMNA221)
Measurement and Geometry
Using units of measurement
Connect decimal representations to the metric system (VCMMG222)
Convert between common metric units of length, mass and capacity (VCMMG223)
Solve problems involving the comparison of lengths and areas using appropriate units (VCMMG224)
Connect volume and capacity and their units of measurement (VCMMG225)
Interpret and use timetables (VCMMG226)
Measure, calculate and compare elapsed time (VCMNA227)
Shape
Construct simple prisms and pyramids (VCMMG228)
Location and transformation
Investigate the effect of combinations of transformations on simple and composite shapes, including tessellations, with and without the use of digital technologies (VCMMG229)
Introduce the Cartesian coordinate system using all four quadrants (VCMMG230)
Geometric reasoning
Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles (VCMMG231)
Statistics and Probability
Chance
Describe probabilities using fractions, decimals and percentages (VCMSP232)
Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies (VCMSP233)
Compare observed frequencies across experiments with expected frequencies (VCMSP234)
Data representation and interpretation
Construct, interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (VCMSP235)
Interpret secondary data presented in digital media and elsewhere (VCMSP236)
Pose and refine questions to collect categorical or numerical data by observation or survey (VCMSP237)

SAMPLE


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

SAMPLE

TERM 1 SUGGESTED PLANNER

Week	Unit	Page	Number and Algebra	Measurement and Geometry	Statistics and Probability
1	1	2	Use the compensation strategy to add numbers. Use the jump strategy to add numbers. Solve 6-digit subtractions and problems. Problem solving including conceptual, open-ended, and elapsed time.	Identify right-angle, scalene, equilateral and isosceles triangles. Name various 2D shapes. Elapsed time.	
2	2	6	Addition to 6 digits and problem solving. Find equivalent fractions through use of a table. Compare fractions. Problem solving including conceptual and open-ended.	Draw objects that could be made from supplied nets. Draw nets from 3D objects.	
3	3	10	Read, write and order large numbers. Apply mental multiplication strategies. Multiplication patterns. Problem solving including conceptual and open-ended.		Interpret dot plot graphs. Construct a dot plot graph using supplied data.
4	4	14	Estimate multiplications before answering them. Use number lines to interpret improper fractions and mixed numerals. Problem solving including conceptual and open-ended.	Use scale and direction to plot a course on a map. State the direction and distance for given destinations. State the length in millimetres for given lines. Measure the perimeter of shapes in millimetres. Construct shapes with given perimeters.	
5	5	19	Write and interpret Roman numerals using the knowledge of place value. Apply the order of operations. Problem solving including conceptual and open-ended.	Use the area formula to calculate area in square metres. Construct rectangles from given perimeters.	Interpret line graphs. Construct 3 line graphs from developed data.
6	6	24	Divisions with fractional remainders. Using shapes to complete geometric patterns, then writing rules for them. Problem solving including conceptual and open-ended.	Construct objects from cubes, then draw the top, front and side views of 3D objects.	
7	7	28	Use multiplication to find equivalent fractions. Continue a pattern of equivalent fractions. Identify prime and composite numbers. Problem solving including conceptual and open-ended.		Identify the chance of events happening on a scale of 0 to 1. State examples of a given chance on a scale of 0 to 1.
8	8	32	Divide decimals by a single digit to 3 decimal places. Add and subtract fractions with the same denominator. Add and subtract like fractions. Problem solving including conceptual and open-ended.	Identify angles as acute, right, obtuse, straight, reflex and full turn. Measure various angles. State 24-hour times for given digital times. Interpret a 24-hour timetable.	
9	9	37	Find unit fractions of collections. Use strategies such as the guess and check strategy to solve problems. Problem solving including conceptual and open-ended.	Use instruments to draw equilateral, scalene and isosceles triangles. Draw objects isometrically.	
10		42	Diagnostic Review 1		

SAMPLE

TERM 2 SUGGESTED PLANNER

Week	Unit	Page	Number and Algebra	Measurement and Geometry	Statistics and Probability
1	10	44	Subtract decimals on a bank statement. Add entries to a bank statement. Use a calculator to multiply decimals. Problem solving including conceptual and open-ended.		Interpret side-by-side column graphs based on temperatures in world cities and gym visiting times for various age groups.
2	11	48	Add and subtract decimals to 3 decimal places. Solve decimal problems. Use a table to order fractions and mixed numerals. Problem solving including conceptual and open-ended.	Construct 3D objects from drawings of their top, front and side views.	
3	12	52	Multiply decimals. Solve problems involving multiplication of decimals. Use the percentage function on a calculator. Problem solving including conceptual and open-ended.		Conduct chance experiments to test conjectures of most frequently occurring score when rolling dice. Posing questions.
4	13	56	Short division and problem solving to 6 digits. List factors for given numbers. List the first 8 multiples for given numbers. Problem solving including conceptual and open-ended.	Use a street directory and coordinates. Follow directions to find a path. Write a set of directions to a given destination. Use animal masses to describe a mass of 4 tonnes. Convert tonnes to kilograms and kilograms to tonnes.	
5	14	61	Expand numbers to 7 digits. Order large numbers. State decimal place values. Write decimals for fractions and fractions for decimals. Problem solving including conceptual, open-ended, and elapsed time.	Draw diagonals on a series of polygons. Draw a variety of 2D shapes using instruments from given directions and dimensions. Interpret a 24-hour bus timetable and solve problems associated with it. Elapsed time.	
6	15	66	Reduce fractions by dividing the numerator and denominator by the same number. Following a flow chart. Solving square numbers. Problem solving including conceptual and open-ended.		
7	16	70	Multiplication by 2-digit numbers. Identify a number pattern, then complete it. Graph the relationship between the numbers in the pattern. Problem solving including conceptual and open-ended.	Identify shapes with rotational symmetry. List the order of rotational symmetry. Create a tessellating pattern.	
8	17	74	Division of numbers up to 7 digits. Use strategies to solve problems. Exhaust all possibilities to solve problems. Problem solving including conceptual and open-ended.	Measure the radius, circumference and diameter of circles. State conversions between metric measurements.	Construct a tree diagram to show all possibilities of uniforms for a baseball team.
9	18	79	Solve large additions and problems. Conceptualise percentages and state equivalences with decimals and fractions. Problem solving including conceptual and open-ended.	Calculate areas involving decimals and solve associated problems. Calculate odd-shaped areas in square metres. Use Euler's formula in relation to finding the faces, vertices and edges of objects. Name and classify 3D objects.	
10		84	Diagnostic Review 2		

SAMPLE

TERM 3 SUGGESTED PLANNER

Week	Unit	Page	Number and Algebra	Measurement and Geometry	Statistics and Probability
1	19	86	Multiply fractions by whole numbers using repeated addition, then by a formal setting out. Add entries to a spreadsheet and complete calculations. Problem solving including conceptual and open-ended.	Interpret a map using grid references. Follow a course on a map. Find paths on a map of specific distances.	
2	20	90	Complete subtractions to 8 digits and solve problems. Add and subtract mixed numerals. Use equivalences to subtract mixed numerals. Problem solving including conceptual and open-ended.	Measure and label complementary and supplementary angles.	
3	21	94	Multiplication by 10, 100 and 1000. Multiplication of up to 5 digits by 2 digits. Triangular number patterns. Problem solving including conceptual and open-ended.		Interpret a chance experiment involving coloured marbles in a bag. Place marbles in a bag to match given chances. Match activities to chance statements.
4	22	98	Adding the Goods and Services Tax to items. Calculating how much GST is on a retail item. Use inverse operations to check answers. Problem solving including conceptual and open-ended.	Reflect, translate and rotate 2D shapes. Converting capacities. Calculating capacity problems.	
5	23	103	Divide decimals with a calculator and interpret decimal remainders. Write a rule and extend number patterns. Calculate negative numbers. Problem solving including conceptual and open-ended.	Estimate, then use calibrated scales to measure the mass of objects. Solve problems involving practical mass activities.	
6	24	108	Find and complete geometric patterns. Write a rule for geometric patterns. Problem solving including conceptual and open-ended.	Use scale, perimeter and area to solve problems.	Interpret two-way tables. Construct a side-by-side column graph using data.
7	25	112	Multiplication of numbers up to 5 digits by 2 digits. Solve quick problems involving fractional quantities. Problem solving including conceptual and open-ended.		Interpret potentially misleading data.
8	26	116	Find missing numbers to make equivalent number sentences. Solve purchasing problems. Calculating negative numbers. Problem solving including conceptual and open-ended.	Calculate time zone changes in Australia and New Zealand. Calculate times around the world using meridians of longitude.	
9	27	121	Multiplication of numbers to 6 digits by 2 digits. Solve cost and estimation problems. Use and state rules to solve number patterns. Problem solving including conceptual and open-ended.	Enlarge 2D shapes using grid paper. Compare the area of enlarged shapes. Enlarge 3D objects and compare the area of the enlarged shape. Use the volume formula to calculate the volume of various prisms. Solve a practical problem based on various volumes.	
10		126	Diagnostic Review 3		

SAMPLE

TERM 4 SUGGESTED PLANNER

Week	Unit	Page	Number and Algebra	Measurement and Geometry	Statistics and Probability
1	28	128	Expanding numbers to 6 digits. Expand numbers including decimals. Reducing and multiplying fractions. Problem solving including conceptual and open-ended.		Find the range by locating the highest and lowest scores. Find the median by locating the middle score.
2	29	132	Multiply and divide decimals by 10, 100 and 1000. Multiply decimals by another decimal. Solve currency exchange problems. Problem solving including conceptual and open-ended.	Find areas that are larger, smaller or about equal to 1 hectare. Find the difference between place measured in square kilometres.	Posing questions, gathering data and comparing data variation.
3	30	136	Supply missing numbers in equations. Use a given value to complete equations. State whether and why answers are reasonable or not. Problem solving including conceptual and open-ended.	Identify the relationship between 1 mL of water and 1 cm^3. Demonstrate the relationship between 1 mL of water, 1 cm^3 and 1 g.	Interpret misleading data. Compare two graphs and evaluate data.
4	31	141	Multiplication of numbers by 3 digits. Problem solving including conceptual and open-ended.	Plotting points on a Cartesian plane. Identify parts of a circle—circumference, diameter, radius, semicircle, quadrant, chord, sector, segment and arc. Calculate distance travelled using km/h. Calculate the speed at which a person moves. Calculate rates of pay.	
5	32	146	Division by 2-digit numbers. Describe problems by choosing equations that solve them. Identify further information needed to solve a problem. Problem solving including conceptual and open-ended.	Find the missing angle in triangles and quadrilaterals. Measure angles made when two straight lines intersect.	
6	33	150	Introduce and apply pronumerals. Use pronumerals in equations and patterns. Use estimation in problem solving. Problem solving including conceptual and open-ended.		Calculate the mean score from a set of scores. Calculate the mode score from a set of scores.
7	34	154	Long division by 2-digit numbers. Solve problems involving long division. Apply negative number knowledge to solve problems. Problem solving including conceptual and open-ended.	Use the Cartesian plane to show rotation and translation of shapes and give coordinates of shapes that are drawn. Place events in a person's life and in history on a timeline.	Write a story to describe what is happening in a graph. Interpret cost effective ways to purchase from reading a graph.
8	35	159	Find percentages using various strategies. Divide whole numbers by fractions. Divide fractions by fractions. Problem solving including conceptual and open-ended.	Use scale and follow directions to find a destination. Draw a map of the school after researching and making a scale. Find the area of triangles by using the formula: $\frac{1}{2}$ base × height = area.	
9		164	Diagnostic Review 4		

SAMPLE

1 Add these numbers using the compensation strategy.

a	64 + 29 =	f	156 + 19 =	k	2128 + 67 =
b	135 + 38 =	g	127 + 37 =	l	3347 + 47 =
c	163 + 29 =	h	229 + 48 =	m	4675 + 29 =
d	135 + 28 =	i	333 + 29 =	n	5876 + 37 =
e	237 + 49 =	j	247 + 38 =	o	6293 + 58 =

67 + 28
Think
67 + 30 minus 2
97 – 2 = 95



2 Add these numbers using the jump strategy.

a	575 + 29 =	f	5193 + 149 =	k	2128 + 238 =
b	687 + 48 =	g	6292 + 138 =	l	3297 + 327 =
c	793 + 49 =	h	7156 + 227 =	m	4356 + 549 =
d	887 + 58 =	i	4194 + 329 =	n	5275 + 137 =
e	486 + 37 =	j	8176 + 439 =	o	6196 + 829 =

257 + 38
Think
257 + 30 = 287
287 + 8 = 295



3 Add these numbers using the split strategy.

a	164 + 229 =	f	156 + 519 =	k	128 + 767 =
b	135 + 138 =	g	127 + 437 =	l	347 + 447 =
c	163 + 229 =	h	229 + 348 =	m	675 + 229 =
d	135 + 328 =	i	333 + 229 =	n	876 + 137 =
e	237 + 449 =	j	247 + 638 =	o	293 + 558 =

164 + 229
Think
100 + 200 = 300
60 + 20 = 80
4 + 9 = 13
Total = 393



4 Give an estimate for each question by rounding each number to 100. The first one has been done for you.

a	212 + 397 = 600	g	3354 + 146 = _____	m	1379 + 1222 = _____
b	316 + 484 = _____	h	4245 + 360 = _____	n	1498 + 1307 = _____
c	309 + 201 = _____	i	4739 + 555 = _____	o	1689 + 2221 = _____
d	678 + 320 = _____	j	3347 + 563 = _____	p	2365 + 3437 = _____
e	476 + 281 = _____	k	5797 + 707 = _____	q	5290 + 3615 = _____
f	979 + 219 = _____	l	4369 + 432 = _____	r	4309 + 2388 = _____

5 Solve the problems.

a	Trent flew 12 345 km on Monday and 7465 km on Tuesday. What was the total length of his flight?	b	Jim's mother bought a new car for $24 545 and spent another $2449 on extras. What was the total cost of the car?

SAMPLE

Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)

6 Complete each algorithm.

a 47067 − 23004	b 80346 − 70008	c 86667 − 65826	d 75033 − 9869	e 67777 − 44600
f 456307 − 463	g 658570 − 723	h 767400 − 406548	i 878500 − 637004	j 987000 − 486038
k 256789 − 3596	l 357406 − 27480	m 267309 − 36987	n 576208 − 26708	o 374008 − 36649

7 Bill's house renovations.

a Bill bought a house at Mangerton for $297 000 and sold it for $354 500. How much profit did he make? _____

b Bill bought a house at Corrimal for $289 050 and sold it for $347 250. How much profit did he make? _____

c Bill bought a house at Dapto for $277 980 and sold it for $333 550. How much profit did he make? _____

d Bill bought a house at Kiama for $317 450 and sold it for $377 590. How much profit did he make? _____

e Bill bought a house at Mt Keira for $312 250 and sold it for $390 500. How much profit did he make? _____



SUPER QUESTION

8 To claim travelling expenses on her tax return, Christina keeps a 'log book' which shows her car's odometer reading at the beginning and at the end of each trip. Help her calculate the distances covered and the amounts she can claim calculated at 15c per kilometre.

	Date	Beginning of trip	End of trip	Kilometres travelled	Amount claimed
a	18/9	38 542	39 461		
b	19/10	43 814	44 002		
c	4/11	44 629	44 913		
d	29/3	52 414	52 739		
e	24/4	55 029	55 216		
f			Total		

SAMPLE

9 Complete the addition stacks.

a

	21		
8	13	19	7

b

24	18	16	19

c

27	34	27	36

10 Solve the problems.

a	34 562 spectators attended the show on Saturday and 40 567 attended on Sunday. How many attended in total?		d	Mr Jones bought 6 new baseball bats for his baseball club. If the bats cost $174.50 each, how much would he have spent?	
b	The monorail runs every 10 minutes, 18 hours a day, every day of the week. How many times would it run in 26 weeks?		e	Five buses carrying 48 children each transported them to the sports carnival. If each child paid $4.50, how much would be collected?	
c	A large backyard fish pond has a capacity of 3500 L. If it is $\frac{4}{5}$ full, how much more water would need to be added to make it full?		f	Jack had a bag of 45 000 beans. If he lost $\frac{1}{10}$ of them and sold $\frac{3}{5}$ of them, how many beans would Jack have left?	

WEEKLY TESTER

11 Jill is 3 times older than Jack who is $\frac{1}{2}$ the age of Josh. Sally is 4 times older than Jack and Kim is $\frac{7}{8}$ the age of Sally. Calculate the ages given various ages for Jill.

	Jill	Jack	Josh	Sally	Kim
a	24				
b	27				
c	18				
d	42				



OPEN-ENDED CHALLENGER

12 The teacher wrote this number sentence on the blackboard. □□.□ × □ =

She also said that the numbers in the missing boxes were **4, 7, 9, 3.**
What could some of the multiplications and their answers be?

□□.□ × □ = ____

□□.□ × □ = ____

□□.□ × □ = ____

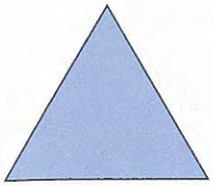
□□.□ × □ = ____

□□.□ × □ = ____

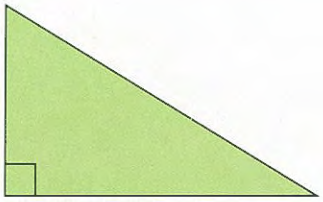
□□.□ × □ = ____

SAMPLE

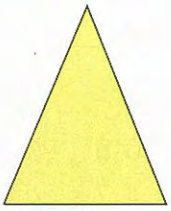
Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)



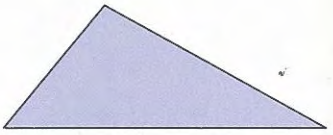
Equilateral triangle



Right-angle triangle



Isosceles triangle



Scalene triangle

13 Answer the questions.

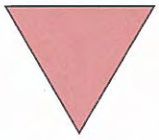
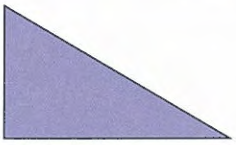
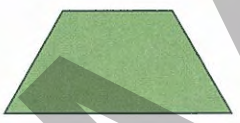
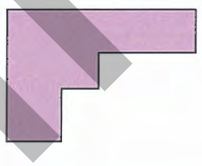
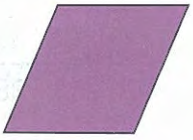
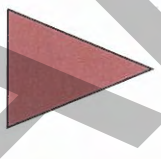
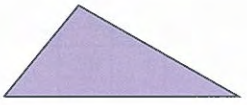
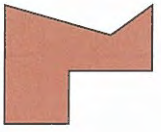
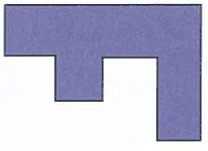
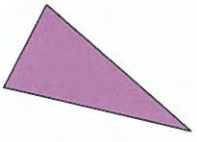
a Which triangle has 3 sides the same length and 3 angles the same size? _____

b Which triangle has 2 sides the same length and 2 angles the same size? _____

c Which triangle has no sides the same length and no angles the same size? _____

d Which triangle contains a right angle? _____

14 Name these shapes, including the full names for the triangles.

a  _____	e  _____	i  _____	m  _____
b  _____	f  _____	j  _____	n  _____
c  _____	g  _____	k  _____	o  _____
d  _____	h  _____	l  _____	p  _____

15 What shape am I?

a I have 3 straight sides. My side lengths are 7 cm, 4 cm and 5 cm. _____

b I have 8 angles the same size and 8 straight sides the same length. _____

c I have 6 straight sides. _____

d I have 10 straight sides the same length and 10 angles the same size. _____

SAMPLE

DIAGNOSTIC Review 1

PART 1

Write the place value of the digit in bold print.

a 216 **8**34 _____

b 54**9** 275 _____

c **7**86 308 _____

Write these numbers in Roman numerals.

d 37 _____ e 66 _____

f 129 _____ g 338 _____

Write Hindu–Arabic numbers for these.

h XXXVIII _____

i LXIX _____

j CCCLXIV _____

k DCCCLXXXVIII _____

PART 2

a
$$\begin{array}{r} 967578 \\ +\ 634347 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 854067 \\ +\ 46834 \\ \hline \\ \hline \end{array}$$

c $6\overline{)3966}$ d $4\overline{)75448}$ e $8\overline{)80987}$

f
$$\begin{array}{r} 2362 \\ \times\ 3 \\ \hline \\ \hline \end{array}$$

g
$$\begin{array}{r} 14745 \\ \times\ 7 \\ \hline \\ \hline \end{array}$$

h
$$\begin{array}{r} 34564 \\ \times\ 6 \\ \hline \\ \hline \end{array}$$

i If Tim's average for 9 cricket games was 67 runs, what was his total score? _____ runs

j 3580 people attended day one of the cricket match but only 2376 attended day two. How many more people attended on day one? _____

k John saved $234 in January, $437 in February and $567 in March. How much more does he need to save to buy a computer worth $1599? $ _____

PART 3

Write equivalent fractions for.

a $\frac{1}{2} = \frac{}{10}$ b $\frac{3}{5} = \frac{}{10}$

c $\frac{1}{4} = \frac{}{8}$ d $\frac{3}{8} = \frac{}{24}$

Write a mixed numeral for each improper fraction.

e $\frac{7}{4} =$ f $\frac{13}{6} =$

g $\frac{9}{5} =$ h $\frac{17}{6} =$

Add the fractions.

i $\frac{3}{8} + \frac{2}{8} =$ j $\frac{3}{4} + \frac{2}{4} =$

k $\frac{3}{10} + \frac{4}{10} =$ l $\frac{5}{10} + \frac{8}{10} =$

Find the fractions.

m $\frac{3}{5}$ of 20 sheep =

n $\frac{5}{6}$ of 96 goats =

o $\frac{7}{12}$ of 600 stamps =

PART 4

Complete the number sentences.

a $3 \times 7 + 5 =$ b $100 - 3 \times 9 + 38 =$

c $3 \times (7 + 5) =$ d $33 + 47 - 3 \times 9 =$

e Circle the numbers that are prime:

74	89	167	231	96	77	195

Complete.

f $27 \times 100 =$ _____

g $27 \times 1000 =$ _____

h $27 \times 10\,000 =$ _____

PART 5

Extend the number pattern based on the shapes, then write a rule for it.



a

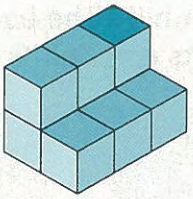
Shapes	1	2	3	4	5	6	7	8
Lines								

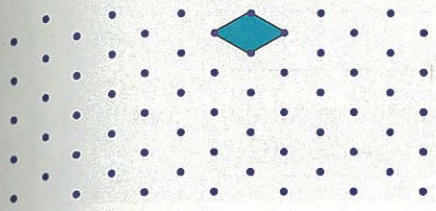
b Rule: _____

SAMPLE

PART 6

Draw this shape on the isometric dot paper. The back block has been drawn for you.

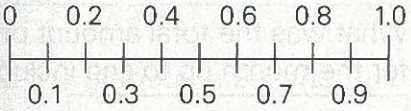




PART 7

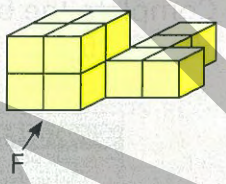


If 0 is impossible and 1 is certain, what is the probability of this spinner landing on red? Put a cross on the scale to show your answer.



PART 8

Draw the top, front and side views.

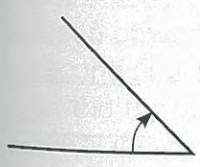


Top	Front	Side

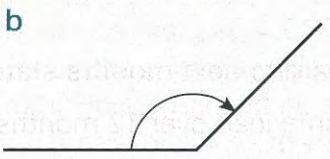
PART 9

Name and measure these angles.

a



b



PART 10

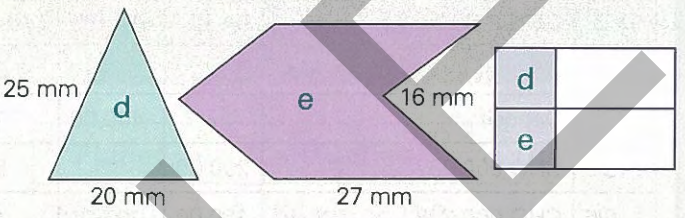
Measure the length of each line in mm.

a _____

b _____

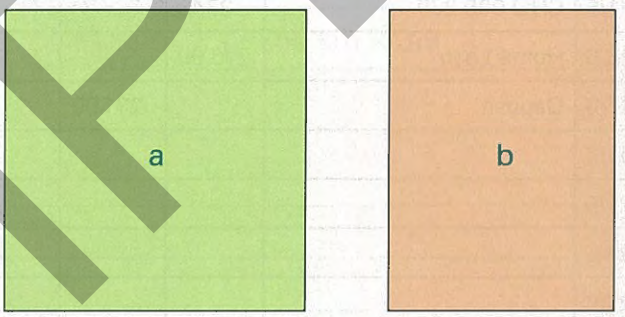
c _____

Measure and record the perimeters of these shapes in millimetres.



PART 11

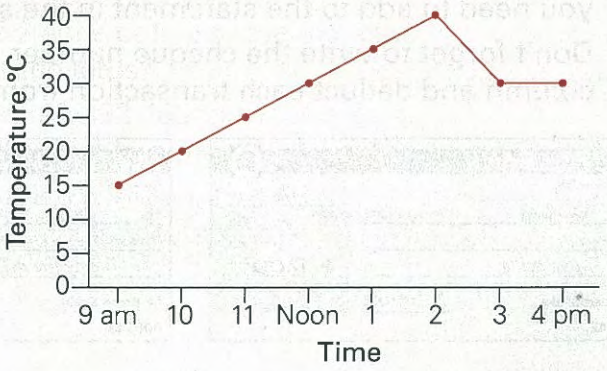
Calculate the areas in cm².



Area a = _____ cm²

Area b = _____ cm²

PART 12



a The temperature at 11:00 am was: _____

b At what time was it 35°C? _____

c The biggest change in one hour in temperature took place between:

_____

SAMPLE