AusVELS Mathematics AC - Number & Algebra (Strands and Sub-Strands with Elaborations)

PROGRESSION IS HIGHLIGHTED IN THE FOLLOWING DOCUMENT VIA **BOLDED TEXT**.

Based on Australian Curriculum, Assessment and Reporting Authority (ACARA) materials

Cross-curriculum priorities		
Aboriginal and Torres Strait Islander histories and cultures	Asia and Australia's engagement with Asia	Sustainability

Year Level Indicators	PROFICIENCY STRANDS 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.	Sub-strands							
		Number and place value		Fractions and decimals		Money and financial mathematics		Patterns and algebra	
		Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations	Content Descriptor	Elaborations
Foundation	**Sourced from Level descriptions:** 'At this level: **Understanding** includes connecting names, numerals and quantities' '**Fluency** includes readily counting numbers in sequences, continuing patterns...,' '**Problem Solving** includes using materials to model authentic problems, sorting objects, using familiar counting sequences to solve unfamiliar problems, and discussing the reasonableness of the answer' '**Reasoning** includes explaining comparisons of quantities, creating patterns...,'	Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point (ACMNA001)	* Reading stories from other cultures featuring counting in sequence to assist students to recognise ways of counting in local languages and across cultures * Identifying the number words in sequence, backwards and forwards, and reasoning with the number sequences, establishing the language on which subsequent counting experiences can be built * Developing fluency with forwards and backwards counting in meaningful contexts, including stories and rhymes * Understanding that numbers are said in a particular order and there are patterns in the way we say them	N/A	N/A	N/A	N/A	Sort and classify familiar objects and explain the basis for these classifications. Copy, continue and create patterns with objects and drawings (ACMNA005)	* Observing natural patterns in the world around us * Creating and describing patterns using materials, sounds, movements or drawings
		Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond (ACMNA002)	* Understanding that each object must be counted only once, that the arrangement of objects does not affect how many there are, and that the last number counted answers the 'how many' question * Using scenarios to help students recognise that other cultures count in a variety of ways, such as by placing one pebble in a bag to represent one object (for example to count the number of cattle).						
		Subitise small collections of objects (ACMNA003)	* Using subitising as the basis for ordering and comparing collections of numbers						
		Compare, order and make correspondences between collections, initially to 20, and explain reasoning (ACMNA289)	* Comparing and ordering items of like and unlike characteristics using the words 'more', 'less', 'same as' and 'not the same as' and giving reasons for these answers * Understanding and using terms such as 'first' and 'second' to indicate ordinal position in a sequence. * Using objects which are personally and culturally relevant to students						
		Represent practical situations to model addition and sharing (ACMNA004)	* Using a range of practical strategies for adding small groups of numbers, such as visual displays or concrete materials * Using Aboriginal and Torres Strait Islander methods of adding, including spatial patterns and reasoning						
Foundation Level Achievement Standard	NOTE: The standards are not divided into sub-strands in the AusVELS documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students connect number names and numerals with sets of up to 20 elements, estimate the size of these sets, and use counting strategies to solve problems that involve comparing, combining and separating these sets. They match individual objects with counting sequences up to and back from 20. Students order the first 10 elements of a set.							

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Level 1	**Sourced from Level descriptions:** 'At this level: **Understanding** includes connecting names, numerals and quantities, and **partitioning numbers in various ways**' '**Fluency** includes counting number in sequences readily **forward and backwards, locating numbers on a line**...,' '**Problem Solving** includes using materials to model authentic problems, using familiar counting sequences to solve unfamiliar problems and discussing the reasonableness of the answer' '**Reasoning** includes...,' ',...**explaining** patterns **that have been created**'	**Develop confidence with** number sequences to and from **100** by ones from any starting point. **Skip count by twos, fives and tens starting from zero** (ACMNA012)	* Using the popular Korean counting game (samyukgu) for skip counting * Developing fluency with forwards and backwards counting in meaningful contexts such as circle games	**Recognise and describe one-half as one of two equal parts of a whole.** (ACMNA016)	* Sharing a collection of readily available materials into two equal portions * Splitting an object into two equal pieces and describing how the pieces are equal	**Recognise, describe and order Australian coins according to their value** (ACMNA017)	* Showing that coins are different in other countries by comparing Asian coins to Australian coins * Understanding that the value of Australian coins is not related to size * Describing the features of coins that make it possible to identify them	**Investigate and describe number patterns formed by skip counting and patterns with objects** (ACMNA018)	* Using place-value patterns beyond the teens to generalise the number sequence and predict the next number * Investigating patterns in the number system, such as the occurrence of a particular digit in the numbers to 100
		Recognise, model, read, write and order numbers to at least 100. **Locate these numbers on a number line** (ACMNA013)	* Modelling numbers with a range of material and images * Identifying numbers that are represented on a number line and placing numbers on a prepared number line						
		Count collections to **100 by partitioning numbers using place value** (ACMNA014)	* Understanding partitioning of numbers and the importance of grouping in tens * Understanding two-digit numbers as comprised of tens and ones/units						
		Represent and **solve** simple addition and **subtraction** problems **using a range of strategies including counting on, partitioning and rearranging parts** (ACMNA015)	* Developing a range of mental strategies for addition and subtraction problems						
Level 1 Achievement Standard	NOTE: The standards are not divided into sub-strands in the AusVELS documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students **describe** number sequences resulting from skip counting by 2s, 5s and 10s. Students count to and from 100 and locate numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies.		They identify **representations of one half.**		Students recognise **Australian coins according to their value**.		Students **describe** number sequences resulting from skip counting by 2s, 5s and 10s. They **continue** simple patterns involving numbers and objects **with and without the use of digital technology**.	

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Level 2	**Sourced from Level descriptions:** 'At this level: **Understanding** includes connecting **number calculations with counting sequences**, partitioning and **combining** numbers **flexibly**, **identifying and describing the relationship between addition and subtraction and between multiplication and division** **Fluency** includes counting numbers in sequences readily...,' '...**Problem Solving** **includes formulating problems from** authentic situations, **making** models and **using number sentences that represent problem situations**...,' '...**Reasoning** includes **using known facts to derive strategies for unfamiliar calculations, comparing and contrasting related models of operations**...,'	**Investigate** number sequences, initially those increasing and decreasing by twos, **threes**, fives and ten from **any starting point, then moving to other sequences**. (ACMNA026)	* Developing fluency and confidence with numbers and calculations by saying number sequences * Recognising patterns in number sequences, such as adding 10 always results in the same final digit	**Recognise and interpret common uses of halves, quarters and eighths of shapes and collections** (ACMNA033)	* Recognising that sets of objects can be partitioned in different ways to demonstrate fractions * Relating the number of parts to the size of a fraction	**Count** and order **small collections** of Australian coins and **notes according to their value** (ACMNA034)	* Identifying equivalent values in collections of coins or notes, such as two five-cent coins having the same value as one 10 cent coin * Counting collections of coins or notes to make up a particular value, such as that shown on a price tag	Describe patterns with numbers and **identify missing elements** (ACMNA035)	* Describing a pattern created by skip counting and representing the pattern on a number line * Investigating features of number patterns resulting from adding twos, fives or 10s
		Recognise, model, represent and order numbers to at least **1000** (ACMNA027)	* Recognising there are different ways of representing numbers and identifying patterns going beyond 100 * Developing fluency with writing numbers in meaningful contexts					**Solve problems by using number sentences** for addition or subtraction (ACMNA036)	* Representing a word problem as a number sentence * Writing a word problem to represent a number sentence
		Group, partition and **rearrange** collections up to **1000 in hundreds, tens and ones to facilitate more efficient** counting (ACMNA028)	* Using an abacus to model and represent numbers * Understanding three-digit numbers as comprised of hundreds, tens and ones/units * Demonstrating and using models such as linking blocks, sticks in bundles, place-value blocks and Aboriginal bead strings and explaining reasoning						
		Explore the connection between addition and subtraction (ACMNA029)	* Becoming fluent with partitioning numbers to understand the connection between addition and subtraction * Using counting on to identify the missing element in an additive problem						
		Solve simple addition and subtraction problems using **a range of efficient mental and written strategies** (ACMNA030)	* Becoming fluent with a range of mental strategies for addition and subtraction problems, such as commutativity for addition, building to 10, doubles, 10 facts and adding 10 * Modelling and representing simple additive situations using materials such as 10 frames, 20 frames and empty number lines						
		Recognise and represent multiplication as repeated addition, groups and arrays (ACMNA031)	* Representing array problems with available materials and explaining reasoning * Visualising a group of objects as a unit and using this to calculate the number of objects in several identical groups						
		Recognise and represent division as grouping into equal sets and solve simple problems using these representations (ACMNA032)	* Dividing the class or a collection of objects into equal-sized groups * Identifying the difference between dividing a set of objects into three equal groups and dividing the same set of objects into groups of three						
Level 2 Achievement Standard	NOTE: The standards are not divided into sub-strands in the AusVELS documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence, **and use digital technology to produce sequences by constant addition.**		and they divide collections and shapes into halves, quarters and eighths.		They **find the total value of** simple c ollections of Australian notes and coi ns.			
		They perform simple addition and subtraction calculations, using a range of strategies.							
		Students count to and from, and order nu mbers up to 1000.							
		Students represent multiplication and division by grouping into sets							

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Level 3	**Sourced from Level descriptions:** 'At this level: **Understanding** includes connecting number **representations** with number sequences, partitioning and combining numbers flexibly, **representing unit fractions**...,' ',...**Fluency** includes **recalling multiplication facts**...,' ',...**Problem Solving** includes...,' ',...**using number properties** to continue number patterns **Reasoning** includes using **generalising from number properties and results of calculations**...,'	Investigate the conditions required **for a number to be odd or even and identify odd and even numbers** (ACMNA051)	* Identifying even numbers using skip counting by twos or by grouping even collections of objects in twos * Explaining why all numbers that end in the digits 0, 2, 4, 6 and 8 are even and that numbers ending in 1, 3, 5, 7 and 9 are odd	**Model and represent unit** fractions including 1/2, 1/4, **1/3, 1/5 and their multiples to a complete whole** (ACMNA058)	* Partitioning areas, lengths and collections to create halves, thirds, quarters and fifths, such as folding the same sized sheets of paper to illustrate different unit fractions and comparing the number of parts with their sizes * Locating unit fractions on a number line * Recognising that in English the term 'one third' is used (order: numerator, denominator) but that in other languages this concept may be expressed as 'three parts, one of them' (order: denominator, numerator) for example Japanese	**Represent** money values **in multiple ways** and **count the change required for simple transactions to the nearest five cents** (ACMNA059)	* Recognising the relationship between dollars and cents, and that not all countries use these denominations and divisions (for example Japanese Yen)	Describe, continue, and **create** number patterns **resulting from performing addition or subtraction** (ACMNA060)	* Identifying and writing the rules for number patterns * Describing a rule for a number pattern, then creating the pattern
		Recognise, model, represent and order numbers to at least **10 000** (ACMNA052)	* Placing four-digit numbers on a number line using an appropriate scale * Reproducing numbers in words using their numerical representations and vice versa						
		Apply place value to partition, rearrange and regroup numbers to at least **10 000 to assist calculations and solve problems** (ACMNA053)	* Recognising that 10 000 equals 10 thousands, 100 hundreds, 1000 tens and 10 000 ones * Justifying choices about partitioning and regrouping numbers in terms of their usefulness for particular calculations						
		Recognise and explain the connection between addition and subtraction (ACMNA054)	* Demonstrating the connection between addition and subtraction using partitioning or by writing equivalent number sentences						
		Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation (ACMNA055)	* Recognising that certain single-digit number combinations always result in the same answer for addition and subtraction, and using this knowledge for addition and subtraction of larger numbers * Combining knowledge of addition and subtraction facts and partitioning to aid computation (for example 57 + 19 = 57 + 20 – 1)						
		Recall multiplication facts of two, three, five and ten **and related division facts** (ACMNA056)	* Establishing multiplication facts using number sequences						
		Represent and solve problems involving multiplication **using efficient mental and written strategies and appropriate digital technologies** (ACMNA057)	* Writing simple word problems in numerical form and vice versa * Using a calculator to check the solution and reasonableness of the answer						
Level 3 Achievement Standard	NOTE: The standards are not divided into sub-strands in the AusVELS documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students count to and from 10 000. Students recall addition and multiplication facts for single-digit numbers. They classify numbers as either odd or even, continue number patterns involving addition and subtraction, and explore simple number sequences b ased on multiples.		Students model and represent unit fractions for halves, thirds, quarters, fifths and eights, and multiples of these up to **one**.		They represent money values in various ways and correctly count out change from financial transactions.			

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Level 4	**Sourced from Level descriptions:** 'At this level: **Understanding** includes making connections **between** representations of numbers, partitioning and combining numbers flexibly, **extending place value to decimals**...,' ',...**Fluency** includes recalling multiplication **tables**, communicating **sequences of simple fractions**...,' ',...**Problem Solving** includes formulating, modelling and recording authentic situations involving operations, comparing **large numbers with each other**...,' ',...and using properties of numbers to continue patterns **Reasoning** includes using generalising from number properties and results of calculations, **deriving strategies for unfamiliar** multiplication and division tasks...,'	Investigate and **use** the properties of odd and even numbers (ACMNA071)	* Using the four operations with pairs of odd or even numbers or one odd and one even number, then using the relationships established to check the accuracy of calculations	Investigate **equivalent** fractions used in contexts (ACMNA077)	* Exploring the relationship between families of fractions (halves, quarters and eighths or thirds and sixths) by folding a series of paper strips to construct a fraction wall	Solve problems involving **purchases** and the calculation of change to the nearest five cents **with and without digital technologies** (ACMNA080)	* Recognising that not all countries use dollars and cents, e.g. India uses rupees. * Carrying out calculations in another currency as well as in dollars and cents, and identifying both as decimal systems	Explore and describe number patterns resulting from performing **multiplication** (ACMNA081)	* Identifying examples of number patterns in everyday life
		Recognise, **represent and order** numbers to at least tens of thousands (ACMNA072)	* Reproducing five-digit numbers in words using their numerical representations, and vice versa	Count **by** quarters halves and thirds, including **with mixed numerals**. Locate and represent **these fractions** on a number line (ACMNA078)	* Converting mixed numbers to improper fractions and vice versa * Investigating the use of fractions and sharing as a way of managing Country: for example taking no more than half the eggs from a nest to protect future bird populations			Solve **word** problems by **using number sentences involving** multiplication or division **where there is no remainder** (ACMNA082)	* Representing a word problem as a number sentence * Writing a word problem using a given number sentence
		Apply place value to partition, rearrange and regroup numbers to at least tens of thousand**s** to assist calculations and solve problems (ACMNA073)	* Recognising and demonstrating that the place-value pattern is built on the operations of multiplication or division of tens	Recognise that the place value system can be **extended to tenths and hundredths**. Make connections between fractions and **decimal notation** (ACMNA079)	* Using division by 10 to extend the place-value system * Using knowledge of fractions to establish equivalences between fractions and decimal notation			Use **equivalent number sentences** involving addition and subtraction **to find unknown quantities** (ACMNA083)	* Writing number sentences to represent and answer questions such as: 'When a number is added to 23 the answer is the same as 57 minus 19. What is the number?' * Using partitioning to find unknown quantities in number sentences
		Investigate number sequences **involving multiples of 3, 4, 6, 7, 8, and 9** (ACMNA074)	* Recognising that number sequences can be extended indefinitely, and determining any patterns in the sequences						
		Recall multiplication facts **up to 10×10** and related division facts (ACMNA075)	* Using known multiplication facts to calculate related division facts						
		Develop efficient mental and written strategies **and use appropriate digital technologies** for multiplication and for division where there is no remainder (ACMNA076)	* Using known facts and strategies, such as commutativity, doubling and halving for multiplication, and connecting division to multiplication when there is no remainder						
Level 4 Achievement Standard	NOTE: The standards are not divided into sub-strands in the AusVELS documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, **and estimate answers accurately enough for the context**.		Students locate **familiar** fractions on a number line,		Students solve simple purchasing problems with and without the use of digital technology.		Students identify unknown quantities in number sentences.	
		Students use **the properties** of odd and even numbers, and describe number patterns resulting from multiplication.		recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations **up to two decimal places**.				Students **continue** number sequences involving multiples of single-digit numbers and **unit** fractions, and locate them on a number line.	
		Students recall multiplication facts to 10 x 10 and related division facts.							

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Level 5	**Sourced from Level descriptions:** 'At this level: **Understanding** includes making connections between representations of numbers, using fractions **to represent probabilities**, comparing and ordering **fractions and decimals** and **representing them in various ways**...,' ',...**Fluency** includes...,' ',...**using estimation to check the reasonableness of answers to calculations**...,' ',...**Problem Solving** includes formulating and **solving** authentic problems **using whole numbers** and **creating financial plans** **Reasoning** includes **investigating** strategies to perform calculations efficiently, continuing patterns involving **fractions and decimals**...,'	Identify and describe **factors** and multiples of **whole numbers** and **use them to solve problems** (ACMNA098)	* Exploring factors and multiples using number sequences * Using simple divisibility tests	**Compare and order common unit fractions** and locate and represent **them** on a number line (ACMNA102)	* Recognising the connection between the order of unit fractions and their denominators	**Create simple** financial **plans** (ACMNA106)	* Creating a simple budget for a class fundraising event * Identifying the GST component of invoices and receipts	**Describe, continue and create patterns with fractions, decimals** and whole numbers **resulting from addition and subtraction** (ACMNA107)	* Using the number line or diagrams to create patterns involving fractions or decimals
		Use **estimation and rounding** to **check the reasonableness of answers to calculations** (ACMNA099)	* Recognising the usefulness of estimation to check calculations * Applying mental strategies to estimate the result of calculations, such as estimating the cost of a supermarket trolley load	Investigate strategies to solve problems involving addition and subtraction **of fractions with the same denominator** (ACMNA103)	* Modelling and solving addition and subtraction problems involving fractions by using jumps on a number line, or making diagrams of fractions as parts of shapes				
		Solve problems involving multiplication of **large** numbers by one-or **two-digit** numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)	* Exploring techniques for multiplication such as the area model, the Italian lattice method or the partitioning of numbers * Applying the distributive law and using arrays to model multiplication and explain calculation strategies	Recognise that the place value system can be extended **beyond hundredths** (ACMNA104)	* Using knowledge of place value and division by 10 to extend the number system to thousandths and beyond * Recognising the equivalence of one thousandths and 0.001			Use equivalent number sentences **involving multiplication and division** to find unknown quantities (ACMNA121)	* Using relevant problems to develop number sentences
		Solve problems involving division **by a one digit number**, including those that result **in a remainder** (ACMNA101)	* Using the fact that equivalent division calculations result if both numbers are divided by the same factor * Interpreting and representing the remainder in division calculations sensibly for the context	**Compare, order and represent decimals** (ACMNA105)	* Locating decimals on a number line				
		Use efficient mental and written strategies and **apply** appropriate digital technologies to solve problems (ACMNA291)	* using calculators to check the reasonableness of answers						
Level 5 Achievement Standard	NOTE: The standards are not divided into sub-strands in the AusVELS documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students solve simple problems involving the four operations using a range of strategies including digital technology. They estimate to check the reasonableness of answers and **approximate** answers by rounding. Students identify and describe factors and multiples.		Students order decimals and unit fractions and locate them on number lines. They add and subtract fractions with the same denominator.		They explain **plans for simple budgets**.		They find unknown quantities in number sentences, and continue patterns by adding and subtracting fractions and decimals.	

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Level 6	**Sourced from Level descriptions:** 'At this level: **Understanding** includes **describing properties of different sets of numbers**, **using** fractions and decimals **to describe probabilities**, representing fractions and decimals in various ways **and describing connections between them**, and **making reasonable** estimations **Fluency** includes representing **integers** on a number line, calculating **simple percentages**, using **brackets appropriately**, converting between **fractions and decimals**, using **operations** with fractions, **decimals and percentages**...,' '...**Problem Solving** includes formulating and solving authentic problems using **fractions**, **decimals, percentages**...,' '...**Reasoning** includes **explaining** mental strategies for performing calculations, **describing results for continuing number sequences**...,'	Identify and describe properties of **prime, composite, square and triangular** numbers (ACMNA122)	* Understanding that some numbers have special properties and that these properties can be used to solve problems * Representing composite numbers as a product of their prime factors and using this form to simplify calculations by cancelling common primes * Understanding that if a number is divisible by a composite number then it is also divisible by the prime factors of that number (for example 216 is divisible by 8 because the number represented by the last three digits is divisible by 8, and hence 216 is also divisible by 2 and 4)	Compare fractions with **related** denominators and locate and represent them on a number line (ACMNA125)	* Demonstrating equivalence between fractions using drawings and models	Investigate and calculate **percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies** (ACMNA132)	* Using authentic information to calculate prices on sale goods	Continue and create sequences involving whole numbers, fractions and decimals. Describe **the rule used to create the sequence** (ACMNA133)	* identifying and generalising number patterns * Investigating additive and multiplicative patterns such as the number of tiles in a geometric pattern, or the number of dots or other shapes in successive repeats of a strip or border pattern looking for patterns in the way the numbers increase/decrease
		Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving **all four** operations with whole numbers (ACMNA123)	* Applying strategies already developed for solving problems involving small numbers to those involving large numbers * Applying a range of strategies to solve realistic problems and commenting on the efficiency of different strategies	Solve problems involving addition and subtraction of fractions with the same **or related** denominators (ACMNA126)	* Understanding the processes for adding and subtracting fractions with related denominators and fractions as an operator, in preparation for calculating with all fractions * Solving realistic additive (addition and subtraction) problems involving fractions to develop understanding of equivalent fractions and the use of fractions as operators * Modelling and solving additive problems involving fractions by using methods such as jumps on a number line, or by making diagrams of fractions as parts of shapes			Explore the use of **brackets and order of operations** to write number sentences (ACMNA134)	* Appreciating the need for rules to complete multiple operations within the same number sentence
		Investigate everyday situations that use integers. Locate and represent **these** numbers on a number line (ACMNA124)	* Understanding that integers are ...-3, -2, -1, 0, 1, 2, 3,..... * Solving everyday additive problems using a number line * Investigating everyday situations that use integers, such as temperatures * Using number lines to position and order integers around zero	Find a simple fraction **of a quantity where the result is a whole number, with and without digital technologies** (ACMNA127)	* Recognising that finding one third of a quantity is the same as dividing by 3				
				Add and subtract decimals, **with and without digital technologies**, and **use** estimation and rounding to check the reasonableness of answers (ACMNA128)	* Extending whole-number strategies to explore and develop meaningful written strategies for addition and subtraction of decimal numbers to thousandths * Exploring and practising efficient methods for solving problems requiring operations on decimals, to gain fluency with calculating with decimals and with recognising appropriate operations				
				Multiply decimals by whole numbers and **perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies** (ACMNA129)	* Interpreting the results of calculations to provide an answer appropriate to the context				
				Multiply and divide decimals by powers of 10 (ACMNA130)	* Multiplying and dividing decimals by multiples of powers of 10				
				Make connections between equivalent fractions, decimals and percentages (ACMNA131)	* Connecting fractions, decimals and percentages as different representations of the same number, moving fluently between representations and choosing the appropriate one for the problem being solved				

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Level 6 Achievement Standard	NOTE: The standards are not divided into sub-strands in the AusVELS documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	Students recognise the properties of prime, composite, square and triangular numbers and **determine sets** of these numbers. They solve problems involving all four operations with whole numbers and **describe the use of integers in everyday contexts**.		They solve problems involving the addition and subtraction of **related** fractions. BELONGS IN MEASUREMENT AND GEOMETRY They **use ordered pairs of integers to represent** coordinates of points and locate **a point in any one of the** four quadrants on the Cartesian plane. They **make connections between** the powers of 10 and the multiplication and division of decimals. Students **connect decimal representations to the metric system** and choose appropriate units of measurement to perform a calculation. Students locate fractions and integers on a number line and connect fractions, decimals and percentages **as different representations of the same number**. FROM STATISTICS AND PROBABILITY Students **list and communicate probabilities using simple fractions, decimals and percentages**. Students add, subtract and multiply decimals and divide decimals **where the result is rational.** They calculate a simple fraction of a quantity		and calculate **common** percentage discounts on sale items, with and without the use of digital technology.		They **specify** rules to generate sequences involving whole numbers, fractions and decimals. Students write number sentences using brackets and order of operations,	

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		Number and place value		Fractions and decimals		Money and financial mathematics		Patterns and algebra	
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Level 7	**Sourced from Level descriptions:** 'At this 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...,' ',...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**...,' ',...**Problem Solving** includes formulating and solving authentic problems using numbers...,' ',...**Reasoning** includes applying **the number laws to calculations**...,' ',...applying an understanding of **ratio**...,'	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	N/A - See Real Numbers		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	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
		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	**Real numbers**		**Linear and non-linear relationships**		Create **algebraic expressions and evaluate them by substituting a given value for each variable** (ACMNA176)	* Using authentic formulas to perform substitutions
		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	**Content Descriptor**	**Elaborations**	**Content Descriptor**	**Elaborations**	**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
		Compare, order, add and subtract integers (ACMNA280)	N/A	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 2/3 is the same as 4/6 and 6/9)	**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 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)	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		
				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	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		
				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				

Year Level Indicators	PROFICIENCY STRANDS	Sub-strands							
		Number and place value		Real numbers		Money and financial mathematics	Linear and non-linear relationships	Patterns and algebra	
		Content Descriptor	Elaboration	Content Descriptor	Elaborations			Content Descriptor	Elaborations
Level 7 Achievement Standard	NOTE: The standards are not divided into sub-strands in the AusVELS documents. However, logic would dictate that the standards could be put into sub-strands, as demonstrated to the right.	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 make **simple** estimates to **judge** the reasonableness of results.		They solve problems involving all four operations with fractions, decimals and percentages, and their equivalences, and express fractions **in their simplest form**.		They compare the cost of items to make financial decisions, with and without the use of digital technology.	THIS ALSO COULD APPLY TO MEASUREMENT AND GEOMETRY They assign ordered pairs to given points on the Cartesian plane and interpret and analyse graphs **of relations** from **real** data. Students **develop** simple linear **models for situations, make predictions on these models, solve related equations and check their solutions**.	Students use variables to represent arbitrary numbers using, and connect the laws and properties for numbers to algebra and substitute numbers into algebraic expressions.	