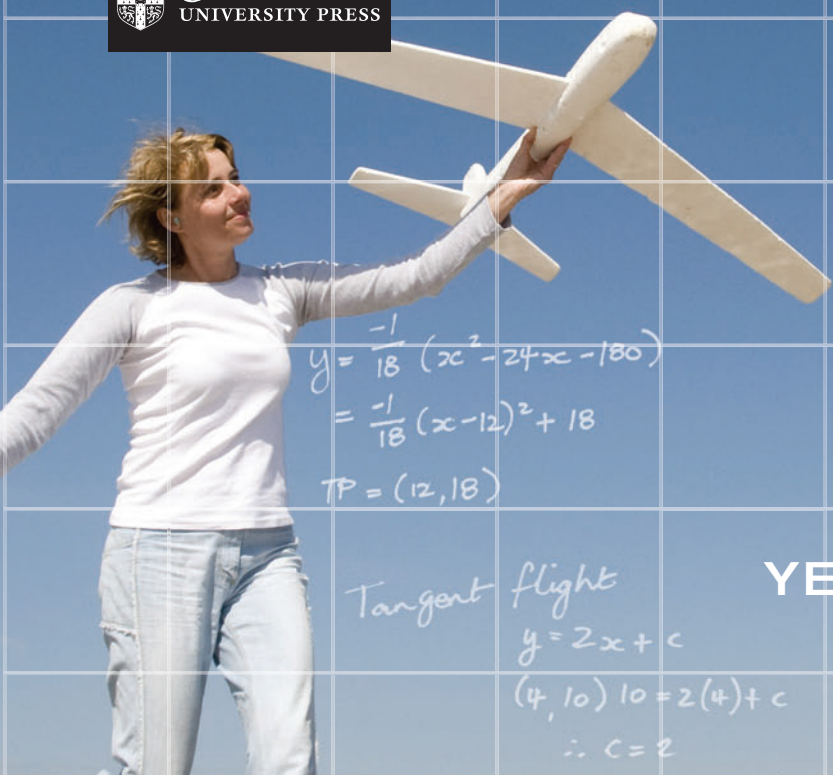


Cambridge University Press

978-1-107-67670-1 - CambridgeMaths: NSW Syllabus for the Australian Curriculum: Year 10: Stage 5.1/5.2/5.3

Stuart Palmer, David Greenwood, Sara Woolley, Jenny Goodman and Jennifer Vaughan

Frontmatter

[More information](#)

YEAR

10

STAGE 5.1/5.2/5.3 >>

CambridgeMATHS

NSW SYLLABUS FOR THE AUSTRALIAN CURRICULUM

>> Additional resources online

STUART PALMER | DAVID GREENWOOD
SARA WOOLLEY | JENNY GOODMAN
JENNIFER VAUGHAN



Cambridge University Press

978-1-107-67670-1 - CambridgeMaths: NSW Syllabus for the Australian Curriculum: Year 10: Stage 5.1/5.2/5.3

Stuart Palmer, David Greenwood, Sara Woolley, Jenny Goodman and Jennifer Vaughan

Frontmatter

[More information](#)

CAMBRIDGE UNIVERSITY PRESS

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.edu.au

Information on this title: www.cambridge.org/9781107676701

© Stuart Palmer, David Greenwood, Jenny Goodman,
Jennifer Vaughan, Sara Woolley 2014

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2014

Cover designed by Sardine Design

Typeset by Aptara Corp.

Printed in Singapore by C.O.S Printers Pte Ltd

A Cataloguing-in-Publication entry is available from the catalogue of the National Library of Australia at www.nla.gov.au

ISBN 978-1-107-67670-1 Paperback

Additional resources for this publication at www.cambridge.edu.au/GO

Reproduction and communication for educational purposes

The Australian *Copyright Act 1968* (the Act) allows a maximum of one chapter or 10% of the pages of this publication, 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

Reproduction and communication for other purposes

Except as permitted under the Act (for example a fair dealing for the purposes of study, research, criticism or review) no part of this publication may be reproduced, stored in a retrieval system, communicated or transmitted in any form or by any means without prior written permission. All inquiries should be made to the publisher at the address above.

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate. Information regarding prices, travel timetables and other factual information given in this work is correct at the time of first printing but Cambridge University Press does not guarantee the accuracy of such information thereafter.

Cambridge University Press

978-1-107-67670-1 - CambridgeMaths: NSW Syllabus for the Australian Curriculum: Year 10: Stage 5.1/5.2/5.3

Stuart Palmer, David Greenwood, Sara Woolley, Jenny Goodman and Jennifer Vaughan

Frontmatter

[More information](#)

Table of Contents



Strands, substrands and outcomes

<i>About the authors</i>	<i>ix</i>
<i>Introduction and guide to this book</i>	<i>x</i>
<i>Acknowledgements</i>	<i>xiv</i>

1	Measurement	2	Measurement and Geometry
	Pre-test	4	Numbers of any Magnitude (S5.1)
1A	Converting units of measurement	5	Area and Surface Area
1B	Accuracy of measuring instruments	10	(S5.1, S5.2, S5.3)
1C	Pythagoras' theorem in three-dimensional problems	14	Volume MA5.1–9MG, MA5.1–8MG,
1D	Area of triangles, quadrilaterals, circles and sectors REVISION	21	MA5.2–11MG, MA5.3–13MG,
1E	Surface area of prisms and cylinders	29	MA5.2–12MG, MA5.3–14MG
1F	Surface area of pyramids and cones	35	(S5.2, S5.3)
1G	Volume of prisms and cylinders	40	
1H	Volume of pyramids and cones	46	
1I	Volume and surface area of spheres	51	
	Investigation	57	
	Challenges	60	
	Review: Chapter summary	61	
	Multiple-choice questions	62	
	Short-answer questions	63	
	Extended-response questions	66	

2 Indices and surds 68 Number and Algebra

	Pre-test	70	Indices (S5.1, S5.2)
2A	Rational numbers and irrational numbers	71	Surds and Indices (S5.3§)
2B	Adding and subtracting surds	78	MA5.1–5NA, MA5.2–7NA
2C	Multiplying and dividing surds	82	MA5.3–6NA
2D	Binomial products	87	
2E	Rationalising the denominator	91	
2F	Review of index laws REVISION	95	
2G	Negative indices REVISION	100	
2H	Scientific notation REVISION	105	
2I	Fractional indices	109	
2J	Exponential equations	114	
2K	Exponential growth and decay FRINGE	118	
	Investigation	124	
	Challenges	126	
	Review: Chapter summary	127	
	Multiple-choice questions	128	
	Short-answer questions	129	
	Extended-response questions	131	

3 Probability 132 Statistics and Probability

	Pre-test	134	Probability (S5.1, S5.2)
3A	Review of probability REVISION	135	MA5.1–13SP, MA5.2–17SP
3B	Formal notation for Venn diagrams and two-way tables EXTENSION	142	
3C	Mutually exclusive events and non-mutually exclusive events EXTENSION	151	
3D	Formal notation for conditional probability EXTENSION	156	
3E	Using arrays for two-step experiments	162	
3F	Using tree diagrams	168	
3G	Dependent events and independent events	177	
	Investigation	182	
	Challenges	184	
	Review: Chapter summary	185	
	Multiple-choice questions	186	
	Short-answer questions	187	
	Extended-response questions	189	



4	Single variable and bivariate statistics	190	Statistics and Probability
	Pre-test	192	Single Variable Data Analysis (S5.1, S5.2, S5.3)
4A	Collecting, using and misusing statistical data	193	Bivariate Data Analysis (S5.2, S5.3)
4B	Review of data displays REVISION	198	MA5.1–12SP, MA5.2–15SP,
4C	Summary statistics	206	MA5.3–18SP, MA5.2–16SP,
4D	Box plots	211	MA5.3–19SP
4E	Standard deviation	216	
4F	Displaying and analysing time-series data	221	
4G	Bivariate data and scatter plots	227	
4H	Line of best fit by eye	234	
4I	Linear regression with technology	241	
	Investigation	246	
	Challenges	248	
	Review: Chapter summary	249	
	Multiple-choice questions	250	
	Short-answer questions	251	
	Extended-response questions	253	
5	Expressions, equations and linear relationships	254	Number and Algebra
	Pre-test	256	Algebraic Techniques (S5.2, S5.3§)
5A	Review of algebra REVISION	257	Linear Relationships (S5.1, S5.2, S5.3§)
5B	Algebraic fractions REVISION	263	Equations (S5.1, S5.2§, S5.3§)
5C	Solving linear equations REVISION	268	MA5.2–6NA, MA5.3–5NA,
5D	Linear inequalities	273	MA5.2–8NA, MA5.3–7NA,
5E	Graphing straight lines	277	MA5.1–6NA, MA5.2–9NA,
5F	Finding the equation of a line	285	MA5.3–8NA
5G	Using formulas for distance and midpoint	292	
5H	Parallel lines and perpendicular lines	298	
5I	Solving simultaneous equations using substitution	304	
5J	Solving simultaneous equations using elimination	310	
5K	Further applications of simultaneous equations	314	
5L	Regions on the Cartesian plane EXTENSION	318	
	Investigation	325	
	Challenges	328	
	Review: Chapter summary	329	
	Multiple-choice questions	330	
	Short-answer questions	332	
	Extended-response questions	335	
	Semester review 1	336	



6 Geometrical figures and circle geometry 346

	Pre-test	348
6A	Review of geometry REVISION	349
6B	Congruent triangles REVISION	360
6C	Using congruence to investigate quadrilaterals	367
6D	Similar figures	371
6E	Proving and applying similar triangles	377
6F	Circle terminology and chord properties	384
6G	Angle properties of circles	391
6H	Further angle properties of circles	398
6I	Theorems involving tangents	403
6J	Intersecting chords, secants and tangents	409
	Investigation	413
	Challenges	415
	Review: Chapter summary	416
	Multiple-choice questions	417
	Short-answer questions	418
	Extended-response questions	421

Measurement and Geometry

Properties of Geometrical Figures

(S5.1, S5.2, S5.3\$)

Circle Geometry (S5.3#)

MA5.1–11MG, MA5.2–14MG,

MA5.3–16MG, MA5.3–17MG

7 Trigonometry 422

	Pre-test	424
7A	Trigonometric ratios	425
7B	Finding unknown angles	432
7C	Applications in two dimensions	437
7D	Directions and bearings	442
7E	Applications in three dimensions	449
7F	Obtuse angles and exact values	455
7G	The sine rule	461
7H	The cosine rule	467
7I	Area of a triangle	471
7J	The four quadrants	475
7K	Graphs of trigonometric functions	482
	Investigation	490
	Challenges	492
	Review: Chapter summary	493
	Multiple-choice questions	494
	Short-answer questions	495
	Extended-response questions	498

Measurement and Geometry

Right-angled triangles

(trigonometry) (S5.1, 5.20)

Trigonometry and Pythagoras'

Theorem (S5.1, S5.2, S5.3\$)

MA5.1–10MG, MA5.2–13MG,

MA5.3–15MG



8	Quadratic expressions and quadratic equations	500	Number and Algebra
	Pre-test	502	Algebraic Techniques (S5.2, S5.3\$)
8A	Expanding expressions REVISION	503	Equations (S5.2, S5.3\$)
8B	Factorising expressions	508	MA5.2-6NA, MA5.3-5NA,
8C	Factorising monic quadratic trinomials	512	MA5.2-8NA, MA5.3-7NA
8D	Factorising non-monic quadratic trinomials	517	
8E	Factorising by completing the square	521	
8F	Solving quadratic equations by factorising	526	
8G	Using quadratic equations to solve problems	531	
8H	Solving quadratic equations by completing the square	535	
8I	Solving quadratic equations with the quadratic formula	539	
	Investigation	544	
	Challenges	546	
	Review: Chapter summary	547	
	Multiple-choice questions	548	
	Short-answer questions	549	
	Extended-response questions	550	
9	Non-linear relationships, functions and their graphs	552	Number and Algebra
	Pre-test	554	Non-linear Relationships (S5.1, S5.2, S5.3\$)
9A	Exploring parabolas	555	Functions and Other Graphs (S5.3#)
9B	Sketching parabolas using transformations	564	Ratios and Rates (S5.2, S5.3)
9C	Sketching parabolas using factorisation	570	MA5.1-7NA, MA5.2-10NA,
9D	Sketching parabolas by completing the square	576	MA5.3-9NA, MA5.2-5NA,
9E	Sketching parabolas using the quadratic formula and the discriminant	581	MA5.3-4NA, MA5.3-12NA
9F	Applications of parabolas	586	
9G	Lines and parabolas	592	
9H	Functions and their notation	601	
9I	Graphs of circles	608	
9J	Exponential functions and their graphs	614	
9K	Hyperbolic functions and their graphs	620	
9L	Cubic equations, functions and graphs	627	
9M	Further transformations of graphs	637	
9N	Using graphs to describe change	643	

Cambridge University Press

978-1-107-67670-1 - CambridgeMaths: NSW Syllabus for the Australian Curriculum: Year 10: Stage 5.1/5.2/5.3

Stuart Palmer, David Greenwood, Sara Woolley, Jenny Goodman and Jennifer Vaughan

Frontmatter

[More information](#)

9O	Literal equations and restrictions on variables	657
9P	Inverse functions	662
	Investigation	670
	Challenges	672
	Review: Chapter summary	673
	Multiple-choice questions	675
	Short-answer questions	677
	Extended-response questions	681

10 Logarithms and polynomials 682

Number and Algebra

	Pre-test	684
10A	Introducing logarithms	685
10B	Logarithmic graphs	689
10C	Laws of logarithms	700
10D	Solving equations using logarithms	704
10E	Polynomials	708
10F	Expanding and simplifying polynomials	712
10G	Dividing polynomials	715
10H	Remainder theorem and factor theorem	718
10I	Factorising polynomials to find zeros	721
10J	Graphs of polynomials	724
	Investigation	729
	Challenges	730
	Review: Chapter summary	731
	Multiple-choice questions	732
	Short-answer questions	733
	Extended-response questions	735

Logarithms (S5.3#)

Polynomials (S5.3#)

MA5.3-10NA, MA5.3-11NA

Semester review 2 736

	Answers	749
	Index	888

Cambridge University Press

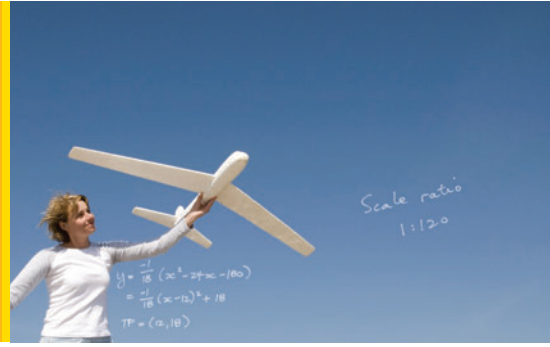
978-1-107-67670-1 - CambridgeMaths: NSW Syllabus for the Australian Curriculum: Year 10: Stage 5.1/5.2/5.3

Stuart Palmer, David Greenwood, Sara Woolley, Jenny Goodman and Jennifer Vaughan

Frontmatter

[More information](#)

About the Authors



Stuart Palmer was born and educated in NSW. He is a high school mathematics teacher with more than 25 years' experience teaching boys and girls from all walks of life in a variety of schools. Stuart has taught all the current NSW Mathematics courses in Stages 4, 5 and 6 numerous times. He has been a Head of Department in two schools and is now an educational consultant who conducts professional development workshops for teachers all over NSW and beyond. He also works with pre-service teachers at the University of Sydney and the University of Western Sydney.



David Greenwood is the Head of Mathematics at Trinity Grammar School in Melbourne and has 20 years' experience teaching mathematics from Years 7 to 12. He has run numerous workshops within Australia and overseas regarding the implementation of the Australian Curriculum and the use of technology for the teaching of mathematics. He has written more than 20 mathematics titles and has a particular interest in the sequencing of curriculum content and working with the Australian Curriculum proficiency strands.



Sara Woolley was born and educated in Tasmania. She completed an Honours degree in Mathematics at the University of Tasmania before completing her education training at the University of Melbourne. She has taught mathematics in Victoria from Years 7 to 12 since 2006 and has a keen interest in the creation of resources that cater for a wide range of ability levels.



Jenny Goodman has worked for 20 years in comprehensive State and selective high schools in NSW and has a keen interest in teaching students of differing ability levels. She was awarded the Jones Medal for education at Sydney University and the Bourke prize for Mathematics. She has written for Cambridge NSW and was involved in the *Spectrum* and *Spectrum Gold* series.



Jennifer Vaughan has taught secondary mathematics for more than 30 years in NSW, WA, Queensland and New Zealand, and has tutored and lectured in mathematics at Queensland University of Technology. She is passionate about providing students of all ability levels with opportunities to understand and to have success in using mathematics. She has taught special needs students and has had extensive experience in developing resources that make mathematical concepts more accessible.



Introduction and guide to this book



This resource developed from an analysis of the *NSW Syllabus for the Australian Curriculum* and the ACARA syllabus, *Australian Curriculum: Mathematics*. It is structured on a detailed teaching program for the implementation of the NSW Syllabus, and a comprehensive copy of the teaching program can be found on the companion website.

The language and concepts have been carefully reviewed and revised to make sure that they are effective for students doing Stage 5.1/5.2/5.3. For each section, the coverage of Stage 4, 5.1, 5.2 and 5.3 are indicated by 'ladder icons'. There is a greater number of advanced and challenging questions, compared to the Stage 5.1/5.2/5.3 textbook. However, the sequences of topics of both textbooks are aligned to make it easier for teachers using both resources.

The chapters are based on a logical teaching and learning sequence for the syllabus topic concerned, so that chapter sections can be used as ready-prepared lessons. Exercises have questions graded by level of difficulty, indicated in the teaching program, and grouped by the NSW Syllabus's working mathematically components, indicated by badges in the margin of the exercises. This facilitates the management of differentiated learning and reporting on students' achievement.

For certain topics the prerequisite knowledge has been given in sections marked as REVISION, while EXTENSION marks a few sections that go beyond the syllabus. Similarly, the word FRINGE is used to mark a few topics treated in a way that lies at the edge of the syllabus requirements, but which provide variety and stimulus. Apart from these, all topics are aligned exactly to the NSW Syllabus, as indicated at the start of each chapter and in the teaching program.

Guide to this book

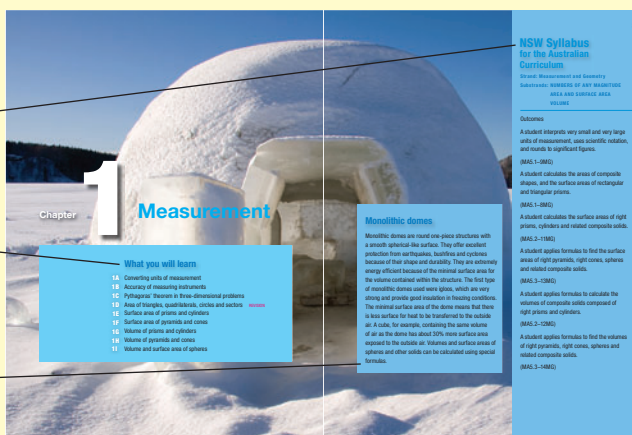
Features:

NSW Syllabus for the Australian Curriculum: strands, substrands and content outcomes for chapter (see teaching program for more detail)

What you will learn: an overview of chapter contents

Chapter introduction: use to set a context for students

Pre-test: establishes prior knowledge (also available as a printable worksheet)



Pre-test

- Evaluate the following.

a 2×100	b $5 \div 10^2$	c $230 \div 10^2$
d 0.043×100^2	e $62900 \div 1000$	f 1.38×10^4
- Evaluate the following.

a $A = \ell \times b$ when $\ell = 3$ and $b = 7$
b $A = b \times h$ when $b = 10$ and $h = 3$
c $A = \frac{1}{2}b \times h$ when $b = 2$ and $h = 3.8$

Guide to this book (continued)

Topic introduction: use to relate the topic to mathematics in the wider world

HOTmaths icons: links to interactive online content via the topic number, 1C in this case (see next page for more)

Let's start: an activity (which can often be done in groups) to start the lesson

Key ideas: summarises the knowledge and skills for the lesson

Examples: solutions with explanations and descriptive titles to aid searches (digital versions also available for use with IWB)

Exercise questions categorised by the **working mathematically components** and **enrichment** (see next page)

Questions are linked to examples

Investigations: inquiry-based activities **Challenges**

Investigation

1 Tree wealth
 Changes are that people who become as property, shares and other business and other electronic devices. Appreciating or depreciating assets lose value over time.

Appreciating or depreciating
 Imagine that you have \$100 000 to invest.
 Option 1: Invest in shares and expect a 10% return.
 Option 2: Buy a car that depreciates at 10% per year.
 a Find the value of the \$100 000 after 2 years.
 b How long will it take for the share investment to be worth \$100 000?

Challenges

1 Simplify: $3^{n-1} + 3^{n-1} + 3^{n-1}$.

2 Simplify:
 a $\frac{25^x}{125^x}$ b $\frac{8^x}{6^x} \cdot \frac{3^x}{9^x}$

3 Solve $3^{2x} \times 27^{x+1} = 81$.

4 Simplify:
 a $\frac{2^{n+1} - 2^{n-1}}{2^{n+1} - 2^{n-2}}$ b $\frac{2^{n+1} - 4 \times 2^n}{2^{2n+1} - 4^n}$

5 A rectangular piece of paper has an area of $100\sqrt{2}$ cm². The piece of it is folded in half along the dashed line, the new rectangle is similar to the original rectangle. What are the dimensions of the piece of paper?


1C Pythagoras' theorem in three-dimensional problems

You will recall that for any right-angled triangle we can link the length of the three sides using Pythagoras' theorem. Given two of the sides, we can work out the length of the remaining side. This has applications in all sorts of two- and three-dimensional problems.

Let's start: President Garfield's proof
 Five years before he became president of the United States of America in 1881, James Garfield discovered a proof of Pythagoras' theorem. It involves arranging two identical right-angled triangles (Ⓐ and Ⓑ) to form a trapezium, as shown.

Stage

5.3#
5.3
5.3#
5.2
5.2#
5.1
4




US President Garfield discovered a proof of Pythagoras' theorem.


Key ideas

- The area of a two-dimensional shape can be defined as the number of square units contained within its boundaries. Some common area formulas are given.


Square



Rectangle




Triangle

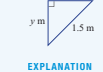


Example 5 Finding side lengths using Pythagoras' theorem
 Find the length of the unknown side in these right-angled triangles, correct to 2 decimal places.

a



b






SOLUTION
 a $c^2 = a^2 + b^2$
 $\therefore x^2 = 5^2 + 9^2$
 $= 106$
 $x = \sqrt{106}$

EXPLANATION
 x cm is the length of the hypotenuse. Substitute the two shorter sides $a = 5$ and $b = 9$ (or $a = 9$ and $b = 5$).

Exercise 1C

1 Solve for a in these equations, leaving your answer in exact form using a square root sign. Assume $a > 0$.
 a $a^2 + 3^2 = 8^2$ b $a^2 + 5^2 = 6^2$ c $2^2 + a^2 = 9^2$

Example 5 Use Pythagoras' theorem to find the length of the hypotenuse for these right-angled triangles. Round your answers to 2 decimal places where necessary.
 a  b  c 

7 A 20 cm drinking straw sits diagonally in a glass of radius 3 cm and height 10 cm. What length of straw protrudes from the glass? Round your answer to 1 decimal place.

12 Two joining chords in a semicircle have lengths 1 cm and 2 cm, as shown. Find the exact radius, r cm, of the semicircle.

13 The diagonals of a rectangle are 10 cm long. Find the exact

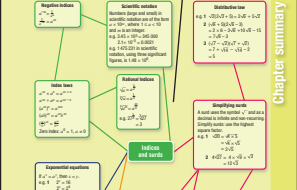
Enrichment: How many proofs?

15 There are hundreds of proofs of Pythagoras' theorem.
 a Research some of these proofs using the internet and pick one you understand clearly.
 b Write up the proof, giving full reasons.
 c Present your proof to a friend or the class. Show all diagrams, algebra and reasons.

Chapter summary: mind map of key concepts & interconnections

2 Semester reviews per book

Chapter summary



Multiple-choice questions

1 Which of the following is a cube?
 A 120 B 6 C $\sqrt{7}$ D 65 E 1.6

2 A square has an area of 75 square units. Its side length is simplified form, is:
 A $\sqrt{75}$ B $3\sqrt{5}$ C $2\sqrt{15}$ D $\sqrt{25}$ E $\sqrt{15}$

3 $4\sqrt{5}$ is equivalent to:
 A $\sqrt{20}$ B $\sqrt{80}$ C $2\sqrt{5}$ D $2\sqrt{10}$ E $4\sqrt{10}$

4 $3\sqrt{12} + 4\sqrt{3}$ simplifies to:
 A $7\sqrt{3}$ B $6\sqrt{3} + 7$ C $6\sqrt{6} + 3\sqrt{3}$ D $3\sqrt{3} + 7$

5 The simplified form of $\frac{10\sqrt{12}}{2\sqrt{3}}$ is:
 A $\frac{5\sqrt{12}}{3}$ B $\frac{5\sqrt{4}}{3}$ C $\frac{5\sqrt{3}}{3}$ D $\frac{5\sqrt{2}}{3}$ E $\frac{5\sqrt{1}}{3}$

Semester review 1

Chapter 1: Measurement
Multiple-choice questions

1 The perimeter and area for this shape, correct to 2 decimal places, are:
 A $P = 23.7$ cm, $A = 147.77$ cm²
 B $P = 20.7$ cm, $A = 122.07$ cm²
 C $P = 20.7$ cm, $A = 122.07$ cm²
 D $P = 18.36$ cm, $A = 82.27$ cm²
 E $P = 17.3$ cm, $A = 122.07$ cm²

2 0.04 m³ is equivalent to:
 A 4 m³ B 4000 m³ C 0.00004 m³ D 40000 m³

3 A square-based pyramid has a base area of 36 m² and a height of 7 m. Therefore, its volume is:
 A 108 m³ B 756 m³ C 252 m³ D 2520 m³

4 The curved surface area of this half cylinder, in exact form, is:
 A 80π cm² B 160π cm² C 80π cm²
 D 160π cm² E 160π cm²

5 The volume of a sphere of diameter 20 cm is closest to:
 A 10100 cm³ B 32027 cm³ C 113095 cm³ D 141577 cm³ E 70487 cm³

Short-answer questions

1 Convert each of the following units to three places in the brackets.
 a 23 m to centimetres

Textbooks also include:

- Complete answers
- Index
- Using technology activities

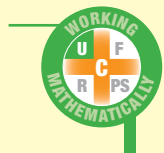
Chapter reviews with multiple-choice, short-answer and extended-response questions



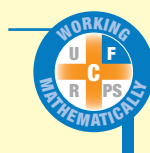
Working Mathematically badges

All exercises are divided into sections marked by Working Mathematically badges, such as this example:

Understanding & Communicating



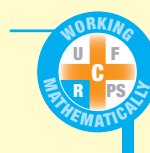
Fluency & Communicating



Problem-solving & Communicating



Reasoning & Communicating



The letters U (Understanding), F (Fluency), PS (Problem-solving), R (Reasoning) and C (Communication) are highlighted in colour to indicate which of these components apply mainly to the questions in that section. Naturally, there is some overlap between the components.

Stage Ladder icons

Shading on the ladder icons at the start of each section indicate the Stage or Stages addressed in that section.

Stage

5.3#
5.3
5.3§
5.2
5.2◇
5.1
4

This key explains what each rung on the ladder icon means in practical terms.

For more information see the teaching program and teacher resource package:

Stage	Past and present experience in Stages 4 and 5	Future direction for Stage 6 and beyond
5.3#	These are optional topics which contain challenging material for students who will complete all of Stage 5.3 during Years 9 and 10.	These topics are intended for students who are aiming to study Mathematics at the very highest level in Stage 6 and beyond.
5.3	Capable students who rapidly grasp new concepts should go beyond 5.2 and study at a more advanced level with these additional topics.	Students who have completed 5.1, 5.2 and 5.3 are generally well prepared for a calculus-based Stage 6 Mathematics course.
5.3§	These topics are recommended for students who will complete all the 5.1 and 5.2 content and have time to cover some additional material.	These topics are intended for students aiming to complete a calculus-based Mathematics course in Stage 6.
5.2	A typical student should be able to complete all the 5.1 and 5.2 material by the end of Year 10. If possible, students should also cover some 5.3 topics.	Students who have completed 5.1 and 5.2 without any 5.3 material typically find it difficult to complete a calculus-based Stage 6 Mathematics course.
5.2◇	These topics are recommended for students who will complete all the 5.1 content and have time to cover some additional material.	These topics are intended for students aiming to complete a non-calculus course in Stage 6, such as Mathematics General.
5.1	Stage 5.1 contains compulsory material for all students in Years 9 and 10. Some students will be able to complete these topics very quickly. Others may need additional time to master the basics.	Students who have completed 5.1 without any 5.2 or 5.3 material have very limited options in Stage 6 Mathematics.
4	Some students require revision and consolidation of Stage 4 material prior to tackling Stage 5 topics.	



Additional resources online

INTEGRATED PROGRAM

The *CambridgeMATHS/HOTmaths* integrated program for the Australian Curriculum offers the best of textbook and interactive online resources. It can be used with a HOTmaths account (eg for class demos via IWBs or data projectors) or with student accounts, which enable access to the full range of features, including use at home.

The integrated program is linked from icons and the topic numbers in the textbooks, as detailed in a document available (free) from the Cambridge website.

COURSE: CambridgeMATHS 7 NSW AC

TOPICS: Select A Topic

- Review
- 1 Computation with positive integers
- 2 Angle relationships
- 3 Computation with positive and negative integ
- 4 Understanding fractions, decimals and perce

All HOTmaths features are included in the program, eg:

Interactive simulations & programs

WIDGET

Interactive examples

WALKTHROUGH

Worksheets (also available as workbooks)

HOTSHEET

Practice quizzes with competitive scoring option

Tests with learning management system

TAKE A TOPIC QUIZ

LEVEL 2

LEVEL 3

CHALLENGE

Maths dictionary with links to content

dictionary

www.cambridge.edu.au/hotmaths

Cambridge University Press

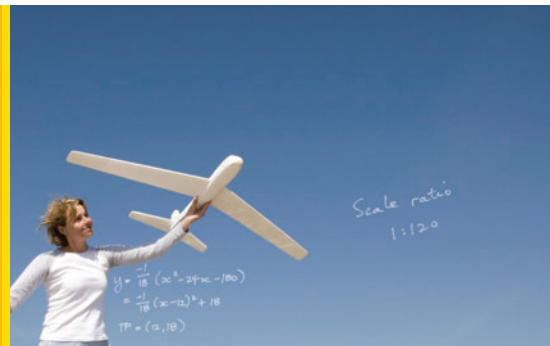
978-1-107-67670-1 - CambridgeMaths: NSW Syllabus for the Australian Curriculum: Year 10: Stage 5.1/5.2/5.3

Stuart Palmer, David Greenwood, Sara Woolley, Jenny Goodman and Jennifer Vaughan

Frontmatter

[More information](#)

Acknowledgements



The author and publisher wish to thank the following sources for permission to reproduce material:

Images: © Alamy / blickwinkel, p.503; © Bidgee. Creative Commons Attribution-Share Alike 2.5 Australia license; © Corbis / Ludo Kuipers, p.246 / STR/epa, p.729; © Flying Cloud, p.314; © iStockphoto / David Freund, p.123 / Jim Kolaczko, p.135; Used under license 2013 from Shutterstock.com / Marteric, pp.2-3 / Jan Gottwald, p.5 / concept w, p.9 / YanLev, p.10 / Theodore Scott, p.12 / atej Hudovernik, p.15 / Alexander Raths, p.20 / Mauro Pezzotta, p.21 / Orange Line Media, p.27 / VIPDesignUSA, p.29 / Konstantin L, p.35 / auremar, pp.38, 435(b) / kukuruxa, p.40 / Dmitrijs Mihejevs, p.44 / Radu Razvan, p.46 / Andrey_Kuzmin, p.50 / Mopic, p.51 / mihalec, p.59 / Mikhail Tchkeidze, p.60(t) / Anton Balazh, pp.60(b), 601 / vicspacewalker, p.64 / sarah2, p.66 / IvanMiladinovic, p.67 / ene, pp.68-69 / John T Takai, p.77 / javarman, p.80 / Olaf Speier, p.99 / Yuriy Chertok, p.103 / Marques, p.104 / Nixx Photography, p.105 / Sebastian Kaulitzki, p.107 / Jirsak, p.113 / max blain, p.116 / lightpoet, pp.117, 492 / BatlomiejsMagierowski, p.118 / Dainis Derics, p.121(t) / epstock, p.121(b) / Mark Herreid, pp.122(l), 464 / Stana, p.122(r) / Andy Dean Photography, p.124 / alexskopje, p.125 / Kevin Hellon, p.130 / Andrey Chmelyov, p.131 / EmiliaUngur, pp.132-133 / Maciej Oleksy, p.138 / mypokcik, p.139 / comodore, p.140(t) / David Evison, p.140(b) / Timo Kohlbacher, p.141 / Naiyyer, p.142 / Racheal Grazias, pp.147, 710 / iofoto, pp.148, 231(t), 432 / mangostock, p.149 / Vetal, p.150 / Patryk Kosmider, p.151 / Christo, p.154(t) / hfng, p.154(b) / Mat Hayward, p.156 / @erics, p.158 / Simon Greig, p.159(man) / Robyn Mackenzie, p.159(pie) / Evlakhov Valeriy, p.159(beer) / Umierov Nariman, p.160 / Andresr, pp.161, 184(b), 309 / Wojciech Beczynski, p.166 / Keith Gentry, p.167 / Poznyakov, p.169 / Kzenon, p.173 / SVLuma, p.174 / Pakhnyushcha, p.175 / photomak, p.179 / Real Deal Photo, p.180 / paul prescott, p.182 / alysta, p.183 / Nick Stubbs, p.184(t) / Malyugin, p.189 / Sam DCruz, pp.190-191, 310 / NAN728, p.198 / EcoPrint, p.201 / Winthrop Brookhouse, p.203 / AISPIX, p.204 / Stephen Mcsweeny, p.206 / debr22pics, p.208 / Lusoimages, p.209 / Maksim Toome, p.211 / irakite, p.213 / Laurence Gough, pp.215, 223 / Benis Arapovic, p.216 / Taras Vyshnya, pp.217, 500-501 / deva, p.221 / Lauren Cameo, p.224 / stavklem, p.225 / Lance Bellers, p.226 / Zurijeta, p.227 / Grandpa, p.231(b) / David Lee, p.234 / zhu difeng, p.239 / Lisa Turay, p.240 / Robert Kneschke, p.245 / Volodymyr Goinyk, p.247 / Vadym Drobot, p.248 / Poleze, p.251 / gallimaufry, p.253(t) / Dmitrijs Dmitrijevs, p.253(b) / kaband, pp.254-255 / Monkey Business Images, pp.257, 307 / AlexRoz, p.261 / Cliff Lloyd, p.262 / Rainer Plendl, p.268 / Ljupco Smokovski, pp.271, 546 / bikeriderlondon, pp.272, 599 / Dmitry Kalinovsky, pp.273, 425 / Yuri Arcurs, p.277 / Jeannette Meier Kamer, p.279 / Inc, p.283 / Chris Geszvain, p.285 / Alex Pix, p.290 / Paul B. Moore, p.291 / fritz16, p.292 / CROM, p.293 / AVAVA, p.297 / hin255, p.304 / Cloudia Newland, p.308 / Alan Heartfield, p.312 / Faraways, p.316(t) / Eric Gevaert, p.316(c) / Cre8tive Images, p.316(b) / SueC, p.317 / Rikard Stadler, p.327 / Sebastian Kaulitzki, p.328(l&r) / Goodluz, p.333 / Deklofenak, p.334 / SurangaWeeratunga, pp.346-347 / Tan Kian Khoo, p.360 / Andrey Burmakin, p.371(t) / rossco, p.371(b) / Layland Masuda, p.374(t) / homydesign, p.374(b) / Orla, p.376 / Zacarias Pereira da Mata,

Cambridge University Press

978-1-107-67670-1 - CambridgeMaths: NSW Syllabus for the Australian Curriculum: Year 10: Stage 5.1/5.2/5.3

Stuart Palmer, David Greenwood, Sara Woolley, Jenny Goodman and Jennifer Vaughan

Frontmatter

[More information](#)

p.377 / Jorg Hackemann, p.379 / Tamara Kulikova, p.382 / Semjonow Juri, p.384 / AISPIX, p.398 / Kitch Bain, p.403 / Philip Lange, p.408 / ssguy, p.409 / Pincasso, pp.422-423 / Vitaly M, p.429 / total, p.430 / Bertold Werkmann, p.435(t) / deb22, p.437 / Alexandra Roganova, p.439 / Andrea Danti, p.440(t) / Chrislofoto, p.440(b) / ILYA GENKIN, p.441 / Brent Wong, p.442 / Rafael Ramirez Lee, p.445(t) / jxf, p.445(b) / hightowernrw, p.446 / Dmitry Bodrov, p.447 / Rtimages, p.448 / emei, p.449 / omers, p.451 / nicobatista, p.452 / THP | Tim Hester Photography, p.453 / Vladyslav Danilin, p.460 / Curioso, p.463 / Shout It Out Design, p.465 / Mircea Bezergheanu, p.469(t) / Balefire, p.469(b) / jamalludin, p.482(b) / Gordon Heeley, p.485 / goory, p.497 / Ralph Loesche, p.498 / MelBrackstone, p.499 / Dmitriy Shironosov, p.515 / kanvag, p.519 / smilewithjul, p.521 / corepics, p.525 / Vladitto, p.526 / Peter Hansen, p.531 / TFoxFoto, p.533 / Fer Gregory, p.534(t) / Ian Bracegirdle, p.534(b) / Amy Johansson, p.539 / Alberto Zornetta, p.543 / Losevsky Pavel, p.550 / konmesa, p.551 / J.D.S, pp.552-553 / Flashon Studio, p.555 / planet5D LLC, p.564 / Bull's-Eye Arts, p.569 / Nadja Antonova, p.574 / Konstantin Chagin, p.581 / Kevin Tavares, p.586 / William Farquhar, p.588(t) / oksana.perkins, p.588(b) / Kaspars Grinvalds, p.589 / koka55, p.590(t) / Natali Glado, p.590(b) / JJ pixs, p.591 / WitthayaP, p.600 / Kamil Macniak, p.607 / B Brown, p.608 / Veronika Trofer, p.618 / sjgh, p.620 / Milos Luzanin, p.627 / Pekka Nikonen, p.634 / MarcelClemens, p.635(t) / leisuretime70, p.635(b) / Lorenzo Mondo, p.643 / Pressmaster, pp.645, 649, 682-683 / Kletr, p.652 / David Pruter, p.653 / Susan Flashman, p.654 / Peter Bernik, p.656 / Phillip Rubino, p.657 / Iamnao, p.660 / kavram, p.678 / Ing. Scheider Markus, p.681 / Kenneth William Caleno, p.685 / Darrenp, p.697(t) / Val Thoermer, p.697(b) / Laborant, p.703(l) / stevanovic.igor, p.703(r) / Sybille Yates, p.704 / Henrik Larsson, p.706(t) / marilook, p.706(b) / Anatoliy Meshkov, p.707 / Qoqazian, p.735 / Dragon Images, p.748; © Triezel327, p.481; Wikimedia Commons. Public domain, pp.14, 108, 298.

Every effort has been made to trace and acknowledge copyright. The publisher apologises for any accidental infringement and welcomes information that would redress this situation.

All curriculum material taken from *NSW Mathematics 7-10 Syllabus* © Board of Studies NSW for and on behalf of the Crown in right of the State of New South Wales, 2012.

Cambridge University Press

978-1-107-67670-1 - CambridgeMaths: NSW Syllabus for the Australian Curriculum: Year 10: Stage 5.1/5.2/5.3

Stuart Palmer, David Greenwood, Sara Woolley, Jenny Goodman and Jennifer Vaughan

Frontmatter

[More information](#)

Cambridge **GO**

YOUR GATEWAY ONLINE

Digital resources and support material for schools.

THIS TEXTBOOK IS SUPPORTED BY ONLINE RESOURCES

Additional resources are available free for users of this textbook online at *Cambridge GO* and include:

- the PDF Textbook – a downloadable version of the student text, with note-taking and bookmarking enabled
- activities in Word format
- links to other resources.

Use the unique 16-character access code found in the front of this textbook to activate these resources.



About the Interactive Textbook...

The Interactive Textbook is designed to make the online reading experience meaningful, from navigation to display. It also contains a range of extra features that enhance teaching and learning in a digital environment, including access to the Study Toolkit in PDF format.

Access the Interactive Textbook by purchasing a unique 16-character access code from your Educational Bookseller, or you may have already purchased the Interactive Textbook as a bundle with this printed textbook. The access code and instructions for use will be enclosed in a separate sealed pocket.

The Interactive Textbook is available on a calendar year subscription. For a limited time only, access to this subscription has been included with the purchase of the enhanced version of the printed student text at no extra cost. You are not automatically entitled to receive any additional interactive content or updates that may be provided on *Cambridge GO* in the future.

Preview online at:

www.cambridge.edu.au/go