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For Chapters 7–13, see Teacher Companion Part Two.

PEARSON
mathematics

Student Book

Homework Program

Teacher Companion 1

Teacher Companion 2

LS LightbookStarter
Lightbook Starter
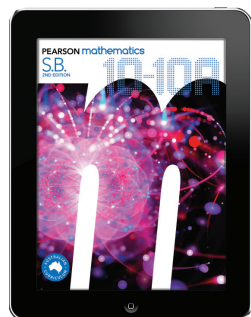
eBook

Student Book

The Student Book for 10–10A provides maximum flexibility for teachers by including both 10 and 10A material in the same book. All 10A material is clearly labelled, enabling teachers to cover 10 or 10A course topics as appropriate for different classes.

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 10–10A 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

Inequalities jigsaw
Equipment required: scissors, pen, ruler, graph paper and **Appendix 1H**

This activity is similar to a jigsaw puzzle, but involves matching an inequality with its solution and its graph. This game can either be played individually or in pairs. A copy of the jigsaw is provided in **Appendix 1H**.

1 Cut out the jigsaw, making sure that all cuts are made along the bold lines.
2 Students need to place the pieces together so that the sides are adjacent to their equivalent pair. Some students may need to complete the associated working on graph paper before they can arrange the pieces correctly.

As an extension, students could work in pairs to create their own inequality jigsaw.

SOH-CAH-TOA Categories

Appendix 6A
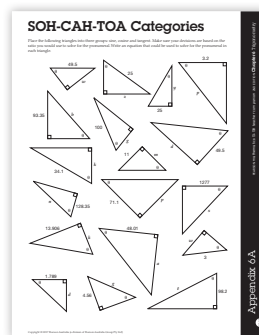
Recap

- quick questions for the beginning or end of class
- encouraging a calm, ordered beginning or end to the lesson

Recap

Question	Answer
1 What is the coefficient of $-4x^2y$?	-4
2 Simplify $3a \times 2a^3 + 5$.	$6a^4 + 5$
3 Find two numbers that multiply to give 6 and add to give -5.	-3 and -2
4 Simplify $\frac{5}{8} + \frac{2}{3}$.	$\frac{31}{24} = 1\frac{7}{24}$
5 Simplify $\frac{5}{8} \times \frac{2}{3}$.	$\frac{5}{12}$

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
Recall Worksheets
- R4.1: Expanding expressions
- R4.2: Factorisation
- R4.3: Finding numbers that multiply and add
- R4.4: Factorising quadratic trinomials

Exploration Task
- What does completing the square have to do with a square?

Lightbook Starter
- Before you begin 4

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

Student misconceptions
Students often have misconceptions about how to deal with inequalities that involve negatives. When multiplying or dividing both sides of the inequality by a negative number, reverse the direction of the inequality (i.e. > would become <). However, just because there is a negative sign in the inequality does not necessarily mean the direction of the inequality will change. Reinforce to students that it is only when you need to multiply or divide by a negative number, across the inequality, that the direction changes.

Suggested examples

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

Suggested examples

1 Find, correct to 2 decimal places, the value of the unknowns in the diagram below. Then calculate the angle of elevation, correct to the nearest minute, of the top right-hand corner of the box from the bottom left-hand corner.
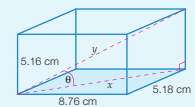
Answer:

$$x^2 = 5.18^2 + 8.76^2$$
$$x^2 = 103.57$$
$$x = \sqrt{103.57}$$
$$x = 10.176\,9347\ldots$$
$$x = 10.18 \text{ cm (2 d.p.)}$$
$$y^2 = 10.177^2 + 5.16^2$$
$$y^2 = 130.1956$$
$$y = \sqrt{130.1956}$$
$$y = 11.41 \text{ cm (2 d.p.)}$$

$$\tan(\theta) = \frac{5.16}{10.177}$$
$$\theta = \tan^{-1}\left(\frac{5.16}{10.177}\right)$$
$$\theta = 26°53' \text{ (nearest minute)}$$

Answers and worked solutions

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

Answers

Pearson Mathematics 10–10A Curriculum Correlation

Australian Curriculum: Mathematics correlation

This maps the Australian Curriculum: Mathematics syllabus to *Pearson Mathematics 10–10A*.

AC | Australian CURRICULUM

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 – Year 10	Pearson Mathematics 10–10A
Money and financial mathematics	**Chapter 13 Financial mathematics**
Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229) • working with authentic information, data and interest rates to calculate compound interest and solve related problems	13.1 Interest 13.2 Compound interest—the general formula 13.3 Compound interest—further applications 13.4 Comparing interest rates 13.5 Depreciation 13.6 Growth and decay
Patterns and algebra	**Chapter 1 Linear relationships** **Chapter 3 Algebra and quadratics, part 1** **Chapter 4 Algebra and quadratics, part 2** **Chapter 5 Measurement** **Chapter 12 Non-linear relationships and logarithms**
Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230) • using the distributive law and the index laws to factorise algebraic expressions • understanding the relationship between factorisation and expansion	3.2 Factorising using common factors
Simplify algebraic products and quotients using index laws (ACMNA231) • applying knowledge of index laws to algebraic terms, and simplifying algebraic expressions using both positive and negative integral indices	12.3 Summary of index laws
Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232) • expressing the sum and difference of algebraic fractions with a common denominator • using the index laws to simplify products and quotients of algebraic fractions	3.7 Algebraic fractions 12.3 Summary of index laws
Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233) • exploring the method of completing the square to factorise quadratic expressions and solve quadratic equations • identifying and using common factors, including binomial expressions, to factorise algebraic expressions using the technique of grouping in pairs • using the identities for perfect squares and the difference of squares to factorise quadratic expressions	3.1 Expanding brackets 3.2 Factorising using common factors 3.5 Factorising monic quadratic expressions 3.6 Factorising using special products 4.2 Factorising by completing the square 4.3 Solving quadratics by completing the square
Substitute values into formulas to determine an unknown (ACMNA234) • solving simple equations arising from formulas	1.1 Linear equations 5.6 Rearranging formulas

Number and Algebra – Year 10	Pearson Mathematics 10–10A
Linear and non-linear relationships	**Chapter 1 Linear relationships** **Chapter 3 Algebra and quadratics, part 1** **Chapter 4 Algebra and quadratics, part 2** **Chapter 12 Non-linear relationships and logarithms** **Chapter 13 Financial mathematics**
Solve problems involving linear equations, including those derived from formulas (ACMNA235) • representing word problems with simple linear equations and solving them to answer questions	1.1 Linear equations
Solve linear inequalities and graph their solutions on a number line (ACMNA236) • representing word problems with simple linear inequalities and solving them to answer questions	1.5 Linear inequalities
Solve linear simultaneous equations, using algebraic and graphical techniques, including using digital technology (ACMNA237) • associating the solution of simultaneous equations with the coordinates of the intersection of their corresponding graphs	1.6 Simultaneous equations
Solve problems involving parallel and perpendicular lines (ACMNA238) • solving problems using the fact that parallel lines have the same gradient and conversely that if two lines have the same gradient then they are parallel • solving problems using the fact that the product of the gradients of perpendicular lines is -1 and conversely that if the product of the gradients of two lines is -1 then they are perpendicular	1.2 Gradient 1.3 Sketching linear graphs 1.4 Parallel and perpendicular lines
Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate (ACMNA239) • sketching graphs of parabolas and circles • applying translations, reflections and stretches to parabolas and circles • sketching the graphs of exponential functions using transformations	3.3 Identifying quadratic graphs and their equations 3.4 Quadratic transformations 4.4 Sketching parabolas 12.1 Identifying non-linear graphs and their equations 12.2 Sketching graphs of non-linear relationships 13.6 Growth and decay
Solve linear equations involving simple algebraic fractions (ACMNA240) • solving a wide range of linear equations, including those involving one or two simple algebraic fractions, and checking solutions by substitution • representing word problems, including those involving fractions, as equations and solving them to answer the question	1.1 Linear equations
Solve simple quadratic equations using a range of strategies (ACMNA241) • using a variety of techniques to solve quadratic equations, including grouping, completing the square, the quadratic formula and choosing two integers with the required product and sum	4.1 Solving quadratic equations 4.3 Solving by completing the square 4.6 Solving non-monic quadratics

Number and Algebra – Year 10A	Pearson Mathematics 10–10A
Real numbers	**Chapter 11 Surds** **Chapter 12 Non-linear relationships and logarithms**
Define rational and irrational numbers and perform operations with surds and fractional indices (ACMNA264) • understanding that the real number system includes irrational numbers • extending the index laws to rational number indices • performing the four operations with surds	11.1 Rational and irrational numbers 11.2 Multiplying and dividing surds 11.3 Adding and subtracting surds 11.4 Surds and the distributive law 11.5 Rationalising the denominator 12.4 Fractional indices
Use the definition of a logarithm to establish and apply the laws of logarithms (ACMNA265) • investigating the relationship between exponential and logarithmic expressions • simplifying expressions using the logarithm laws	12.5 Logarithms 12.6 Laws of logarithms
Patterns and algebra	**Chapter 8 Polynomials**
Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems (ACMNA266) • investigating the relationship between algebraic long division and the factor and remainder theorems	8.3 Polynomials 8.4 Remainder and factor theorems
Linear and non-linear relationships	**Chapter 4 Algebra and quadratics, part 2** **Chapter 8 Polynomials** **Chapter 12 Non-linear relationships and logarithms** **Chapter 13 Financial mathematics**
Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations (ACMNA267) • applying transformations, including translations, reflections in the axes and stretches to help graph parabolas, rectangular hyperbolas, circles and exponential functions	12.1 Identifying non-linear graphs and their equations 12.2 Sketching graphs of non-linear relationships
Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation (ACMNA268) • investigating the features of graphs of polynomials including axes intercepts and the effect of repeated factors	8.1 Equations of the form $y = ax^n$ 8.2 Transformations of $y = ax^n$ 8.5 Sketching polynomials
Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts (ACMNA269) • writing quadratic equations that represent practical problems	4.5 Factorising non-monic quadratic trinomials 4.6 Solving non-monic quadratics
Solve simple exponential equations (ACMNA270) • investigating exponential equations derived from authentic mathematical models based on population growth	12.5 Logarithms 13.6 Growth and decay

Measurement and Geometry – Year 10	Pearson Mathematics 10–10A
Using units of measurement	**Chapter 5 Measurement**
Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids (ACMMG242) • investigating and determining the volumes and surface areas of composite solids by considering the individual solids from which they are constructed	5.1 Area 5.2 Surface areas of prisms and cylinders 5.3 Volumes of prisms and cylinders

Measurement and Geometry – Year 10	Pearson Mathematics 10–10A
Geometric reasoning	**Chapter 9 Geometry**
Formulate proofs involving congruent triangles and angle properties (ACMMG243) • applying an understanding of relationships to deduce properties of geometric figures (for example the base angles of an isosceles triangle are equal)	9.1 Congruent and similar triangles 9.2 Proving congruence and similarity 9.3 Proofs using congruent triangles 9.5 Geometric properties of special quadrilaterals
Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes (ACMMG244) • distinguishing between a practical demonstration and a proof (for example demonstrating triangles are congruent by placing them on top of each other, as compared to using congruence tests to establish that triangles are congruent) • performing a sequence of steps to determine an unknown angle giving a justification in moving from one step to the next • communicating a proof using a sequence of logically connected statements	9.1 Congruent and similar triangles 9.2 Proving congruence and similarity 9.3 Proofs using congruent triangles 9.4 Proofs using similar triangles 9.5 Geometric properties of special quadrilaterals
Pythagoras and trigonometry	**Chapter 6 Trigonometry**
Solve right-angled triangle problems including those involving direction and angles of elevation and depression (ACMMG245) • applying Pythagoras' Theorem and trigonometry to problems in surveying and design	6.1 The trigonometric ratios 6.2 Finding lengths 6.3 Finding angles 6.4 Angles of elevation and depression 6.5 Bearings 6.6 Mixed two-dimensional problems

Measurement and Geometry – Year 10A	Pearson Mathematics 10–10A
Using units of measurement	**Chapter 5 Measurement**
Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids (ACMMG271) • using formulas to solve problems • using authentic situations to apply knowledge and understanding of surface area and volume	5.4 Surface areas of tapered solids and spheres 5.5 Volumes of tapered solids and spheres 5.7 Applications of volume
Geometric reasoning	**Chapter 9 Geometry**
Prove and apply angle and chord properties of circles (ACMMG272) • performing a sequence of steps to determine an unknown angle or length in a diagram involving a circle, or circles, giving a justification in moving from one step to the next • communicating a proof using a logical sequence of statements • proving results involving chords of circles	9.6 Angles in circles 9.7 Chords of circles
Pythagoras and trigonometry	**Chapter 7 Advanced trigonometry**
Establish the sine, cosine and area rules for any triangle and solve related problems (ACMMG273) • applying knowledge of sine, cosine and area rules to authentic problems such as those involving surveying and design	7.4 The sine and cosine rules 7.5 Applications of the sine and cosine rules 7.6 Areas of triangles using trigonometry

Measurement and Geometry – Year 10A	Pearson Mathematics 10–10A
Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies (ACMMG274) • establishing the symmetrical properties of trigonometric functions • investigating angles of any magnitude • understanding that trigonometric functions are periodic and that this can be used to describe motion	7.2 The unit circle
Solve simple trigonometric equations (ACMMG275) • using periodicity and symmetry to solve equations	7.3 Solving trigonometric equations
Apply Pythagoras' Theorem and trigonometry to solving three-dimensional problems in right-angled triangles (ACMMG276) • investigating the applications of Pythagoras' theorem in authentic problems	7.1 Solving three-dimensional problems

Statistics and Probability – Year 10	Pearson Mathematics 10–10A
Chance	**Chapter 10 Probability**
Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence (ACMSP246) • recognising that an event can be dependent on another event and that this will affect the way its probability is calculated	10.1 Probability review 10.2 Venn diagrams and sample space 10.3 Mutually exclusive events 10.4 Probability tree diagrams 10.5 Conditional statements 10.6 Dependent and independent events
Use the language of 'if … then', 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247) • using two-way tables and Venn diagrams to understand conditional statements • using arrays and tree diagrams to determine probabilities	10.1 Probability review 10.2 Venn diagrams and sample space 10.3 Mutually exclusive events 10.4 Probability tree diagrams 10.5 Conditional statements 10.6 Dependent and independent events
Data representation and interpretation	**Chapter 2 Statistics**
Determine quartiles and interquartile range (ACMSP248) • finding the five-number summary (minimum and maximum values, median and upper and lower quartiles) and using its graphical representation, the box plot, as tools for both numerically and visually comparing the centre and spread of data sets	2.2 Box plots 2.3 Comparing data sets
Construct and interpret box plots and use them to compare data sets (ACMSP249) • understanding that box plots are an efficient and common way of representing and summarising data and can facilitate comparisons between data sets • using parallel box plots to compare data about the age distribution of Aboriginal and Torres Strait Islander people with that of the Australian population as a whole	2.2 Box plots 2.3 Comparing data sets

Curriculum Correlation

Statistics and Probability – Year 10	Pearson Mathematics 10–10A
Compare shapes of box plots to corresponding histograms and dot plots (ACMSP250) • investigating data in different ways to make comparisons and draw conclusions	2.1 Cumulative frequency curves 2.2 Box plots 2.3 Comparing data sets
Use scatter plots to investigate and comment on relationships between two numerical variables (ACMSP251) • using authentic data to construct scatter plots, make comparisons and draw conclusions	2.4 Scatter plots and data investigations
Investigate and describe bivariate numerical data where the independent variable is time (ACMSP252) • investigating biodiversity changes in Australia since European occupation • constructing and interpreting data displays representing bivariate data over time	2.5 Time-related data
Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data (ACMSP253) • investigating the use of statistics in reports regarding the growth of Australia's trade with other countries of the Asia region • evaluating statistical reports comparing the life expectancy of Aboriginal and Torres Strait Islander people with that of the Australian population as a whole	2.7 Statistics in the media

Statistics and Probability – Year 10A	Pearson Mathematics 10–10A
Chance	**Chapter 2 Statistics**
Investigate reports of studies in digital media and elsewhere for information on their planning and implementation (ACMSP277) • evaluating the appropriateness of sampling methods in reports where statements about a population are based on a sample • evaluating whether graphs in a report could mislead, and whether graphs and numerical information support the claims	2.7 Statistics in the media
Data representation and interpretation	**Chapter 2 Statistics**
Calculate and interpret the mean and standard deviation of data and use these to compare data sets (ACMSP278) • using the standard deviation to describe the spread of a set of data • using the mean and standard deviation to compare numerical data sets	2.8 Standard deviation
Use information technologies to investigate bivariate numerical data sets. Where appropriate use a straight line to describe the relationship allowing for variation (ACMSP279) • investigating different techniques for finding a 'line of best fit'	2.6 Lines of best fit