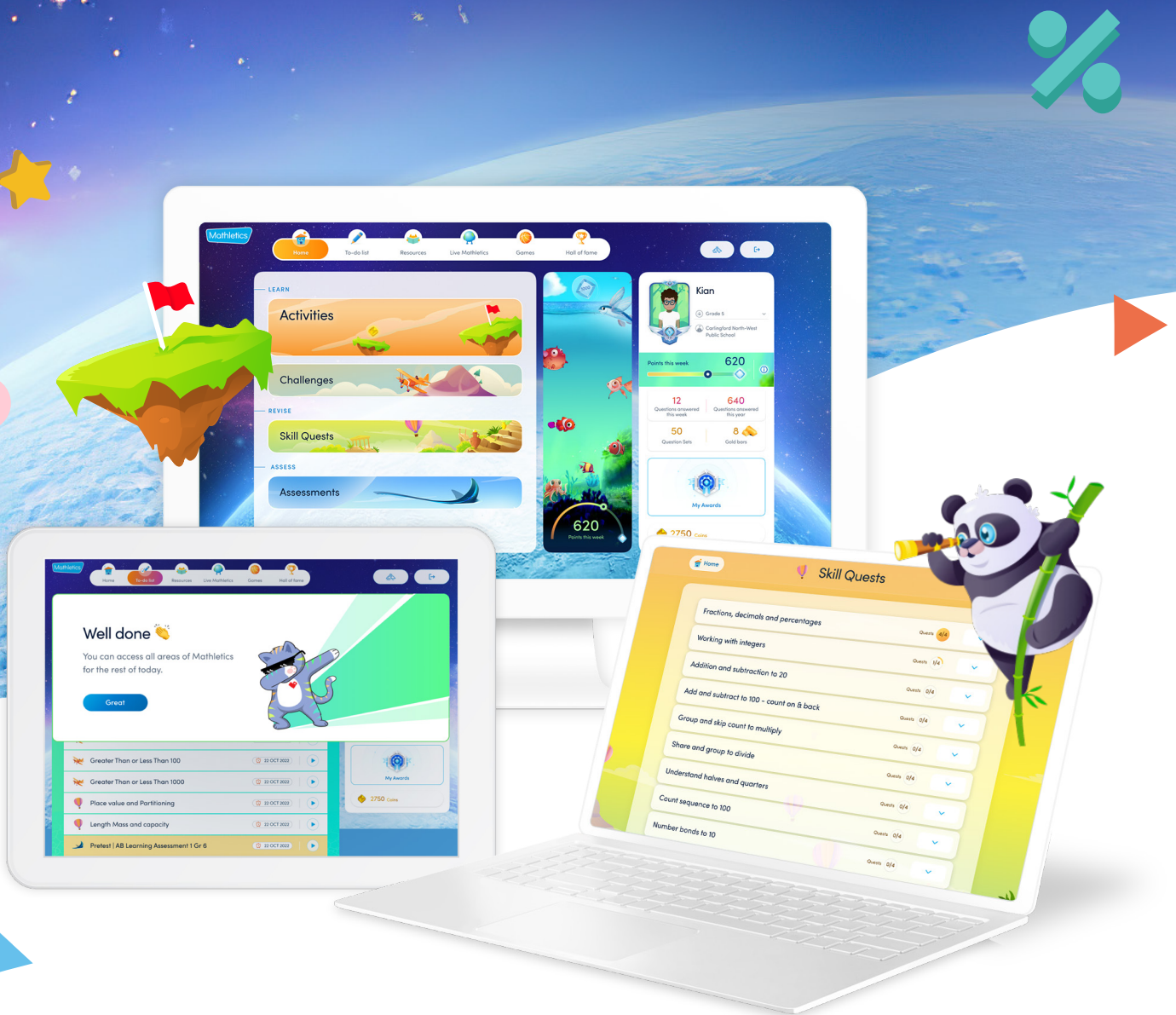# Mathletics
Victorian Curriculum
Skill Quests & Activities

Years 9-10

January 2024

Mathletics

Year 9

1 Number

VC2M9N01	
Recognise that the real number system includes the rational numbers and the irrational numbers, and solve problems involving real numbers with and without using digital tools	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Number properties	Inequalities on a Number Line: Mixed Basics
	Inequalities on a Number Line: Basics
	Graphing Inequalities on a Number Line
	Real Formulae

2 Algebra

VC2M9A01	
Apply the exponent laws to numerical expressions with integer exponents and the zero exponent, and extend to variables	
Skill Quests	**Skills**
Exponent laws in numerical expressions	Using exponent laws in numerical expressions
	Negative exponents in numerical expressions
Exponent laws in algebraic expressions	Using exponent laws in algebraic expressions
	Zero & negative exponents in algebraic expressions
Course Topic	**Activities Title**
Exponent laws	Negative Indices
	Exponent Notation and Algebra
	Multiplication with Indices
	Exponent Laws and Algebra
	Exponent Laws with Brackets
	Zero Exponent and Algebra

VC2M9A02	
Simplify algebraic expressions, apply the distributive law to expand algebraic expressions including binomial products, and factorise monic quadratic expressions	
Skill Quests	**Skills**
Expand binomials	Expanding binomials
Factorise monic quadratics	Factorising monic quadratics
Course Topic	**Activities Title**
Algebraic expressions	Expanding Binomial Products
	Factorising Quadratics 1

VC2M9A03	
Sketch linear graphs of equations in various algebraic forms, using the coordinates of 2 points, and solve linear equations	
Skill Quests	**Skills**
Graph linear equations	Finding & using x and y-intercepts
	Graphing using the gradient-intercept method
	Comparing linear relationships
	Further linear equations
Course Topic	**Activities Title**
Coordinate Geometry	General Form of a Line
	Equation of a Line 1
	Equation from Point and Gradient
	Equation from Two Points

VC2M9A04	
Find the gradient of a line segment, the midpoint of the line interval and the distance between 2 distinct points on the Cartesian plane	
Skill Quests	**Skills**
Coordinate Geometry	Finding the gradient without the formula
	Finding the gradient using the formula

Course Topic	Activities Title
	Finding the midpoint without the formula
	Finding the midpoint using the formula
	Distance between two points without the formula
	Distance between two points using the formula
Coordinate Geometry	Gradient
	Distance Between Two Points
	Midpoint by Formula

VC2M9A05
Identify and graph quadratic functions, solve quadratic equations graphically and numerically, and use null factor law to solve monic quadratic equations with integer roots algebraically, using graphing software and digital tools as appropriate

Skill Quests	Skills
Graph quadratic equations	Completing tables of values
	Graphing quadratics
	Finding x- & y-intercepts of parabolas
	Finding the vertex
	Determining the equation, given the graph
Solve quadratic equations	Solving simple quadratic equations

Course Topic	Activities Title
Quadratic equations	Powers and Patterns
	Monic Quadratic Trinomial Equations
	Quadratic Equations 2
	Checking Quadratic Solutions
	Monic Quadratic Equations by Factorising
	Graphing Parabolas
	Gradients for Real
	Vertex of a Parabola
	Parabolas and Marbles
	Parabolas and Rectangles

VC2M9A06
Use mathematical modelling to solve applied problems involving change, including financial contexts involving simple interest; formulate problems, choosing to use either linear or quadratic functions or other simple variations; interpret solutions in terms of the context; evaluate the model and report methods and findings

Skill Quests	Skills
Solve financial context problems	Solving simple interest problems
	Understanding hire purchase agreements

Course Topic	Activities Title
Algebra applications	Modelling Linear Relationships
	Constructing Formulae

VC2M9A07	
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	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

3 Measurement

VC2M9M01
Solve problems involving the volume and surface area of right prisms, cylinders and composite objects using appropriate units

Skill Quests	Skills
Volume of prisms, cylinders & composites	Solving problems with the volume of right prisms
	Volume of cylinders
	Finding dimensions from volume of cylinder
	Volumes of composite right prisms
Surface area of prisms & cylinders	Surface area of right prisms with nets
	Surface area of rectangular prisms
	Surface area of triangular prisms
	Surface area of cylinders

Course Topic	Activities Title
Volume & Surface Area	Surface Area: Rectangular Prisms
	Surface Area: Triangular Prisms 1
	Surface Area: Triangular Prisms
	Surface Area: Cylinders
	Volume: Cylinders

VC2M9M02
Solve problems involving very small and very large measurements, timescales and intervals expressed in scientific notation

Skill Quests	Skills
Work with small & large numbers	Prefixes for small & large measurements
	Large & small time intervals
	Representing large & small numbers
Scientific notation	Introducing scientific notation
	Converting scientific notation & basic numbers
	Calculating & rounding with scientific notation

Course Topic	Activities Title
Scientific Notation & Errors	Scientific Notation
	Scientific Notation to Decimal
	Ordering Scientific Notation

VC2M9M03
Solve spatial problems, applying angle properties, scale, similarity, ratio, Pythagoras' theorem and trigonometry in right-angled triangles

Skill Quests	Skills
Pythagoras' theorem	Finding the hypotenuse
	Finding a short side
	Finding a length
	Solving problems with Pythagoras' theorem
	Identifying Pythagorean triples
	Using the converse of Pythagoras' theorem

Course Topic	Activities Title
Solving spatial problems	Scale Factor
	Similar Areas and Volumes

VC2M9M04	
Calculate and interpret absolute, relative and percentage errors in measurements	
Skill Quests	**Skills**
Calculate errors in measurements	Calculating percentage errors
Course Topic	**Activities Title**
Teacher directed	

VC2M9M05	
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	
Skill Quests	**Skills**
Solve problems with rates	Solving problems with rates
	Converting rates
	Direct proportion
	Inverse proportion
	Direct & inversely proportionate graphs
	Interpreting & using conversion graphs
	The constant of proportionality
	Graphing equations of direct proportion
	Solving distance, speed & time problems
	Travel graphs
Course Topic	**Activities Title**
Rates & Ratio problems	Purchase Options
	Wages and Salaries
	Commission
	Working Overtime
	Special Allowances
	Bonuses and Leave Loading
	Piecework and Royalties

4 Space

<table>
<tr><td colspan="2">VC2M9SP01
Recognise the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles using properties of similarity</td></tr>
<tr><td>Skill Quests</td><td>Skills</td></tr>
<tr><td rowspan="6">Use trigonometry to solve problems</td><td>Introducing trigonometry</td></tr>
<tr><td>Establishing sine, cosine & tangent ratios</td></tr>
<tr><td>Identifying trigonometric ratios</td></tr>
<tr><td>Finding a side length using trig ratios</td></tr>
<tr><td>Finding an angle using trig ratios</td></tr>
<tr><td>Solving 2D & 3D problems using trig ratios</td></tr>
<tr><td>Course Topic</td><td>Activities Title</td></tr>
<tr><td rowspan="7">Right-angled triangles</td><td>Hypotenuse, Adjacent, Opposite</td></tr>
<tr><td>Sin A</td></tr>
<tr><td>Cos A</td></tr>
<tr><td>Tan A</td></tr>
<tr><td>Finding Angles From Ratios</td></tr>
<tr><td>Find Unknown Sides</td></tr>
<tr><td>Find Unknown Angles</td></tr>
</table>

<table>
<tr><td colspan="2">VC2M9SP02
Apply the enlargement transformation to shapes and objects using dynamic geometry software as appropriate; identify and explain, using language of similarity, ratio and scale, aspects that remain the same and those that change</td></tr>
<tr><td>Skill Quests</td><td>Skills</td></tr>
<tr><td rowspan="3">Use scale factors</td><td>Using scale factors</td></tr>
<tr><td>Applying scale factors</td></tr>
<tr><td>Area & volume scale factors</td></tr>
<tr><td>Course Topic</td><td>Activities Title</td></tr>
<tr><td colspan="2">Teacher directed</td></tr>
</table>

<table>
<tr><td colspan="2">VC2M9SP03
Design, test and refine algorithms involving a sequence of steps and decisions based on geometric constructions and theorems; discuss and evaluate refinements</td></tr>
<tr><td>Skill Quests</td><td>Skills</td></tr>
<tr><td colspan="2">Teacher directed</td></tr>
<tr><td>Course Topic</td><td>Activities Title</td></tr>
<tr><td colspan="2">Teacher directed</td></tr>
</table>

5 Statistics

VC2M9ST01	
Analyse reports of surveys in digital media and elsewhere for information on how data was obtained around everyday questions and issues involving at least one numerical and at least one categorical variable, to estimate population means and medians	
Skill Quests	**Skills**
Analyse reports from secondary sources	Analysing reports from secondary sources
Course Topic	**Activities Title**
Teacher directed	

VC2M9ST02	
Analyse how different sampling methods, and different samples using the same method, can affect the results of surveys and how choice of representation can be used to support a particular point of view	
Skill Quests	**Skills**
Analyse sampling methods	Analysing sampling methods
Course Topic	**Activities Title**
Teacher directed	

VC2M9ST03	
Represent the distribution of multiple data sets for numerical variables using comparative representations such as back-to-back stem-and-leaf plots and histograms; describe data, using terms including 'skewed', 'symmetric' and 'bi-modal'; compare data distributions using mean, median and range to describe and interpret numerical data sets with consideration of centre, spread and shape, and the effect of outliers on these measures	
Skill Quests	**Skills**
Describe shape	Describing shape
Compare summary statistics	Comparing summary statistics
Course Topic	**Activities Title**
Statistical displays	Frequency Histograms
	Double Stem and Leaf Plots
	Histograms for Grouped Data

VC2M9ST04	
Choose appropriate forms of display or visualisation for a given type of data; justify selections and interpret displays for a given context	
Skill Quests	**Skills**
Display data	Choosing appropriate graph for data
	Constructing data displays
Course Topic	**Activities Title**
Teacher directed	

VC2M9ST05	
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	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

6 Probability

<table>
<tr><td colspan="2" align="center">VC2M9P01
List all outcomes for two-step chance experiments both with and without replacement, using lists, tree diagrams, tables or arrays; assign probabilities to outcomes and events</td></tr>
<tr><td>Skill Quests</td><td>Skills</td></tr>
<tr><td rowspan="2">Describe 2 step chance experiments</td><td>Describing 2 step experiments with replacement</td></tr>
<tr><td>Describing 2 step experiments without replacement</td></tr>
<tr><td>Course Topic</td><td>Activities Title</td></tr>
<tr><td rowspan="3">Probability</td><td>Probability With Replacement</td></tr>
<tr><td>Probability Without Replacement</td></tr>
<tr><td>Tree Diagrams</td></tr>
</table>

<table>
<tr><td colspan="2" align="center">VC2M9P02
Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and', inclusive 'or' and exclusive 'or'</td></tr>
<tr><td>Skill Quests</td><td>Skills</td></tr>
<tr><td>Calculate relative frequencies</td><td>Calculating & using relative frequency</td></tr>
<tr><td>Course Topic</td><td>Activities Title</td></tr>
<tr><td colspan="2">Teacher directed</td></tr>
</table>

<table>
<tr><td colspan="2" align="center">VC2M9P03
Design and conduct repeated chance experiments and simulations using digital tools to estimate probabilities that cannot be determined exactly</td></tr>
<tr><td>Skill Quests</td><td>Skills</td></tr>
<tr><td colspan="2">Teacher directed</td></tr>
<tr><td>Course Topic</td><td>Activities Title</td></tr>
<tr><td colspan="2">Teacher directed</td></tr>
</table>

Year 10

1 Number

VC2M10N01	
Recognise the effect of using approximations of real numbers in repeated calculations and compare the results when using exact representations	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

2 Algebra

VC2M10A01	
Factorise algebraic expressions by taking out a common algebraic factor	
Skill Quests	**Skills**
Factorise algebraic expressions	Taking out a numerical factor
	Taking out an algebraic factor
	Taking out the HCF
Course Topic	**Activities Title**
Algebraic expressions & fractions	Factorising with Indices

VC2M10A02	
Simplify algebraic products and quotients using exponent laws	
Skill Quests	**Skills**
Simplify expressions with exponents	Expressions with product of exponents
	Expressions with quotient of exponents
	Expressions with raising a power to a power
	Expressions with negative powers
Course Topic	**Activities Title**
Algebraic expressions & fractions	Multiplication and Division with Indices/Multiplication and Division with Exponents
	Simplifying with Index Laws 2
	Algebraic Fractions 1

VC2M10A03	
Apply the 4 operations to simple algebraic fractions with numerical or single variable denominators	
Skill Quests	**Skills**
Algebraic fractions	Algebraic fractions: numerical denominators
	Algebraic fractions: single variable denominators
Course Topic	**Activities Title**
Algebraic expressions & fractions	Algebraic Fractions 2
	Algebraic Fractions 3
	Simplifying Algebraic Fractions by Factorising/Simplifying Algebraic Fractions by Factoring
	Factorising and Fractions 1/Factoring and Fractions 1
	Grouping in Pairs

VC2M10A04	
Expand binomial products and factorise monic quadratic expressions using a variety of strategies	
Skill Quests	**Skills**
Expand binomial products	Expanding binomial products
	Expanding special products
	Further binomial expansions
Factorise monic quadratics	Factorising monic quadratics

Course Topic	Activities Title
Algebraic expressions & fractions	Special Binomial Products
	Completing the Square
	Completing the Square 2

VC2M10A05
Substitute values into formulas to determine an unknown and rearrange formulas to solve for a particular term

Skill Quests	Skills
Work with formulas	Substituting into formulas
	Rearranging formulas

Course Topic	Activities Title
Algebraic expressions & fractions	Rearranging the Equation

VC2M10A06
Implement algorithms that use data structures using pseudocode or a general purpose programming language

Skill Quests	Skills
Teacher directed	

Course Topic	Activities Title
Teacher directed	

VC2M10A07
Solve problems involving linear equations, including those derived from formulas

Skill Quests	Skills
Problems involving linear equations	Word problems

Course Topic	Activities Title
Linear equations & inequalities	Equations to Solve Problems
	Write an Equation: Word Problems

VC2M10A08
Solve linear inequalities and graph their solutions on a number line

Skill Quests	Skills
Linear inequalities & their graphs	Understanding inequalities
	Solving 1 step linear inequalities
	Solving more 1 step linear equations
	Solving 2 step linear equations
	Solving more 2 step linear equations
	Graphing inequalities on a number line

Course Topic	Activities Title
Linear equations & inequalities	Solving Inequalities 1
	Solving Inequalities 2
	Linear Regions
	Intersecting Linear Regions

VC2M10A09
Solve simultaneous linear equations, using algebraic and graphical techniques including using digital tools

Skill Quests	Skills
Simultaneous linear equations	Solving simultaneous equations graphically
	Solving simultaneous equations algebraically
	Solving simultaneous equations in context
Course Topic	Activities Title
Simultaneous equations	Simultaneous Equations 1
	Simultaneous Equations 2
	Solve Systems by Graphing
	Simultaneous Linear Equations

VC2M10A10
Solve problems involving gradients of parallel and perpendicular lines

Skill Quests	Skills
Parallel & perpendicular lines	Parallel lines
	Perpendicular lines
	Equations of lines: Parallel & perpendicular lines
	Problems involving parallel & perpendicular lines
Course Topic	Activities Title
Linear equations & inequalities	Are they Parallel?
	Are they Perpendicular?
	Equation of a Line 3
	Perpendicular and parallel lines

VC2M10A11
Explore the connection between algebraic and graphical representations of relations such as simple quadratic, reciprocal, circle and exponential, using digital tools as appropriate

Skill Quests	Skills
Sketch parabolas	Sketching parabolas
	Investigating how changes affect parabolas
Sketch reciprocals	Sketching reciprocals
Sketch circles	Sketching circles
Sketch exponentials	Sketching exponentials
Compare non-linear graphs	Comparing non-linear graphs
Course Topic	Activities Title
Non-linear relationships	Graphing Circles
	Graphing Exponentials
	Exponential Growth and Decay

VC2M10A12
Solve linear equations involving simple algebraic fractions

Skill Quests	Skills
Solve equations with algebraic fractions	Solving equations with algebraic fractions
Course Topic	Activities Title
Linear equations & inequalities	Solving More Equations
	Equations with Grouping Symbols
	Equations with Decimals
	Equations with Fractions

VC2M10A13
Solve simple quadratic equations using a range of strategies, including null factor law

Skill Quests	Skills
Solve simple quadratic equations	Solving simple quadratic equations
Course Topic	Activities Title
Non-linear relationships	Quadratic Equations 1
	Quadratic Formula
	Nature of Solutions of Quadratics

VC2M10A14
Solve simple exponential equations

Skill Quests	Skills
Solve simple exponential equations	Solving simple exponential equations
Course Topic	Activities Title
Non-linear relationships	Exponential Equations

VC2M10A15
Use mathematical modelling to solve applied problems involving inverse proportion, growth and decay, including in financial contexts to establish the compound interest formula as repeated applications of simple interest; 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

Skill Quests	Skills
Compound & simple interest	Compound interest
	Solving problems with compound interest
	Comparing simple & compound interest
Course Topic	Activities Title
Non-linear relationships	What Type of Function?
	Compound Interest
	Compound Interest by Formula
	Future Value of Investments 1
	Future Value of Investments 2
	Straight Line Depreciation
	Depreciation
	Declining Balance Depreciation

VC2M10A16	
Solve equations graphically or using systematic numerical guess-check-and-refine with digital tools, with consideration of whether all solutions have been found	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

3 Measurement

VC2M10M01	
Solve problems involving the surface area and volume of composite objects using appropriate units	
Skill Quests	**Skills**
Surface area of composite solids	Calculating the surface area of composite solids
Volume of composite solids	Calculating the volume of composite solids
Course Topic	**Activities Title**
Volume & Surface Area	Volume: Composite Figures

VC2M10M02	
Interpret and use logarithmic scales in applied contexts involving small and large quantities and change	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

VC2M10M03	
Solve practical problems by applying Pythagoras' theorem and trigonometry to right-angled triangles, including problems involving direction and angles of elevation and depression	
Skill Quests	**Skills**
Angles of elevation & depression	Angles of elevation & depression
Bearings	Converting to compass bearings
	Solving problems with compass bearings
	Converting to true bearings
	Solving problems with true bearings
Course Topic	**Activities Title**
Pythagoras & Trigonometry	Bearings
	True and Compass Bearings
	Degrees and Minutes
	Elevation and Depression
	Trigonometry Problems 2
	Trigonometry Problems 1
	Elevations

VC2M10M04	
Use mathematical modelling to solve practical problems involving direct and inverse proportion and scaling of objects; formulate problems and interpret solutions in terms of the situation, including the impact of measurement errors on the accuracy of results; evaluate and modify models as necessary, and report assumptions, methods and findings	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

4 Space

VC2M10SP01	
Apply deductive reasoning to formulate proofs involving shapes in the plane and use theorems to solve spatial problems	
Skill Quests	**Skills**
Solve problems using geometric proofs	Solving problems using geometric proofs
Course Topic	**Activities Title**
Teacher directed	

VC2M10SP02	
Interpret networks and network diagrams used to represent relationships in practical situations and describe connectedness	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Networks	Networks Introduction
	Minimum Spanning Trees

5 Statistics

VC2M10ST01	
Compare data distributions for continuous numerical variables using quartiles and interquartile range and appropriate data displays including boxplots, histograms and dot plots; discuss the shapes of these distributions in terms of centre, spread, shape and outliers in the context of the data	
Skill Quests	**Skills**
Interquartile range	Interquartile range
Displays for continuous data	Constructing & interpreting histograms
	Constructing & interpreting box plots
	Describing shape
Course Topic	**Activities Title**
Statistical data	Calculating Interquartile Range
	Box-and-Whisker Plots 1
	Box-and-Whisker Plots 2
	Cumulative Frequency Table
	Median and Cumulative Frequency
	Histogram or Polygon?
	Cumulative Frequency Histogram
	Skewness of Data

VC2M10ST02	
Construct scatterplots and consider a line of good fit; comment on the association between the 2 numerical variables in terms of strength, direction and linearity	
Skill Quests	**Skills**
Use scatter plots	Constructing scatter plots
	Constructing a line of best fit
	Making predictions & drawing conclusions
	Bivariate data over time
Course Topic	**Activities Title**
Statistical data	Correlation

VC2M10ST03	
Construct two-way tables and discuss possible relationship between categorical variables	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

VC2M10ST04	
Analyse claims, inferences and conclusions of statistical reports in the media and other places, by linking claims to displays, statistics and representative data, including ethical considerations and identification of potential sources of bias	
Skill Quests	**Skills**
Evaluate statistical reports	Evaluating statistical reports
Course Topic	**Activities Title**
Teacher directed	

VC2M10ST05	
Plan and conduct statistical investigations of situations that involve bivariate data, including where the independent variable is time; evaluate and report findings with consideration of limitations of any inferences	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

6 Probability

VC2M10P01	
Use the language of 'if ... then ...', 'given', 'of' and 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language, and describe and interpret situations involving conditional probability; design and conduct simulations using digital tools to model conditional probability and interpret results	
Skill Quests	**Skills**
Use conditional probability	Using conditional probability
	More on conditional probability
	Using two-way tables
	Using tree diagrams
	Using arrays
	Using Venn diagrams & set theory
Course Topic	**Activities Title**
Probability	Two-way Table Probability
	Conditional probability
	Probability - 'And' and 'Or'

VC2M10P02	
Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events; investigate the concept of independence	
Skill Quests	**Skills**
Describe 3 step chance experiments	Describing 3 step experiments with replacement
	Describing 3 step experiments without replacement
Understand independent events	Understanding independent events
Course Topic	**Activities Title**
Teacher directed	

Year 10 Advanced

1 Number

VC2M10AN01	
Define rational and irrational numbers and perform operations with surds and fractional indices	
Skill Quests	**Skills**
Rational & irrational numbers	Understanding rational & irrational numbers
	Convert recurring decimals into rational numbers
	Approximating irrational numbers
Surds	Introducing surds
	Surd general rules
	Simplification & addition/subtraction of surds
	Multiplying & dividing surds
	Expanding brackets with surds
	Rationalising the denominator
	Solving problems involving surds
Course Topic	**Activities Title**
Surds	Simplifying Surds
	Adding and Subtracting Surds
	Multiplying Surds
	Dividing Surds
	Expanding Surd Expressions
	Expanding Binomial Surds
	Rationalising the Denominator
	Rationalising and Binomials

VC2M10AN02	
Perform operations on numbers involving fractional exponents and surds	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Surds	Surd Form to Index Form
	Fractional Indices

VC2M10AN03	
Use the definition of a logarithm to establish and apply the laws of logarithms and investigate logarithmic scales in measurement	
Skill Quests	**Skills**
Logarithms & their laws	Introducing logarithms
	Establishing logarithm laws
	Multiplication Log law
	Division Log law 1
	Division Log law 2
	Log graphs & relationship with exponentials
	Solving equations with logarithms

Course Topic	Activities Title
Logarithms	Log Laws
	Change of Base
	Log Base 'e'

2 Algebra

VC2M10AA01	
Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems	
Skill Quests	**Skills**
Polynomials	Introducing polynomials
Remainder & factor theorems	Remainder theorem
	Factor theorem
Course Topic	**Activities Title**
Factor theorem	Polynomial Long Division
	Polynomial Factor Theorem

VC2M10AA02	
Devise and use algorithms and simulations to solve mathematical problems	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

VC2M10AA03	
Simplify combinations of linear expressions with rational coefficients and the solution of related equations	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

VC2M10AA04	
Explore the inverse relationship between exponential functions and logarithmic functions and the solution of related equations	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Logarithms	Equations with Logs

VC2M10AA05	
Describe, interpret, and sketch parabolas, hyperbolas, circles and exponential functions and their transformations	
Skill Quests	**Skills**
Graph parabolas	Graphing parabolas
	Finding the axis of symmetry & vertex
	Finding x & y-intercepts on parabolas
	Parabolas & their transformations
Graph hyperbolas	Graphing hyperbolas
	Hyperbolas & their transformations

Graph circles	Graphing circles
	Circles & their transformations
Graph exponentials	Graphing exponentials
	Exponentials & their transformations
Graph non-linear relationships	Graphing non-linear relationships
	More non-linear relationships
Course Topic	**Activities Title**
Non-linear relationships	Graphing Hyperbolas
	Non Linear Graphs
	Identifying Graphs

VC2M10AA06

Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation

Skill Quests	**Skills**
Sketch polynomials	Sketching polynomials
	Sketching more polynomials
Course Topic	**Activities Title**
Teacher directed	

VC2M10AA07

Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts

Skill Quests	**Skills**
Factorise quadratics	Factorising using difference of 2 squares
	Factorising using grouping
	Factorising using perfect squares
	Factorising quadratic trinomials
	Factorising complex fractions
Solve quadratic equations	Using factorisation
	Completing the square
	Using the quadratic formula
	Solving a variety of quadratic equations
	Checking solutions by substituting
	The discriminant
	Quadratic equations in context
Course Topic	**Activities Title**
Algebraic expressions & fractions	Factorising Quadratics 2/Factoring Quadratics 2
	Factorising and Fractions 2

VC2M10AA08

Use function notation to describe the relationship between dependent and independent variables in modelling contexts

Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Functions	Function Notation 1
	Function Notation 2
	Domain

	Domain and Range
	Piecemeal Functions
	Function Notation 3

VC2M10AA09
Solve linear and non-linear simultaneous equations using graphing or systematic guess-check-and-refine with digital tools

Skill Quests	Skills
Teacher directed	

Course Topic	Activities Title
Simultaneous equations	Simultaneous Equations 3
	Intersection: Line & Parabola
	Intersection: Line & Circle
	Intersection: Two Parabolas
	Intersection: Line & Hyperbola

VC2M10AA10
Experiment with functions and relations using digital tools, making and testing conjectures and generalising emerging patterns

Skill Quests	Skills
Teacher directed	

Course Topic	Activities Title
Teacher directed	

3 Measurement

VC2M10AM01	
Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids	
Skill Quests	**Skills**
Calculate surface area	Surface area of pyramids
	Surface area of cones
	Surface area of spheres
	Find dimensions of objects given the surface area
	Surface area of composite solids
Calculate volume	Volume of pyramids
	Volume of cones
	Volume of spheres
	Volume of composite solids
	Solving volume problems with composite solids
Course Topic	**Activities Title**
Volume & surface area	Naming 3D Objects
	Naming 3D Solids
	Surface Area: Rectangular Pyramids
	Surface Area: Cones
	Surface Area: Spheres
	Volume: Pyramids
	Volume: Cones
	Volume: Spheres
	Surface Area: Rearrange Formula
	Cone and Pyramid dimensions

VC2M10AM02	
Explore the effect of increasingly small changes in the value of variables on the average rate of change and in relation to limiting values	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

4 Space

VC2M10ASP01
Prove and apply relationships between angles and various lines associated with circles (radii, diameters, chords, tangents)

Skill Quests	Skills
Properties of circles	Circle terminology
	Understanding tangents
	Applying equal radii property
	Applying chord properties
	Applying the angle in a semicircle property
	Other angle properties
	Solving problems using circle properties
Course Topic	**Activities Title**
Circle geometry	Circle Terms
	Circle Theorems
	Tangents and Secants

VC2M10ASP02
Establish the sine, cosine and area rules for any triangle and solve related problems

Skill Quests	Skills
Trigonometry: Non right-angled triangles	Applying the sine rule
	Applying the cosine rule
	Applying the area rule
	Solving problems with non-right angled triangles
Course Topic	**Activities Title**
Trigonometry: Non right-angled triangles	Sine Rule: Sides & Acute Angles
	Sine Rule: Obtuse Angle
	Cosine Rule: Find Unknown Side
	Cosine Rule: Find Unknown Angle
	Area Rule 1
	Area Rule 2
	Area Problems

VC2M10ASP03
Use the unit circle to define the simple trigonometric functions of $y=\sin(x)$, $y=\cos(x)$ and $y=\tan(x)$ as functions of a real variable, and graph them with and without the use of digital tools

Skill Quests	Skills
Trigonometry: Identities, ratios, angles	Investigating trigonometric ratios
	Using the unit circle or graphs
	Using trigonometric identities
	Solving problems: angles of any magnitude
	Angle of inclination of a line & its gradient
Course Topic	**Activities Title**
Trigonometry functions	Trigonometric Relationships
	Unit Circle Reductions
	Converting Radians and Degrees
	Exact Trigonometric Ratios

	Which Quadrant?
	Sign of the Angle

VC2M10ASP04
Solve simple trigonometric equations

Skill Quests	Skills
Solve simple trigonometric equations	Solving simple trigonometric equations
Course Topic	**Activities Title**
Trigonometry equations	Period and Amplitude
	Trig Equations 1
	Trig Equations 2
	Trig Equations 3
	Trig Equations 4

VC2M10ASP05
Apply Pythagoras' theorem and trigonometry to solving three-dimensional problems in right-angled triangles

Skill Quests	Skills
Solve problems in three dimensions	Solving problems in three dimensions
Course Topic	**Activities Title**
Trigonometry problems	3D Trigonometry

VC2M10ASP06
Design, test and refine solutions to spatial problems using algorithms and digital tools; communicate and justify solutions

Skill Quests	Skills
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

5 Statistics

VC2M10AST01	
Calculate and interpret the mean and standard deviation of data and use these to compare data sets; investigate the effect of individual data values, including outliers, on the standard deviation	
Skill Quests	**Skills**
Calculate standard deviation	Calculating standard deviation
	Investigating the effect on standard deviation
	Understanding normal distribution
Interpret mean & standard deviation	Comparing data using mean & standard deviation
Course Topic	**Activities Title**
Statistical data	Calculating Standard Deviation
	Interpreting Standard Deviation
	Data Terms
	Data Analysis: Scatter Plots

VC2M10AST02	
Identify measures of spread, and understand their interpretation and usefulness with respect to different data distributions	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

VC2M10AST03	
Use digital tools to investigate bivariate numerical data sets; where appropriate use a straight line to describe the relationship allowing for variation, make predictions based on this straight line and discuss limitations	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

6 Probability

VC2M10AP01	
Explore counting principles, and factorial notation as a representation that provides efficient counting in multiplicative contexts, including calculations of probabilities	
Skill Quests	**Skills**
Fundamental counting principle	Understanding the counting principle
Course Topic	**Activities Title**
Probability	Calculating binomial probability
	Introduction to Binomial Probability

VC2M10AP02	
Investigate reports of studies in digital media and elsewhere for information on their planning and implementation	
Skill Quests	**Skills**
Teacher directed	
Course Topic	**Activities Title**
Teacher directed	

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