Contents

For Chapters 6–9, see Teacher Companion Part Two.

PEARSON mathematics

Student Book

Student Book

Homework Program

Teacher Companion 1

Teacher Companion 2

LS LightbookStarter

Lightbook Starter
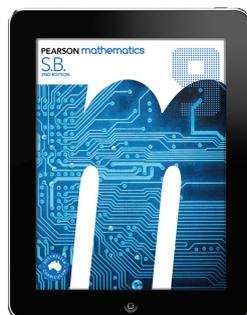
eBook

Student Book

The Second Edition Student Book includes updated questions, activities and design, with full coverage of the Australian Curriculum: Mathematics as well as the Victorian Curriculum: Mathematics.

It incorporates the latest research as well as feedback from teachers and learners across Australia.

Content caters for students of all abilities, with improved differentiation of all exercise questions and more questions for students consolidating their skills.

Homework Program

The Homework Program provides a collection of tear-out worksheets for students to practise and revise mathematical concepts.

Teacher Companion

The Teacher Companion makes lesson preparation easy by combining full-colour Student Book pages with teacher support including improved contextual teaching suggestions and strategies, class activities, extra questions, worked solutions and answers for every question in the Student Book.

AUSTRALIAN · CURRICULUM

Pearson

Pearson Lightbook Starter

Lightbook Starter is an innovative digital resource powered by Pearson's award-winning Lightbook technology. It has been developed to help students learn key mathematical concepts, evaluate their understanding and track their progress. 'Before you begin' sections assess learner readiness before each chapter topic, while 'Check-in' questions can be used to evaluate learner understanding and practice after every chapter section.

Auto-correcting questions are linked to the Progress Tracker dashboard for easy analysis and viewing of results, which are mapped to progression through the Student Book as well as to Australian Curriculum: Mathematics and Victorian Curriculum: Mathematics content descriptions.

Pearson eBook

Much more than just pages on a screen, Pearson eBook is an online or offline version of your Student Book linked to interactive content, rich media resources and other useful content specifically developed for Mathematics. It supports you with appropriate online resources and tools for every section of the Student Book, including videos, eWorked Examples, interactive lessons, worksheets and more. Teacher resources include chapter tests, full teaching programs and curriculum mapping for the Australian Curriculum: Mathematics and for the Victorian Curriculum: Mathematics.

Pearson Places is the gateway to digital learning material for teachers and students across Australia. Access your content at **www.pearsonplaces.com.au**.

P **Pearson**Digital

Professional Learning, Training and Development

Did you know that Pearson also offers teachers a diverse range of training and development product-linked learning programs? We are dedicated to supporting your implementation of **Pearson Mathematics**, but it doesn't stop there.

Our courses align closely with Pearson Mathematics Second Edition and offer an in-depth learning experience, combining both practical and theoretical elements, enabling you to implement the resource effectively in your classroom.

Find out more about our product-linked learning, workshops, courses and conferences at Pearson Academy **www.pearsonacademy.com.au**.

We believe in learning.
All kinds of learning for all kinds of people, delivered in a personal style.
Because wherever learning flourishes, so do people.

USING PEARSON
mathematics
Teacher Companion

Support for the whole department!

The *Pearson Mathematics 9 Teacher Companion* has been designed to provide support for all mathematics teachers at your school, from least to most experienced.

Active participation and inquiry

Class activities

- suggested games and activities that teachers might use to introduce, reinforce or revise mathematical concepts and skills

- useful BLMs provided

Spot the hypotenuse
Equipment required: protractor (optional), coloured pencils, 1 copy of **Appendix 2C** per student

This 5-minute activity can be used when students' concentration starts to wane, as a quick break, or as a concluding activity. The aim is for students to practise identifying the hypotenuse of a right-angled triangle. The diagram in **Appendix 2C** shows many right-angled triangles. How many can your students find? Have students trace over any hypotenuse they identify. You could turn this activity into a game where the winner is the student who can correctly identify the most. Encourage your students to use a protractor to check their work or if they aren't sure whether or not an angle is a right angle (the diagram is drawn to scale).

Spot the hypotenuse

Appendix 2C
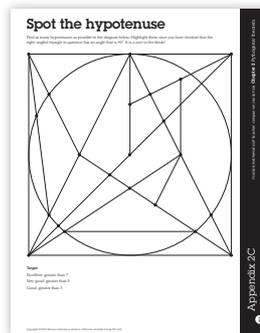
Recap

- quick questions for the beginning or end of class

- encouraging a calm, ordered beginning or end to the lesson

Recap

Question	Answer
1 Simplify: $4a^2b \times -2a^3b^5$	$-8a^5b^6$
2 Simplify: $24x^5y^4 \div 8x^2y$	$3x^3y^3$
3 Simplify: $\dfrac{2a^2 \times 4b}{2ab}$	$4a$
4 Simplify: $(p^3)^5 \times (p^2)^2$	p^{19}
5 Evaluate $4k^0$.	4

Resource summaries

- a list at the beginning of each section of all the digital and print resources available, including videos, interactives, tutorials and more

Resources
eWorked examples
- Finding a percentage of an amount
- Increasing and decreasing by a given percentage
- Writing one amount as a percentage of another

Lessons
- Percentages (1)
- Percentages (2)

Lightbook Starter
- Check-in 1.1

Appendices
- 1A Fraction, decimal and percentage equivalence cards
- 1B Ordering fractions and percentages cards

Comprehensive teaching support

Teaching strategies

- tips of the trade you would tell a new teacher if you had time

- common student misconceptions

- help for students experiencing difficulties

- suggestions for students who finish a task quickly

Which short side is *a* and which short side is *b*?
The side labels *a* and *b* can be interchanged. Emphasise this point to students so that they are confident when labelling all three sides of a right-angled triangle. Show students that they will obtain the same answer to a problem regardless of which side is labelled *a* and which side is labelled *b*. Take this discussion further. What alternative pronumerals could be used to replace *a* and *b*? What about *c*? What should one do to solve a problem if *a* and *b* are the same size? (See suggested example 4.)

Suggested examples

- examples not in the Student Book that help model the working of questions in each section

Suggested examples
1 Jeanne pays simple interest on her loan of $3790 at a rate of 2% p.a. for 3 years. How much interest does she pay?
Answer:
$I = PrT$
$I = 3790 \times 0.02 \times 3$
$I = \$227.40$
Jeanne paid back $227.40 in simple interest.

2 Marcus borrowed $3400 to buy a boat for 18 months at a rate of 19% p.a. simple interest. How much will he repay in total?
Answer:
$I = PrT$
$I = \$3400 \times 0.19 \times 1.5$
$I = \$969$
Total payment $= 3400 + 969 = \$4369$
Marcus will pay $4369 for the boat.

Answers and worked solutions

- answers and solutions showing the working required for every Student Book question and feature

Answers

Pearson Mathematics 9 Curriculum Correlation

Australian Curriculum: Mathematics correlation

This maps the Australian Curriculum: Mathematics syllabus to *Pearson Mathematics 9*.

For further details and for correlations to the Victorian Curriculum, see the Teacher Resources available to download from the eBook, or from the ProductLink page on the Pearson Places website.

Number and Algebra	Pearson Mathematics 9
Real numbers	**Chapter 3 Algebra** **Chapter 9 Non-linear relationships and proportion**
Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (ACMNA208) • identifying direct proportion in real-life contexts	9.6 Direct proportion 9.7 Inverse proportion
Apply index laws to numerical expressions with integer indices (ACMNA209) • simplifying and evaluating numerical expressions, using involving both positive and negative integer indices	3.1 Introducing index laws using variables 3.2 More index laws and index properties
Express numbers in scientific notation (ACMNA210) • representing extremely large and small numbers in scientific notation, and numbers expressed in scientific notation as whole numbers or decimals	3.3 Scientific notation and significant figures
Money and financial mathematics	**Chapter 1 Financial mathematics**
Solve problems involving simple interest (ACMNA211) • understanding that financial decisions can be assisted by mathematical calculations	1.1 Percentages review 1.2 Buying and selling 1.3 Earning an income 1.4 Tax and other pay deductions 1.5 Simple interest 1.6 Payment methods 1.7 The cost of resources 1.8 Communication costs
Patterns and algebra	**Chapter 3 Algebra**
Extend and apply the index laws to variables, using positive integer indices and the zero index (ACMNA212) • understanding that index laws apply to variables as well as numbers	3.1 Introducing index laws using variables 3.2 More index laws and index properties
Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate (ACMNA213) • understanding that the distributive law can be applied to algebraic expressions as well as numbers • understanding the relationship between expansion and factorisation and identifying algebraic factors in algebraic expressions	3.4 Rearranging formulas 3.5 Expanding the brackets 3.6 Expanding special products 3.7 Factorising using common factors 3.8 Factorising by grouping in pairs

Number and Algebra	Pearson Mathematics 9
Linear and non-linear relationships	Chapter 5 Linear relationships Chapter 9 Non-linear relationships and proportion
Find the distance between two points located on the Cartesian plane using a range of strategies, including graphing software (ACMNA214) • investigating graphical and algebraic techniques for finding distance between two points • using Pythagoras' theorem to calculate distance between two points	5.3 Coordinate geometry
Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215) • determining linear rules from suitable diagrams, tables of values and graphs and describing them using both words and algebra	5.1 Solving linear equations 5.2 Solving problems using linear equations 5.4 Plotting linear graphs 5.6 Sketching linear graphs using the gradient and y-intercept 5.7 Sketching linear graphs using the x- and y-intercepts 5.8 Vertical and horizontal graphs
Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294) • investigating graphical and algebraic techniques for finding midpoint and gradient • recognising that the gradient of a line is the same as the gradient of any line segment on that line	5.3 Coordinate geometry 5.5 Gradient 5.6 Sketching linear graphs using the gradient and y-intercept
Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations (ACMNA296) • graphing parabolas, and circles connecting x-intercepts of a graph to a related equation	9.1 Quadratic relationships 9.2 Solving quadratic equations 9.3 Sketching parabolas using transformations 9.4 Circle relationships 9.5 Exponentials and hyperbolas

Measurement and Geometry	Pearson Mathematics 9
Using units of measurement	Chapter 3 Algebra Chapter 4 Measurement Chapter 6 Geometric reasoning
Calculate areas of composite shapes (ACMMG216) • understanding that partitioning composite shapes into rectangles and triangles is a strategy for solving problems involving area	4.1 Perimeter 4.2 Area
Calculate the surface area and volume of cylinders and solve related problems (ACMMG217) • analysing nets of cylinders to establish formulas for surface area • connecting the volume and capacity of a cylinder to solve authentic problems	4.3 Surface area 4.4 Volume and capacity 6.7 Solids and nets
Solve problems involving the surface area and volume of right prisms (ACMMG218) • solving practical problems involving surface area and volume of right prisms	4.3 Surface area 4.4 Volume and capacity
Investigate very small and very large time scales and intervals (ACMMG219) • investigating the usefulness of scientific notation in representing very large and very small numbers	3.3 Scientific notation and significant figures

Measurement and Geometry	Pearson Mathematics 9
Geometric reasoning	**Chapter 6 Geometric reasoning**
Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar (ACMMG220) • establishing the conditions for similarity of two triangles and comparing this to the conditions for congruence • using the properties of similarity and ratio, and correct mathematical notation and language, to solve problems involving enlargement (for example, scale diagrams) • using the enlargement transformation to establish similarity, understanding that similarity and congruence help describe relationships between geometrical shapes and are important elements of reasoning and proof	6.1 Angle review 6.2 Triangles and congruency 6.3 Special quadrilaterals and their properties 6.5 Similarity and similar triangles 6.6 Solving problems using similar triangles
Solve problems using ratio and scale factors in similar figures (ACMMG221) • establishing the relationship between areas of similar figures and the ratio of corresponding sides (scale factor)	6.4 Enlarging and reducing 6.5 Similarity and similar triangles 6.6 Solving problems using similar triangles
Pythagoras and trigonometry	**Chapter 2 Pythagoras' theorem** **Chapter 7 Trigonometry**
Investigate Pythagoras' Theorem and its application to solving simple problems involving right angled triangles (ACMMG222) • understanding that Pythagoras' Theorem is a useful tool in determining unknown lengths in right-angled triangles and has widespread applications • recognising that right-angled triangle calculations may generate results that can be integers, fractions or irrational numbers	2.1 Pythagoras' Theorem and right-angled triangles 2.2 Finding the length of the hypotenuse 2.3 Finding the length of a shorter side 2.4 Applications of Pythagoras' Theorem 2.5 Pythagorean triples
Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles (ACMMG223) • developing understanding of the relationship between the corresponding sides of similar right-angled triangles	7.1 Introduction to trigonometry 7.2 Trigonometric ratios
Apply trigonometry to solve right-angled triangle problems (ACMMG224) • understanding the terms 'adjacent' and 'opposite' sides in a right-angled triangle • selecting and accurately using the correct trigonometric ratio to find unknown sides (adjacent, opposite and hypotenuse) and angles in right-angled triangles	7.1 Introduction to trigonometry 7.2 Trigonometric ratios 7.3 Using trigonometry to find side lengths 7.4 Using trigonometry to find angles 7.5 Applications of trigonometry

Statistics and Probability	Pearson Mathematics 9
Chance	**Chapter 8 Statistics and probability**
List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events (ACMSP225) • conducting two-step chance experiments • using systematic methods to list outcomes of experiments and to list outcomes favourable to an event • comparing experiments which differ only by being undertaken with replacement or without replacement	8.6 Probability events 8.7 Representing probability
Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' (ACMSP226) • using Venn diagrams or two-way tables to calculate relative frequencies of events involving 'and', 'or' questions • using relative frequencies to find an estimate of probabilities of 'and', 'or' events	8.5 Understanding probability 8.6 Probability events 8.7 Representing probability
Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians (ACMSP227) • investigating a range of data and its sources, for example the age of residents in Australia, Cambodia and Tonga; the number of subjects studied at school in a year by 14-year-old students in Australia, Japan and Timor-Leste	8.1 Investigating data 8.2 Interpreting data 8.4 Comparing data sets
Data representation and interpretation	**Chapter 8 Statistics and probability**
Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly and from secondary sources (ACMSP228) • comparing the annual rainfall in various parts of Australia, Pakistan, New Guinea and Malaysia	8.1 Investigating data 8.2 Interpreting data 8.4 Comparing data sets
Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal' (ACMSP282) • using stem-and-leaf plots to compare two like sets of data such as the heights of girls and the heights of boys in a class • describing the shape of the distribution of data using terms such as 'positive skew', 'negative skew' and 'symmetric' and 'bi-modal'	8.3 Statistics from grouped data 8.4 Comparing data sets
Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP283) • comparing means, medians and ranges of two sets of numerical data which have been displayed using histograms, dot plots, or stem and leaf plots	8.2 Interpreting data 8.3 Statistics from grouped data 8.4 Comparing data sets