



**YEAR 7 MATHEMATICS**

**WORK PROGRAM**

## Year 7 Level Content Description

In Year 7, students apply a variety of mathematical concepts in real-life, life-like and purely mathematical situations.

The proficiency strands *Understanding, Fluency, Problem Solving and Reasoning* are an integral part of mathematics content across the three content strands:

*Number and Algebra, Measurement and Geometry, and Statistics and Probability.*

The proficiencies reinforce the significance of working mathematically within the content and describe how the content is explored or developed. They provide the language to build in the developmental aspects of the learning of mathematics.

*At the year 7 level:*

*Understanding* includes describing patterns in uses of indices with whole numbers, recognising equivalences between fractions, decimals, percentages and ratios, plotting points on the Cartesian plane, identifying angles formed by a transversal crossing a pair of lines, and connecting the laws and properties of numbers to algebraic terms and expressions.

*Fluency* includes calculating accurately with integers, representing fractions and decimals in various ways, investigating best buys, finding measures of central tendency and calculating areas of shapes and volumes of prisms.

*Problem Solving* includes formulating and solving authentic problems using numbers and measurements, working with transformations and identifying symmetry, calculating angles and interpreting sets of data collected through chance experiments.

*Reasoning* includes applying the number laws to calculations, applying known geometric facts to draw conclusions about shapes, applying an understanding of ratio and interpreting data displays.

## ICT Statement

Throughout Year 7, students will require ready access to ICTs at a whole-class, small group and individual level. Such ICTs include spreadsheet software, graphing software, graphic calculators or mobile device apps.

Note: A mobile device is a portable computing device, typically having a display screen with touch input or a miniature keyboard.

Ensure that the use of ICT in the classroom, including mobile devices, complies with DET policy requirements – SCM-PR-003:

Appropriate use of mobile telephones and other electronic equipment by students (<http://ppr.det.qld.gov.au/education/learning/Pages/Appropriate-Use-of-Mobile-Telephones-and-other-Electronic-Equipment-by-Students.aspx>).

## Year 7 Achievement Standard

By the end of Year 7:

Students solve problems involving the comparison, addition and subtraction of integers.

They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots.

They solve problems involving percentages and all four operations with fractions and decimals.

They compare the cost of items to make financial decisions.

Students represent numbers using variables.

They connect the laws and properties for numbers to algebra.

They interpret simple linear representations and model authentic information.

Students describe different views of three-dimensional objects.

They represent transformations in the Cartesian plane.

They solve simple numerical problems involving angles formed by a transversal crossing two parallel lines.

Students identify issues involving the collection of continuous data.

They describe the relationship between the median and mean in data displays.

Students use fractions, decimals and percentages, and their equivalences.

They express one quantity as a fraction or percentage of another.

Students solve simple linear equations and evaluate algebraic expressions after numerical substitution.

They assign ordered pairs to given points on the Cartesian plane.

Students use formulas for the area and perimeter of rectangles and calculate volumes of rectangular prisms.

Students classify triangles and quadrilaterals.

They name the types of angles formed by a transversal crossing parallel line.

Students determine the sample space for simple experiments with equally likely outcomes and assign probabilities to those outcomes.

They calculate mean, mode, median and range for data sets.

They construct stem-and-leaf plots and dot-plots.

## ASSUMED PRIOR KNOWLEDGE

By the end of **Year 6**, students recognise the properties of prime, composite, square and triangular numbers.

They describe the use of integers in everyday contexts.

They solve problems involving all four operations with whole numbers.

Students connect fractions, decimals and percentages as different representations of the same number.

They solve problems involving the addition and subtraction of related fractions.

Students make connections between the powers of 10 and the multiplication and division of decimals.

They describe rules used in sequences involving whole numbers, fractions and decimals.

Students connect decimal representations to the metric system and choose appropriate units of measurement to perform a calculation.

They make connections between capacity and volume.

They solve problems involving length and area.

They interpret timetables.

Students describe combinations of transformations.

They solve problems using the properties of angles.

Students compare observed and expected frequencies.

They interpret and compare a variety of data displays including those displays for two categorical variables.

They evaluate secondary data displayed in the media.

Students locate fractions and integers on a number line.

They calculate a simple fraction of a quantity.

They add, subtract and multiply decimals and divide decimals where the result is rational.

Students calculate common percentage discounts on sale items.

They write correct number sentences using brackets and order of operations.

Students locate an ordered pair.

Students list and communicate probabilities using simple fractions, decimals and percentages.

## General Capabilities and Cross-curriculum Priorities



Mathematics provides opportunities for students to strengthen their appreciation and understanding of Aboriginal peoples and Torres Strait Islander peoples and their living cultures. Specific content and skills within relevant sections of the curriculum can be drawn upon to encourage engagement with:

- Aboriginal and Torres Strait Islander frameworks of knowing and ways of learning
- Social, historical and cultural contexts associated with different uses of mathematical concepts in Australian Indigenous societies
- Aboriginal peoples' and Torres Strait Islander peoples' contributions to Australian society and cultures.

Mathematics provides opportunities to explore aspects of Australian Indigenous knowing in connection to, and with guidance from, the communities who own them. Using a respectful inquiry approach, students have the opportunity to explore mathematical concepts in Aboriginal and Torres Strait Islander lifestyles including knowledge of number, space, measurement and time. Through these experiences, students have opportunities to learn that Aboriginal peoples and Torres Strait Islander peoples have sophisticated applications of mathematical concepts which may be applied in other peoples' ways of knowing.

### Aboriginal and Torres Strait Islander histories and cultures

<https://8ways.wikispaces.com/8way+maths>

- Have a yarn-up about times when you've used maths to solve real problems in your life. Highlight the importance of yarning as a way of creating and passing on knowledge in Aboriginal culture.
- Use pictorial graphs to make learning maps showing student progress and desired outcomes. Explain that visualising plans and pathways is an important part of Aboriginal culture.
- Do hands-on problem-solving activities and allow time for reflection. Explore unspoken values and ethical issues in content. Explain that learning without words by using your hands, thinking deeply and finding unspoken meanings are all central to Aboriginal culture.
- Use visuals and create symbols to help students understand and remember content. Promote this as an Aboriginal form of communication.
- If you have to measure something, why not measure natural objects from the local landscape? Highlight Aboriginal connection to Country.
- Apply mathematical knowledge to unrelated/unexpected domains and contexts. Set problems with multiple creative solutions. Celebrate this kind of creative and adaptive thinking as the reason for Aboriginal culture being the longest surviving culture on the planet.
- Model every activity for students, promoting an Aboriginal protocol of "Watch first, then do".
- Relate problems and maths applications back to community life wherever possible. Where a community equivalent does not exist for content you are teaching, discuss ways in which the new knowledge could be applied for community benefit. Create outlets and projects for students to teach/apply important mathematical knowledge to the community.

**Asia and Australia's engagement with Asia**

- Use Australia's business with Asia as a basis for work with finance and percentage.
- Investigate time zones in Asia when doing time units.
- Find distances on maps including Asia or Asian cities when studying scale factor.
- For units on data, use data on Asia as a secondary source for creating graphs and compiling statistics.

**Sustainability**

- For units on measurement: find perimeters and areas of sustainable garden plots, fish farming areas; find surface area and volume of mulch bins, rainwater storage tanks;
- For units on data, use data on sustainability as a secondary source for creating graphs and compiling statistics.

## ASOT (DIMENSIONS)

|   |  |
|---|--|
| <p><b>Curriculum intent</b><br/>         What do my students need to learn?<br/>         Curriculum is the planned learning that a school offers and enacts.<br/>         Curriculum intent is what we want students to learn from the mandated curriculum.<br/>         Teachers decide how best to plan and deliver the curriculum to ensure all students have opportunities to engage in meaningful learning.</p>  | <p style="text-align: center;"><b>Content descriptions</b></p> <p>This work program provides opportunities for students to engage in the Australian Curriculum Content descriptions.</p> <p style="text-align: center;"><b>General capabilities</b></p> <p>This work program provides opportunities for students to engage in the following General capabilities:</p> <p><b>Literacy</b><br/> <b>Numeracy</b><br/> <b>ICT</b><br/>         Students will have opportunities to demonstrate the Australian Curriculum <i>ICT learning continuum</i> in:<br/>         -Investigating with ICT<br/>         -Managing and operating with ICT</p> <p><b>Critical and creative thinking</b><br/>         -Analysing, synthesising and evaluating reasoning and procedures.</p> <p><b>Personal and social capability</b><br/>         -Social awareness</p> <p style="text-align: center;"><b>Relevant prior curriculum</b></p> <p>Students require prior experience with pre-requisite topics for each unit.</p>  |
| <p><b>Feedback</b><br/>         What do my students already know?<br/>         What do my students need to learn?<br/>         How do I teach it?<br/>         Feedback is information and advice provided by a teacher, peer, parent or self about aspects of someone's performance.<br/>         The aim of feedback is to improve learning and is used to plan what to teach next and how to teach it.<br/>         Teachers and students use feedback to close the gap between where students are and where they aim to be.<br/>         Teachers use self-feedback to guide and improve their teaching practice.</p> | <p style="text-align: center;"><b>Supportive learning environment</b></p> <p><b>Differentiation</b><br/>         What do your students already know and what do your students need to learn?<br/>         Consider the individual needs of your students - including ESL, gifted and talented and students requiring additional support.<br/>         Start where students are at and differentiate teaching and learning to support the learning needs of all students.<br/>         Plan and document how you will cater for individual learning needs.<br/>         The learning experiences within this unit can be differentiated by increasing:<br/>         -the frequency of exposure for some students;<br/>         -the intensity of teaching by adjusting the group size;<br/>         -the duration needed to complete tasks and assessment.<br/>         For guided and/or independent practice tasks:<br/>         -student groupings will offer tasks with a range of complexities to cater for individual learning needs;<br/>         -rotational groupings allow for more or less scaffolding of student learning.</p> <p><b>Feedback to students</b><br/>         Establish active feedback partnerships between students, teachers and parents to find out:<br/>         • what each student already knows and can do;<br/>         • how each student is going;<br/>         • where each student needs to go next.<br/>         Ensure feedback is timely, ongoing, instructive and purposeful.<br/>         Use feedback to inform future teaching and learning.</p> |

|  |   |
|--|---|
|  | <p><b>Reflection on the unit plan</b><br/> Identify what worked well during and at the end of the unit for future planning. Reflection may include:</p> <ul style="list-style-type: none"> <li>• activities that worked well and why;</li> <li>• activities that could be improved and how;</li> <li>• monitoring and assessment that worked well and why;</li> <li>• monitoring and assessment that could be improved and how;</li> <li>• common student misconceptions that need, or needed, to be clarified</li> <li>• differentiation and future student learning needs.</li> </ul>   |
| <p><b>Sequencing teaching and learning</b><br/> What do my students already know and can do?<br/> What do my students need to learn?<br/> How do I teach it?</p>   | <p style="text-align: center;"><b>Teaching strategies and learning experiences</b></p> <p>A suggested learning sequence is outlined for each unit.<br/> See the Unit Plans and C2Cs (Teaching Sequence and attached Lesson Plans).<br/> The relationship between what is taught and how it is taught is critical in maximising student learning.<br/> Start with what your students already know and set goals for the next steps for learning.<br/> Decide how to provide multiple opportunities for all students to explore and consolidate ideas, skills and concepts by considering how students learn best and by using a variety of teaching strategies.</p>  |
| <p><b>Assessment</b><br/> What do my students understand and can do?<br/> How well do they know and do it?<br/> Assessment is the purposeful, systematic and ongoing collection of information as evidence for use in making judgments about student learning.<br/> Principals, teachers and students use assessment information to support improving student learning.<br/> Feedback from evaluation of assessment data helps to determine strengths and weaknesses in students' understanding.</p> | <p style="text-align: center;"><b>Monitoring student learning</b></p> <p>Student learning should be monitored throughout the teaching and learning process to determine student progress and learning needs.<br/> Each lesson provides opportunities to gather evidence about how students are progressing and what they need to learn next.<br/> Specific monitoring opportunities in this unit may include:</p> <p><b>Observation</b><br/> Collect information about students' ability.</p> <p><b>Consultation</b><br/> Consult with students about their ability level.</p> <p style="text-align: center;"><b>Assessing student learning</b></p> <p>A variety of assessment should be implemented, reflecting the Achievement Standards.</p> <p style="text-align: center;"><b>Moderating Assessment</b></p> <p>Before the task, teachers discuss task-specific descriptors of the quality of student performance.<br/> Teachers individually mark all student responses, applying the shared understanding achieved through this calibration process. Teachers moderate samples to ensure consistency of judgments.</p> |
| <p><b>Making judgments</b><br/> How do I know how well my students have learned?<br/> Teachers and students use standards to judge the quality of learning based on the available evidence.<br/> The process of judging and evaluating the quality of performance and depth of learning is important to promoting learning.<br/> Teachers identify the task-specific assessable elements to make judgments against specified standards on evidence.</p>  | <p style="text-align: center;"><b>Judging student learning</b></p> <p>The Achievement Standards should be reflected in the Guide to Making Judgements.<br/> The proficiency strands “Understanding and Fluency” and “Problem Solving and Reasoning” are evident in the Guides to Making Judgments.</p>  |



### YEAR 7 COURSE SCOPE AND SEQUENCE

| TERM | WEEKS | UNIT   | OVERVIEW   | ASSESSMENT |
|------|-------|--|--|------------|
| 1    | 1-4   | <b>NUMBER AND PLACE VALUE:<br/>INDICES AND INTEGERS</b><br><br>Text 1.1-1.2,<br>2.1-2.6<br>C2C 1.1-1.5, 1.10-1.11<br>6.1-6.4 | <b>ACARA:</b><br>--Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)<br>--Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)<br>--Investigate and use square roots of perfect square numbers (ACMNA150)<br>--Compare, order, add and subtract integers (ACMNA280)<br><b>GOALS:</b><br>--Explore number laws (commutative, associative, distributive) and apply to mental strategies Text 1.1 C2C 1:5<br>--Interpret index (including powers of 10) and root notation Text 1.2 C2C 1:1, 1.2, 1.4, 6.1<br>--Review multiples, factors, and divisibility Text 2.1<br>--Classify prime and composite numbers, and find prime factors Text 2.2, 2.3 C2C : 1.3<br>--Define and compare integers Text 2.4 C2C 1.10-1.11<br>--Add integers Text 2.5, 2.6 C2C 6.2, 6.3, 6.4<br>--Subtract integers Text 2.5, 2.6 C2C: 6.2, 6.3, 6.4 |            |
|      | 4-7   | <b>GEOMETRIC REASONING: ANGLES</b><br><br>Text Ch. 8.2-8.7<br>C2C 2.1-2.2  | <b>ACARA:</b><br>--Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (ACMMG163)<br>--Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)<br>--Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral (ACMMG166)<br>--Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165)<br><b>GOALS:</b><br>--Review classifying, calculating, and drawing angles. Text 8.1-8.3<br>--Review angles and parallel lines Text 8.4<br>--Review polygons; Classify triangles and quadrilaterals Text 8.5, 8.6, 8.7 C2C 2.1<br>--Find triangle angles Text 8.6 C2C 2.2<br>--Find quadrilateral angles Text 8.7 C2C 2.2  |            |
|      | 7-10  | <b>REAL NUMBERS: DECIMAL AND FRACTION CONCEPTS</b><br><br>Text Ch. 4.1-4.1, 3.1-3.3<br>C2C 5.1, 1.6                          | <b>ACARA:</b><br>--Round decimals to a specified number of decimal places (ACMNA156)<br>--Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)<br>--Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (ACMNA152)<br><b>GOALS:</b><br>--Understand place value and compare decimals Text 4.1<br>--Review rounding of whole numbers and round decimals Text 1.4, 4.2 C2C 5.1(part)<br>--Understand fraction concepts, including mixed numbers and improper fractions. Text 3.1, 3.2, C2C 1.9<br>--Simplify fractions. Text 3.2<br>--Write equivalent fractions Text 3.2<br>--Compare fractions. Text 3.3 C2C 1:6  |            |

| TERM | WEEKS | UNIT  | OVERVIEW  | ASSESSMENT |
|------|-------|---|---|------------|
| 2    | 1-4   | <p>REAL NUMBERS:<br/>PERCENTAGE, RATIO<br/>&amp; RATE</p> <p>MONEY AND<br/>FINANCIAL<br/>MATHEMATICS:<br/>BEST BUYS</p> <p>Text 4.3, 4.7-4.10<br/>C2C: 1.9,<br/>4.2-4.5, 4.10<br/>5.12, 5.2-5.7<br/>6.5-6.7<br/>8.10-8.11</p> | <p>ACARA:<br/>--Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)<br/>--Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)<br/>--Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies. (ACMNA158)<br/>--Recognise and solve problems involving simple ratios (ACMNA173)<br/>--Investigate and calculate 'best buys', with and without digital technologies (ACMNA174)</p> <p>GOALS:<br/>--Convert between fraction and decimal form. Text 4.3 C2C 1.9, 4.2<br/>--Convert fractions and decimals to percentages. Text 4.7, 4.8 C2C 4.2, 6.5-6.7<br/>--Find percentages. Text 4.8 C2C 4.3<br/>--Write ratios and convert to simplified, fraction, decimal, and percentage form.<br/>Text 4.9 C2C 4.4, 4.6<br/>--Find equivalent ratios. Text 4.9 C2C 4.5, 5.12<br/>--Compare rates. Text 4.10 C2C 5.12<br/>--Determine 'best buys' rates (with digital technology). C2C 5.2-5.7<br/>--Use scale factors. C2C 8.10-8.11</p> |            |
|      | 4-7   | <p>PATTERNS AND<br/>ALGEBRA:<br/>ALGEBRAIC<br/>EXPRESSIONS</p> <p>Text 5.1-5.6<br/>C2C: 3.1-3.5<br/>6.11-6.13</p>   | <p>ACARA:<br/>--Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)<br/>--Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)<br/>--Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)</p> <p>GOALS:<br/>--Define and use algebraic notation. Text 5.1, 5.2<br/>--Translate word problems in algebraic expressions or equations.<br/>Text 5.1, 5.2 C2C 3.1-3.5, 6.11-6.13<br/>--Use and write rules. Text 5.3 C2C 3.1-3.5, 6.11-6.13<br/>--Substitute into formulas. Text 5.4<br/>--Describe patterns using algebraic expressions. Text 5.5 C2C 3.1-3.5, 6.11-6.13<br/>--Simplify algebraic expressions using addition and subtraction of like terms. Text 5.6</p>   |            |
|      | 7-10  | <p>REAL NUMBERS:<br/>ADDITION AND<br/>SUBTRACTION OF<br/>FRACTIONS</p> <p>Text 3.4<br/>C2C 1.7-1.8<br/>4.1<br/>5.10</p>   | <p>ACARA:<br/>--Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153)</p> <p>GOALS:<br/>--Add and subtract fractions with related denominators. Text 3.4 C2C 1.7-1.8<br/>--Add and subtract fractions with unrelated denominators. Text 3.4 C2C 4.1<br/>--Add and subtract mixed numbers. Text 3.4 C2C 5.10<br/>--Apply addition and subtraction of fractions to practical situations. Text 3.4 C2C 1.7-1.8, 4.1, 5.10</p>   |            |

| TERM | WEEKS | UNIT  | OVERVIEW  | ASSESSMENT |
|------|-------|---|---|------------|
| 3    | 1-4   | LINEAR AND NON-LINEAR RELATIONSHIPS: EQUATIONS<br><br>Text: 7.1-7.5<br>C2C 3.6-3.8  | <p><b>ACARA:</b><br/>--Solve simple linear equations (ACMNA179)</p> <p><b>GOALS:</b><br/>--Evaluate and write number sentences. Text 7.1, 7.2<br/>--Determine solutions to equations. Text 7.2<br/>--Solve equations by inspection, guess and check, and backtracking. Text 7.2, 7.3 C2C 3.6-3.8<br/>--Solve equations by the vertical balance method(one and two step). Text 7.4 C2C 3.6-3.8<br/>--Solve equations by the vertical balance method(brackets). Text 7.4 C2C 3.6-3.8<br/>--Translate word problems into equations and solve. Text 7.5 C2C 3.6-3.8</p>   |            |
|      | 4-7   | MEASUREMENT AND GEOMETRY (USING UNITS OF MEASURE): PERIMETER, AREA, VOLUME<br>SHAPE: SOLIDS<br><br>Text 6.1-6.6<br>C2C 2.3-2.4, 2.11-2.12<br>7.12-7.13<br>10.6-10.7 | <p><b>ACARA:</b><br/>--Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (ACMMG159)<br/>--Calculate volumes of rectangular prisms (ACMMG160)</p> <p><b>GOALS:</b><br/>--Convert units of length. Text 6.1<br/>--Calculate perimeter. Text 6.2<br/>--Calculate areas of squares, rectangles, parallelograms. Text 6.3, 6.4 C2C 2.3, 2.11-2.12<br/>--Calculate the areas of triangles. Text 6.5 C2C 2.11-2.12<br/>--Find areas of composite shapes. Text 6.5 C2C 7.12-7.13<br/>--Draw solids. Text 10.6-10.7 C2C 2.4<br/>--Calculate volumes of rectangular prisms. Text 6.6 C2C 2.5-2.6, 7.12-7.13</p> |            |
|      | 7-10  | REAL NUMBERS: MULTIPLICATION AND DIVISION OF FRACTIONS<br><br>Text 3.5-3.7<br>C2C 5.8-5.9, 5.11   | <p><b>ACARA:</b><br/>--Multiply and divide fractions using efficient written strategies and digital technologies (ACMNA154)</p> <p><b>GOALS:</b><br/>--Multiply fractions. Text 3.5 C2C 5.8<br/>--Multiply fractions involving mixed numbers. Text 3.5 C2C 5.8<br/>--Divide fractions. Text 3.6 C2C 5.9<br/>--Divide mixed numbers. Text 3.6 C2C 5.9<br/>--Use order of operations with fraction problems. Text 1.5, 3.7 C2C 8.8<br/>--Apply fractions to word problems. Text 3.5-3.7 C2C 5.11</p>  |            |

| TERM | WEEKS | UNIT  | OVERVIEW   | ASSESSMENT |
|------|-------|---|--|------------|
| 4    | 1-4   | <b>REAL NUMBERS:<br/>MULTIPLICATION AND<br/>DIVISION OF<br/>DECIMALS</b><br><br>Text 4.4-4.6<br>C2C 6.8, 5.1  | <b>ACARA:</b><br>--Multiply and divide decimals using efficient written strategies and digital technologies (ACMNA154)<br><b>GOALS:</b><br>--Add and subtract decimals. Text 4.4<br>--Multiply decimals by whole numbers. Text 4.5 C2C 6.8, 5.1<br>--Multiply decimals by decimals. Text 4.5 C2C 6.8, 5.1<br>--Divide decimals by a whole number. Text 4.6 C2C 5.1<br>--Divide decimals by decimals. Text 4.6 C2C 5.1<br>--Apply decimals to word problems. Text 4.4-4.6   |            |
|      | 4-7   | <b>LINEAR AND NON-<br/>LINEAR<br/>RELATIONSHIPS: THE<br/>CARTESIAN PLANE<br/>LOCATION AND<br/>TRANSFORMATION:<br/>TRANSLATION,<br/>REFLECTION,<br/>ROTATION</b><br><br>Text 5.7-5.9; 10.1-10.4<br>C2C 3.9-3.12, 8.5-8.7 | <b>ACARA:</b><br>--Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178)<br>--Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)<br><b>GOALS:</b><br>--Plot and identify points on a Cartesian plane. Text 5.7 C2C 3.9<br>--Develop rules for points which form a linear graph. Text 5.8 C2C 3.10-3.12<br>--Interpret graphs formed by points. Text 5.9 C2C 7.1, 3.10-3.12<br>--Use points to sketch transformations (translation, reflection, rotation) Text 10.1-10.4<br>--Identify symmetry and create tessellations. Text 10.5 C2C 8.5-8.7   |            |
|      | 7-10  | <b>CHANCE:<br/>PROBABILITY</b><br><br><b>DATA<br/>REPRESENTATION<br/>AND<br/>INTERPRETATION:<br/>MEAN, MEDIAN, MODE,<br/>AND GRAPHS</b>   | <b>ACARA:</b><br>Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)<br>Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)<br>Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)<br>Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)<br>Describe and interpret data displays using median, mean and range (ACMSP172)<br>Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)<br><b>GOALS:</b><br>--Find probabilities. Text 9.7 C2C 4.7-4.8<br>--Illustrate sample spaces. C2C 4.9-4.11, 7.7-7.9<br>--Collect data. Text 9.1 C2C 7.4-7.6<br>--Find measures of centre and spread (mean, median, mode, range). Text 9.2 C2C 8.1<br>--Graph univariate data (dot plot, stem & leaf, column/bar, histogram). Text 9.3 C2C 7.2<br>--Graph parts of a whole (circle, divided bar/column). Text 9.4 C2C 7.2<br>--Graph bivariate data (line graphs). Text 9.5 C2C 7.2<br>--Compare data sets. Text 9.6 C2C 8.2-8.4 C2C 7.3 |            |

| ACARA CONTENT DESCRIPTION   | TERM 1 | TERM 2 | TERM 3 | TERM 4 |
|---|--------|--------|--------|--------|
| <b>NUMBER AND PLACE VALUE</b><br>Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)<br>Investigate and use square roots of perfect square numbers (ACMNA150)<br>Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)<br>Compare, order, add and subtract integers (ACMNA280)   |        |        |        |        |
| <b>GEOMETRIC REASONING</b><br>Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (ACMMG163)<br>Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)<br>Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral (ACMMG166)<br>Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165) |        |        |        |        |
| <b>REAL NUMBERS</b><br>Round decimals to a specified number of decimal places (ACMNA156)<br>Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (ACMNA152)   |        |        |        |        |
| <b>REAL NUMBERS</b><br>Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)<br>Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)<br>Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies. (ACMNA158)<br>Recognise and solve problems involving simple ratios (ACMNA173)  |        |        |        |        |
| <b>MONEY AND FINANCIAL MATHEMATICS</b><br>Investigate and calculate 'best buys', with digital technologies (ACMNA174)   |        |        |        |        |
| <b>PATTERNS AND ALGEBRA</b><br>Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)<br>Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)<br>Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)  |        |        |        |        |
| <b>REAL NUMBERS</b><br>Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153)   |        |        |        |        |
| <b>LINEAR AND NON-LINEAR RELATIONSHIPS</b><br>Solve simple linear equations (ACMNA179)  |        |        |        |        |
| <b>MEASUREMENT AND GEOMETRY: USING UNITS OF MEASUREMENT</b><br>Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (ACMMG159)<br>Calculate volumes of rectangular prisms (ACMMG160)   |        |        |        |        |
| <b>SHAPE</b><br>Draw different views of prisms and solids formed from combinations of prisms (ACMMG161)   |        |        |        |        |
| <b>REAL NUMBERS</b><br>Multiply and divide fractions using efficient written strategies and digital technologies (ACMNA154)   |        |        |        |        |
| <b>REAL NUMBERS</b><br>Multiply and divide decimals using efficient written strategies and digital technologies (ACMNA154)  |        |        |        |        |
| <b>LINEAR AND NON-LINEAR RELATIONSHIPS</b><br>Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178)<br>Investigate, interpret and analyse graphs from authentic data (ACMNA180)  |        |        |        |        |
| <b>LOCATION AND TRANSFORMATION</b><br>Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)   |        |        |        |        |
| <b>CHANCE</b><br>Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)<br>Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)  |        |        |        |        |
| <b>DATA REPRESENTATION AND INTERPRETATION</b><br>Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)<br>Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)<br>Describe and interpret data displays using median, mean and range (ACMSP172)<br>Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)                             |        |        |        |        |

## ACARA DESCRIPTORS

### Number and Place Value

Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)  
defining and comparing prime and composite numbers and explaining the difference between them  
applying knowledge of factors to strategies for expressing whole numbers as products of powers of prime factors, such as repeated division by prime factors or creating factor trees  
solving problems involving lowest common multiples and greatest common divisors (highest common factors) for pairs of whole numbers by comparing their prime factorisation

Investigate and use square roots of perfect square numbers (ACMNA150)  
investigating square numbers such as 25 and 36 and developing square-root notation  
investigating between which two whole numbers a square root lies

Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)  
understanding that arithmetic laws are powerful ways of describing and simplifying calculations

Compare, order, add and subtract integers (ACMNA280)

### Real numbers

Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (ACMNA152)  
exploring equivalence among families of fractions by using a fraction wall or a number line (for example by using a fraction wall to show that  $\frac{2}{3}$  is the same as  $\frac{4}{6}$  and  $\frac{6}{9}$ )

Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153)  
exploring and developing efficient strategies to solve additive problems  
involving fractions (for example by using fraction walls or rectangular arrays with dimensions equal to the denominators)

Multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)  
investigating multiplication of fractions and decimals, using strategies including patterning and multiplication as repeated addition, with both concrete materials and digital technologies,  
and identifying the processes for division as the inverse of multiplication

Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)  
using authentic examples for the quantities to be expressed and understanding the reasons for the calculations

Round decimals to a specified number of decimal places (ACMNA156)  
using rounding to estimate the results of calculations with whole numbers and decimals, and understanding the conventions for rounding

Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)  
justifying choices of written, mental or calculator strategies for solving specific problems including those involving large numbers  
understanding that quantities can be represented by different number types and calculated using various operations, and that choices need to be made about each  
calculating the percentage of the total local municipal area set aside for parkland, manufacturing, retail and residential dwellings to compare land use

Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies. (ACMNA158)  
using authentic problems to express quantities as percentages of other amounts

Recognise and solve problems involving simple ratios (ACMNA173)  
understanding that rate and ratio problems can be solved using fractions or percentages and choosing the most efficient form to solve a particular problem

### **Money and financial mathematics**

Investigate and calculate 'best buys', with and without digital technologies (ACMNA174)  
applying the unitary method to identify 'best buys' situations, such as comparing the cost per 100g

### **Patterns and algebra**

Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)  
understanding that arithmetic laws are powerful ways of describing and simplifying calculations and that using these laws leads to the generality of algebra

Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)  
using authentic formulas to perform substitutions

Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)  
identifying order of operations in contextualised problems, preserving the order by inserting brackets in numerical expressions, then recognising how order is preserved by convention  
moving fluently between algebraic and word representations as descriptions of the same situation

### **Linear and non-linear relationships**

Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178)  
plotting points from a table of integer values and recognising simple patterns, such as points that lie on a straight line

Solve simple linear equations (ACMNA179)  
solving equations using concrete materials, such as the balance model, and explain the need to do the same thing to each side of the equation  
using substitution to check solutions  
investigating a range of strategies to solve equations

Investigate, interpret and analyse graphs from authentic data (ACMNA180)  
using travel graphs to investigate and compare the distance travelled to and from school  
interpreting features of travel graphs such as the slope of lines and the meaning of horizontal lines  
using graphs of evaporation rates to explore water storage

### **Measurement and Geometry**

#### **Using units of measurement**

Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (ACMMG159)  
building on the understanding of the area of rectangles to develop formulas for the area of triangles  
establishing that the area of a triangle is half the area of an appropriate rectangle  
using area formulas for rectangles and triangles to solve problems involving areas of surfaces

Calculate volumes of rectangular prisms (ACMMG160)  
investigating volumes of cubes and rectangular prisms and establishing and using the formula  $V = l \times b \times h$   
understanding and using cubic units when interpreting and finding volumes of cubes and rectangular prisms

#### **Shape**

Draw different views of prisms and solids formed from combinations of prisms (ACMMG161)  
using aerial views of buildings and other 3-D structures to visualise the structure of the building or prism

#### **Location and transformation**

Describe translations, reflections in an axis, and rotations of multiples of  $90^\circ$  on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)  
describing patterns and investigating different ways to produce the same transformation such as using two successive reflections to provide the same result as a translation  
experimenting with, creating and re-creating patterns using combinations of reflections and rotations using digital technologies

## **Geometric reasoning**

Identify corresponding, alternate and cointerior angles when two straight lines are crossed by a transversal (ACMMG163)  
defining and classifying pairs of angles as complementary, supplementary, adjacent and vertically opposite

Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)  
constructing parallel and perpendicular lines using their properties, a pair of compasses and a ruler, and dynamic geometry software  
defining and identifying the relationships between alternate, corresponding and co-interior angles for a pair of parallel lines cut by a transversal

Demonstrate that the angle sum of a triangle is  $180^\circ$  and use this to find the angle sum of a quadrilateral (ACMMG166)  
using concrete materials and digital technologies to investigate the angle sum of a triangle and quadrilateral

Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165)  
identifying side and angle properties of scalene, isosceles, right-angled and obtuse-angled triangles  
describing squares, rectangles, rhombuses, parallelograms, kites and trapeziums

## **Statistics and Probability**

### **Chance**

Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)  
discussing the meaning of probability terminology (for example probability, sample space, favourable outcomes, trial, events and experiments)  
distinguishing between equally likely outcomes and outcomes that are not equally likely

Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)  
expressing probabilities as decimals, fractions and percentages

### **Data representation and interpretation**

Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)  
obtaining secondary data from newspapers, the Internet and the Australian Bureau of Statistics  
investigating secondary data relating to the distribution and use of non-renewable resources around the world

Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)  
understanding that some data representations are more appropriate than others for particular data sets, and answering questions about those data sets  
using ordered stem-and-leaf plots to record and display numerical data collected in a class investigation, such as constructing a class plot of height in centimetres on a shared stem-and-leaf plot for which the stems 12, 13, 14, 15, 16 and 17 have been produced

Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)  
understanding that summarising data by calculating measures of centre and spread can help make sense of the data

Describe and interpret data displays using median, mean and range (ACMSP172)  
using mean and median to compare data sets and explaining how outliers may affect the comparison  
locating mean, median and range on graphs and connecting them to real life