Year 7 standard elaborations — Australian Curriculum: Mathematics

Purpose

The standard elaborations (SEs) provide additional clarity when using the Australian Curriculum achievement standard to make judgments on a five-point scale. They promote and support:

- aligning curriculum, assessment and reporting, connecting curriculum and evidence in assessment, so that what is assessed relates directly to what students have had the opportunity to learn
- continuing skill development from one year of schooling to another
- making judgments on a five-point scale based on evidence of learning in a folio of student work
- developing task-specific standards and grading guides.

Structure

The SEs are developed using the **Australian Curriculum achievement standard**. In Years 7 to 10, the Mathematics SEs have been organised using the **proficiency strands**. Performance is frequently represented in terms of complexity and familiarity of the standard being assessed. Across the elaborations this is described according to:
A — unfamiliar, B — complex familiar, C — simple familiar, D — some simple familiar, E — partial, isolated and obvious.

The Mathematics achievement standard describes the learning expected of students at each year level. Teachers use the achievement standard during and at the end of a period of teaching to make on-balance judgments about the quality of learning students demonstrate.

In Queensland the achievement standard represents the **C standard** — a sound level of knowledge and understanding of the content, and application of skills. The SEs are presented in a **matrix**. The discernible differences or degrees of quality associated with the five-point scale are highlighted to identify the characteristics of student work on which teacher judgments are made. Terms are described in the Notes section following the matrix.

Year 7 Australian Curriculum: Mathematics 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 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.

Source	Australian Curriculum, Assessment and Reporting Authority (ACARA), *Australian Curriculum Version 8 Mathematics for Foundation–10*, www.australiancurriculum.edu.au/Mathematics/Curriculum/F-10

Year 7 Mathematics standard elaborations

		A	B	C	D	E
		The folio of a student's work has the following characteristics:				
Understanding and fluency	**Conceptual understanding**	connection and description of mathematical concepts and relationships in unfamiliar situations	connection and description of mathematical concepts and relationships in complex familiar situations	recognition and identification of mathematical concepts and relationships in simple familiar situations	some identification of simple mathematical concepts	statements about obvious mathematical concepts
	Procedural fluency	recall and use of facts, definitions, technologies and procedures to find solutions in unfamiliar situations	recall and use of facts, definitions, technologies and procedures to find solutions in complex familiar situations	recall and use of facts, definitions, technologies and procedures to find solutions in simple familiar situations	some recall and use of facts, definitions, technologies and simple procedures	partial recall of facts, definitions or simple procedures
	Mathematical language and symbols	effective and clear use of appropriate mathematical terminology, diagrams, conventions and symbols	consistent use of appropriate mathematical terminology, diagrams, conventions and symbols	use of appropriate mathematical terminology, diagrams, conventions and symbols	use of aspects of mathematical terminology, diagrams and symbols	use of everyday language

		A	B	C	D	E
Problem-solving and reasoning	**Problem-solving approaches**	systematic application of relevant problem-solving approaches to investigate unfamiliar situations	application of relevant problem-solving approaches to investigate complex familiar situations	application of problem-solving approaches to investigate simple familiar situations	some selection and application of problem-solving approaches in simple familiar situations.	partial selection of problem-solving approaches
	Mathematical modelling	development of mathematical models and representations in unfamiliar situations	development of mathematical models and representations in complex familiar situations	development of mathematical models and representations in simple familiar situations	statements about simple mathematical models and representations	isolated statements about given mathematical models and representations
	Reasoning and justification	clear explanation of mathematical thinking and reasoning, including justification of choices made, evaluation of strategies used and conclusions reached	explanation of mathematical thinking and reasoning, including reasons for choices made, strategies used and conclusions reached	description of mathematical thinking and reasoning, including discussion of choices made, strategies used and conclusions reached	statements about choices made, strategies used and conclusions reached	isolated statements about given strategies or conclusions

Key	shading emphasises the qualities that discriminate between the A–E descriptors

Notes

Australian Curriculum common dimensions

The SEs describe the qualities of achievement in the two dimensions common to all Australian Curriculum learning area achievement standards — understanding and skills.

Dimension	Description
understanding	the concepts underpinning and connecting knowledge in a learning area, related to a student's ability to appropriately select and apply knowledge to solve problems in that learning area
skills	the specific techniques, strategies and processes in a learning area

Terms used in Year 7 Mathematics SEs

The following terms are used in the Year 7 Mathematics SEs. Definitions are drawn from the ACARA Australian Curriculum Mathematics glossary (www.australiancurriculum.edu.au/f-10-curriculum/mathematics/glossary) and from other sources to ensure consistent understanding.

Term	Description
accuracy; accurate	consistent with a standard, rule, convention or known fact
application; apply	use or employ in a particular situation
appropriate	fitting, suitable to the context
aspects	particular parts or features
clarity; clear	easy to perceive, understand or interpret, without ambiguity
comparison; compare	estimate, measure or note how things are similar or dissimilar
complex familiar	students are required to choose and apply procedures in a situation involving a number of elements, components or steps in a context that has been a focus of prior learning
conceptual understanding	connection, description, recognition and identification of mathematical concepts and relationships; in Year 7, examples include: *Number and algebra* • describing patterns in uses of indices with whole numbers • comparing fractions using equivalence • understanding that quantities can be represented by different number types and calculated using various operations, and that choices need to be made about each • connecting the laws and properties of numbers to algebraic terms and expressions • defining and comparing prime and composite numbers and explaining the difference between them *Measurement and geometry* • explaining measurements of perimeter and area • understanding and using cubic units when interpreting and finding volumes of cubes and rectangular prisms • describing squares, rectangles, rhombuses, parallelograms, kites and

Term	Description
	trapeziums *Statistics and probability* • discussing the meaning of probability terminology (for example probability, sample space, favourable outcomes, trial, events and experiments) • explaining the purpose of statistical measures
connection; connect	establish a link
consistent	regular in occurrence; in agreement and not self-contradictory
description; descriptive; describe	give an account of characteristics or features
discussion; discuss	talk or write about a topic, taking in to account different issues or ideas
effective	meeting the assigned purpose in a considered and/or efficient manner to produce a desired or intended result
evaluation; evaluate	examine and judge the merit or significance of something
explanation; explanatory; explain	provide additional information that demonstrates understanding of reasoning and/or application
fluency	students develop skills in choosing appropriate procedures; carrying out procedures flexibly, accurately, efficiently and appropriately; and recalling factual knowledge and concepts readily; students are fluent when they calculate answers efficiently, when they recognise robust ways of answering questions, when they choose appropriate methods and approximations, when they recall definitions and regularly use facts, and when they can manipulate expressions and equations to find solutions; in Year 7, *fluency* is represented in the valued features of *procedural fluency* and *mathematical language and symbols*
given	known or provided
identification; identify	establish or indicate who or what someone or something is
investigate	plan, collect and interpret data/information and draw conclusions about
isolation; isolated	unconnected; set apart
interpretation; interpret	explaining the meaning of information or actions; in the context of Mathematics, this involves giving meaning to information presented in various forms, e.g. words, symbols, diagrams, graphs
justification; justify	show how an argument or conclusion is right or reasonable
mathematical language and symbols	use of appropriate mathematical terminology, diagrams, conventions and symbols; in Year 7, examples include: *Number and algebra* • index notation, whole numbers, prime numbers, composite numbers • lowest common multiples and greatest common divisors (highest common factors) • square root, equivalence, numerator, denominator

Term	Description
	• sum, difference, product, quotient • percentage, fraction, decimal • 'best buy', discount, retail price • Cartesian plane, coordinates, linear • rate, distance–time graph (travel graph), speed, gradient (and slope), variable *Measurement and geometry* • quadrilateral, scalene, isosceles, right-angled and obtuse-angled triangle, square, rectangle, rhombus, parallelogram, kite and trapezium • rectangular prism • parallel, perpendicular, translation, reflection, rotation • complementary, supplementary, adjacent, vertically opposite, alternate, corresponding and co-interior angles *Statistics and probability* • probability, sample space, favourable outcomes, trial, events, experiments • mean, median, mode, range
mathematical modelling	depicting a situation that expresses relationships using mathematical concepts and language; in Year 7, examples include: • solving equations using concrete materials, such as the balance model • investigating and interpreting graphs of authentic data, such as the slope of lines of distance v time graphs, and using graphs of evaporation rates to explore water storage • using aerial views of buildings and other 3D structures to visualise the structure of the building or prism
obvious	evident; apparent
partial	incomplete, half-done, unfinished
problem-solving	students develop the ability to make choices, interpret, formulate, model and investigate problem situations, and communicate solutions effectively; students formulate and solve problems when they use mathematics to represent unfamiliar or meaningful situations, when they design investigations and plan their approaches, when they apply their existing strategies to seek solutions, and when they verify that their answers are reasonable; in Year 7, *problem-solving* is represented in the valued features of *problem-solving approaches* and *mathematical modelling*
problem-solving approaches	use of problem-solving approaches to investigate situations; in Year 7, examples include: • posing a question • making choices when designing investigations • interpreting mathematical or real-life situations • formulating and solving authentic problems using numbers and measurements • investigating square numbers such as 25 and 36 and developing square-root notation • exploring equivalence among families of fractions by using a fraction wall or a number line, e.g. by using a fraction wall to show that $\frac{2}{3}$ is the same as $\frac{4}{6}$ and $\frac{6}{9}$ • 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

Term	Description
	• using area formulas for rectangles and triangles to solve problems involving areas of surfaces • experimenting with, creating and re-creating patterns using combinations of reflections and rotations using digital technologies • working with transformations and identifying symmetry • constructing parallel and perpendicular lines using their properties, a pair of compasses and a ruler, and dynamic geometry software • obtaining secondary data from newspapers, the internet and the Australian Bureau of Statistics • interpreting sets of data collected through chance experiments • determining the evidence needed to support a conclusion or hypothesis • formulating a plan • verifying that answers are reasonable
procedural fluency	recall and use of facts, definitions, technologies and procedures to find solutions in Year 7, examples include: *Number and algebra* • calculating accurately with simple decimals, indices and integers • locating and representing positive and negative fractions and mixed numerals on a number line • factorising and simplifying basic algebraic expressions • using rounding to estimate the results of calculations with whole numbers and decimals • moving fluently between algebraic and word representations as descriptions of the same situation • plotting points on the Cartesian plane from a table of integer values *Measurement and geometry* • calculating areas of shapes and volumes of prisms • defining and classifying pairs of angles as complementary, supplementary, adjacent and vertically opposite *Statistics and probability* • expressing probabilities as decimals, fractions and percentages • using ordered stem-and-leaf plots to record and display numerical data collected in a class investigation
range	covers the scope of relevant situations or elements; in Year 7, the *range* of situations and problems included simple familiar, simple unfamiliar, complex familiar and unfamiliar
reasoning	students develop an increasingly sophisticated capacity for logical thought and actions, such as analysing, proving, evaluating, explaining, inferring, justifying and generalising; students are reasoning mathematically when they explain their thinking, when they deduce and justify strategies used and conclusions reached, when they adapt the known to the unknown, when they transfer learning from one context to another, when they prove that something is true or false and when they compare and contrast related ideas and explain their choices; in Year 7, *reasoning* is represented in the valued features of *reasoning and justification* and *mathematical modelling*

Term	Description
reasoning and justification	description and explanation of mathematical thinking and reasoning, including discussion, justification and evaluation of choices made, strategies used, proofs formulated and conclusions reached; in Year 7, examples include: • justifying choices of written, mental or calculator strategies for solving specific problems • expressing one quantity as a fraction of another and explaining the reasons for the calculations • 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 • applying known geometric facts to draw conclusions about shapes
reasons; reasoned	logical and sound; presented with justification
recall	remember information, ideas or experiences
recognition; recognise	to be aware of, or acknowledge
relevant	connected to the matter in hand
represent	use words, images, symbols or signs to convey meaning
satisfactory	meets the expectation or expected standard; sufficient and competent
simple familiar	students are required to choose and apply procedures in a situation involving few elements, components or steps, and in a context that has been a focus of prior learning
statement; state	a sentence or assertion
systematic	methodical, organised and logical
understanding	students build a robust knowledge of adaptable and transferable mathematical concepts; they make connections between related concepts and progressively apply the familiar to develop new ideas; they develop an understanding of the relationship between the 'why' and the 'how' of mathematics; students build understanding when they connect related ideas, when they represent concepts in different ways, when they identify commonalities and differences between aspects of content, when they describe their thinking mathematically and when they interpret mathematical information; in Year 7, *understanding* is represented in the valued features of *conceptual understanding* and *mathematical language and symbols*
unfamiliar	students are required to choose and apply procedures in a situation involving a number of elements, components or steps in a context in which students have had limited prior experience
use; use of	to operate or put into effect