Mathletics

South Australia - Australian Curriculum v9

Activities (Courses) and Skill Quests

Years 9 – 10

January, 2025

Mathletics

Mathletics

South Australia - Australian Curriculum (v9)

Activities (Courses) & Skill Quests

January, 2025

Year 9

1 Number

AC9M9N01 recognise that the real number system includes the rational numbers and the irrational numbers, and solve problems involving real numbers using digital tools	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

2 Algebra

AC9M9A01 apply the exponent laws to numerical expressions with integer exponents and extend to variables	
Course Topics	**Activities**
A - Exponent laws	Negative Indices
	Zero Index and Algebra
	Multiplication with Indices
	Index Laws and Algebra
	Index Laws with Brackets
Topics	**Skill Quests**
Exponent laws with numerical expressions	Mixed exponent laws: numerical expressions
	Exponent laws: positive & negative integer index
Exponent laws with variables	Mixed exponent laws: algebraic expressions

AC9M9A02 simplify algebraic expressions, expand binomial products and factorise monic quadratic expressions	
Course Topics	**Activities**
A - Algebraic expressions	Expanding Binomial Products
	Factorising with Indices
	Factorising Quadratics 1
Topics	**Skill Quests**
Apply the distributive law	Applying the distributive law
Binomial expansions & factorisations	Expanding binomial products
	Binomial product special results
	Factorising monic quadratic trinomials
	Further binomial expansions

AC9M9A03 find the gradient of a line segment, the midpoint of the line interval and the distance between 2 distinct points on the Cartesian plane	
Course Topics	**Activities**
A - Coordinate geometry	Distance Between Two Points
	Midpoint by Formula
	Slope of a Line
	Gradient
	Equation from Two Points
Topics	**Skill Quests**
Find the distance between two points	Distance between two points without the formula
	Distance between two points using the formula
Find the midpoint between two points	Finding the midpoint without the formula
	Finding the midpoint using the formula
Find the gradient between two points	Finding the gradient without the formula
	Finding the gradient using the formula

AC9M9A04 identify and graph quadratic functions, solve quadratic equations graphically and numerically, and solve monic quadratic equations with integer roots algebraically, using graphing software and digital tools as appropriate	
Course Topics	**Activities**
A - Quadratic equations	Quadratic Equations 1
	Monic Quadratic Trinomial Equations
	Quadratic Equations 2
	Checking Quadratic Solutions
	Monic Quadratic Equations by Factorising
	Graphing Parabolas
Topics	**Skill Quests**
Graph & solve quadratic relationships	Using a table of values to graph quadratics
	Solving simple nonlinear relationships
	Understanding parabolas
Solve simple quadratic equations	Solving simple quadratic equations

AC9M9A05 use mathematical modelling to solve applied problems involving change including financial contexts; formulate problems, choosing to use either linear or quadratic functions; interpret solutions in terms of the situation; evaluate the model and report methods and findings	
Course Topics	**Activities**
A - Quadratic equations	Parabolas and Marbles
	Parabolas and Rectangles
	Constructing Formulae
	Identifying Graphs
Topics	**Skill Quests**
Teacher directed	

AC9M9A06 experiment with the effects of the variation of parameters on graphs of related functions, using digital tools, making connections between graphical and algebraic representations, and generalising emerging patterns	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

3 Measurement

AC9M9M01 solve problems involving the volume and surface area of right prisms and cylinders using appropriate units	
Course Topics	**Activities**
M - Volume & surface area	Surface Area: Rectangular Prisms
	Surface Area: Triangular Prisms 1
	Surface Area: Triangular Prisms
	Surface Area: Cylinders
	Surface Area: Cones
	Surface Area: Rectangular Pyramids
	Volume: Cylinders
	Volume: Pyramids
	Volume: Cones
Topics	**Skill Quests**
Surface area & volume of cylinders	Volumes of cylinders
	Problem-solving with volume
	Surface area of cylinders
Surface area of right prisms	Surface area of right prisms with nets
	Surface area problems

AC9M9M02 solve problems involving very small and very large measurements, time scales and intervals expressed in scientific notation	
Course Topics	**Activities**
M - Scientific notation & errors	Scientific notation to decimal
Topics	**Skill Quests**
Large & small amounts of time	Significant figures
	Understanding prefixes of numbers
	Exponent notation for large/small numbers
	Large & small time intervals
	Limits of accuracy

AC9M9M03 solve spatial problems, applying angle properties, scale, similarity, Pythagoras' theorem and trigonometry in right-angled triangles	
Course Topics	**Activities**
M - Pythagoras and trigonometry	Scale Factor
	Similar Areas and Volumes
	Find Unknown Sides
	Find Unknown Angles
	Cone and Pyramid Dimensions
Topics	**Skill Quests**
Pythagoras' theorem	Identifying sides on right-angled triangles
	Exploring the sides of a right-angled triangle
	Finding a shorter side using Pythagoras' theorem
	Finding the hypotenuse using Pythagoras' theorem
	Solving problems involving Pythagoras' theorem
	Using the converse of Pythagoras' theorem
	Solving Pythagoras' theorem problems: exact values
Apply trigonometry	Finding the missing side using trig ratios
	Finding the missing angle using trig ratios
	Solving 2D & 3D problems using trig ratios
Scale factors with similar figures	Scale factors

AC9M9M04 calculate and interpret absolute, relative and percentage errors in measurements, recognising that all measurements are estimates	
Course Topics	**Activities**
M - Scientific notation & errors	Scientific Notation
	Scientific Notation 1
	Scientific Notation 2
	Ordering Scientific Notation
	Percentage Error
	Error in Measurement
Topics	**Skill Quests**
Teacher directed	

AC9M9M05 use mathematical modelling to solve practical problems involving direct proportion, rates, ratio and scale, including financial contexts; formulate the problems and interpret solutions in terms of the situation; evaluate the model and report methods and findings	
Course Topics	**Activities**
M - Rates & ratio problems	Best Buy
	Purchase Options
Topics	**Skill Quests**
Proportion, rates, graphs & equations	Unit rates
	Converting rates
	Direct proportion
	Indirect/inverse proportion
	Direct & inversely proportionate graphs
	Interpret & use conversion graphs

	The constant of proportionality
	Graph equations of direct proportion
	Distance, speed & time problems
	Travel graphs
Ratio & scales	Ratio & scales in real life
	Ratio & scales in similar triangles

4 Space

AC9M9SP01 recognise the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles using properties of similarity	
Course Topics	**Activities**
SP - Right angle triangles	Hypotenuse, Adjacent, Opposite
	Sin A
	Cos A
	Tan A
	Exact Trigonometric Ratios
Topics	**Skill Quests**
Introduce trigonometry	Introducing trigonometry
	Calculating trigonometric ratios & angles

AC9M9SP02 apply the enlargement transformation to shapes and objects using dynamic geometry software as appropriate; identify and explain aspects that remain the same and those that change	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Similar triangles	Introducing similarity
	Similar triangles
Area & volume scale factors	Area & volume scale factors

AC9M9SP03 design, test and refine algorithms involving a sequence of steps and decisions based on geometric constructions and theorems; discuss and evaluate refinements	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

5 Statistics

AC9M9ST01 analyse reports of surveys in digital media and elsewhere for information on how data was obtained to estimate population means and medians	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Make population predictions from data	Using data to make predictions about populations

AC9M9ST02 analyse how different sampling methods can affect the results of surveys and how choice of representation can be used to support a particular point of view	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

AC9M9ST03 represent the distribution of multiple data sets for numerical variables using comparative representations; compare data distributions with consideration of centre, spread and shape, and the effect of outliers on these measures	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Construct & interpret data displays	Constructing & interpreting data displays
Compare data displays	Comparing data displays

AC9M9ST04 choose appropriate forms of display or visualisation for a given type of data; justify selections and interpret displays for a given context	
Course Topics	**Activities**
ST - Statistical & probability	Frequency Histograms
	Double Stem and Leaf Plots
	Histograms for Grouped Data
Topics	**Skill Quests**
Teacher directed	

AC9M9ST05 plan and conduct statistical investigations involving the collection and analysis of different kinds of data; report findings and discuss the strength of evidence to support any conclusions	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Collect everyday data	Collecting everyday data

6 Probability

AC9M9P01 list all outcomes for compound events both with and without replacement, using lists, tree diagrams, tables or arrays; assign probabilities to outcomes	
Course Topics	**Activities**
ST - Statistical & probability	Probability With Replacement
	Probability Without Replacement
Topics	**Skill Quests**
List outcomes & find probabilities	The fundamental counting principle
	Two-step chance experiments with replacement
	Two-step chance experiments without replacement

AC9M9P02 calculate relative frequencies from given or collected data to estimate probabilities of events involving “and”, inclusive “or” and exclusive “or”	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Calculate & use relative frequency	Calculating & using relative frequency

AC9M9P03 design and conduct repeated chance experiments and simulations, using digital tools to compare probabilities of simple events to related compound events, and describe results	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

Year 10

1 Number

AC9M10N01 recognise the effect of using approximations of real numbers in repeated calculations and compare the results when using exact representations	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

2 Algebra

AC9M10A01 expand, factorise and simplify expressions and solve equations algebraically, applying exponent laws involving products, quotients and powers of variables, and the distributive property	
Course Topics	**Activities**
A - Algebraic expressions and fractions	Special Binomial Products
	Grouping in Pairs
	Multiplication and Division with Indices
	Algebraic Fractions 1
	Algebraic Fractions 2
Topics	**Skill Quests**
Factorise algebraic expressions	Factorising algebraic expressions
Exponent laws	Exponents: multiplication
	Exponents: division
	Exponents: power of a power
	Exponents: zero index
	Exponents: mixed operations with coefficient = 1
	Exponents: mixed operations with coefficient >1
	Exponents: negative index with numerical base
	Exponents: negative, algebraic & numerical base
	Exponents: mixed with negative indices
Algebraic fractions	Algebraic fractions: 4 ops numerical denominators
	Algebraic fractions: simplifying
Binomial expansions & basic quadratics	Expanding binomial products
	Binomial product special results
	Factorising monic quadratic trinomials
	Further binomial expansions
Solve simple quadratic equations	Solving simple quadratic equations

AC9M10A02 solve linear inequalities and simultaneous linear equations in 2 variables; interpret solutions graphically and communicate solutions in terms of the situation	
Course Topics	**Activities**
A - Inequalities and simultaneous equations	Solve One-Step Inequalities 1
	Solve One-Step Inequalities 2
	Solve Two-Step Inequalities
	Solving Inequalities 1
	Solving Inequalities 2
	Linear Regions
	Solve Systems by Graphing
	Intersecting Linear Regions
	Simultaneous Linear Equations
	Simultaneous Equations 1
	Simultaneous Equations 2
Topics	**Skill Quests**
Linear inequalities & their graphs	Understanding inequalities
	Solving linear inequalities – 1-step
	Solving linear inequalities – 2-step
	Solving linear inequalities – 3-step
Linear simultaneous equations	Simultaneous equations

AC9M10A03 recognise the connection between algebraic and graphical representations of exponential relations and solve related exponential equations, using digital tools where appropriate	
Course Topics	**Activities**
A – Exponentials	Graphing Exponentials
	Exponential Equations
	Exponential Growth and Decay
Topics	**Skill Quests**
Representations of nonlinear relations	Representations of nonlinear relations
Solve exponential equations	Solving exponential equations

AC9M10A04 use mathematical modelling to solve applied problems involving growth and decay, including financial contexts; formulate problems, choosing to apply linear, quadratic or exponential models; interpret solutions in terms of the situation; evaluate and modify models as necessary and report assumptions, methods and findings	
Course Topics	**Activities**
A – Exponentials	Compound Interest
	Compound Interest by Formula
	Successive Discounts
	Depreciation
	Comparing Loans
	Comparing Home Loans
Topics	**Skill Quests**
Compound & simple interest	Compound interest
	Comparing simple & compound interest

	Appreciation & depreciation
Problems involving linear equations	Solving word problems with linear equations

AC9M10A05 experiment with functions and relations using digital tools, making and testing conjectures and generalising emerging patterns	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

3 Measurement

AC9M10M01 solve problems involving the surface area and volume of composite objects using appropriate units	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Volume & surface area: composite solids	Volume of composite solids
	Surface area of composite solids

AC9M10M02 interpret and use logarithmic scales in applied contexts involving small and large quantities and change	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

AC9M10M03 solve practical problems applying Pythagoras' theorem and trigonometry of right-angled triangles, including problems involving direction and angles of elevation and depression	
Course Topics	**Activities**
M - Pythagoras and trigonometry	Bearings
	Elevation and Depression
	Trigonometry Problems 2
	Trigonometry Problems 1
	3D Trigonometry
Topics	**Skill Quests**
Angles of elevation/ depression, bearings	Angles of elevation & depression
	Compass bearings
	True bearings

AC9M10M04 identify the impact of measurement errors on the accuracy of results in practical contexts	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

AC9M10M05 use mathematical modelling to solve practical problems involving proportion and scaling of objects; formulate problems and interpret solutions in terms of the situation; evaluate and modify models as necessary, and report assumptions, methods and findings	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

4 Shape

AC9M10SP01 apply deductive reasoning to proofs involving shapes in the plane and use theorems to solve spatial problems	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Solve problems using geometric reasoning	Solving problems using geometric reasoning

AC9M10SP02 interpret networks and network diagrams used to represent relationships in practical situations and describe connectedness	
Course Topics	**Activities**
SP – Networks	Networks Introduction
	Minimum Spanning Trees
Topics	**Skill Quests**
Teacher directed	

AC9M10SP03 design, test and refine solutions to spatial problems using algorithms and digital tools; communicate and justify solutions	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

5 Statistics

AC9M10ST01 analyse claims, inferences and conclusions of statistical reports in the media, including ethical considerations and identification of potential sources of bias	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Evaluate statistical reports	Evaluating statistical reports

AC9M10ST02 compare data distributions for continuous numerical variables using appropriate data displays including boxplots; discuss the shapes of these distributions in terms of centre, spread, shape and outliers in the context of the data	
Course Topics	**Activities**
ST - Statistical data	Calculating Interquartile Range
	Box-and-Whisker Plots 1
	Box-and-Whisker Plots 2
Topics	**Skill Quests**
Compare data distributions	Interquartile range
	Constructing & interpreting box plots
	Comparing box plots
	Comparing dot plots
	Comparing bar graphs

AC9M10ST03 construct scatterplots and comment on the association between the 2 numerical variables in terms of strength, direction and linearity	
Course Topics	**Activities**
ST - Statistical data	Skewness of Data
	Correlation
Topics	**Skill Quests**
Scatter plots	Scatter plots

AC9M10ST04 construct two way tables and discuss possible relationship between categorical variables	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Two-way tables	Two-way tables

AC9M10ST05 plan and conduct statistical investigations of situations that involve bivariate data; evaluate and report findings with consideration of limitations of any inferences	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Bivariate data	Bivariate data

6 Probability

AC9M10P01 use the language of “if .... then”, “given”, “of”, “knowing that” to describe and interpret situations involving conditional probability	
Course Topics	**Activities**
P – Probability	Conditional probability
	Probability - 'And' and 'Or'
Topics	**Skill Quests**
Conditional probability	Conditional probability introduction
	Conditional probability & two-way tables
	Conditional probability & tree diagrams
	Conditional probability & arrays
	Conditional probability & Venn diagrams
	Set theory & Venn diagrams

AC9M10P02 design and conduct repeated chance experiments and simulations using digital tools to model conditional probability and interpret results	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Three-step experiments	Three-step chance experiments with replacement
	Three-step chance experiments without replacement
	Independent events

Mathletics

For more information about Mathletics,
contact our friendly team.

www.mathletics.com/contact

3P Learning