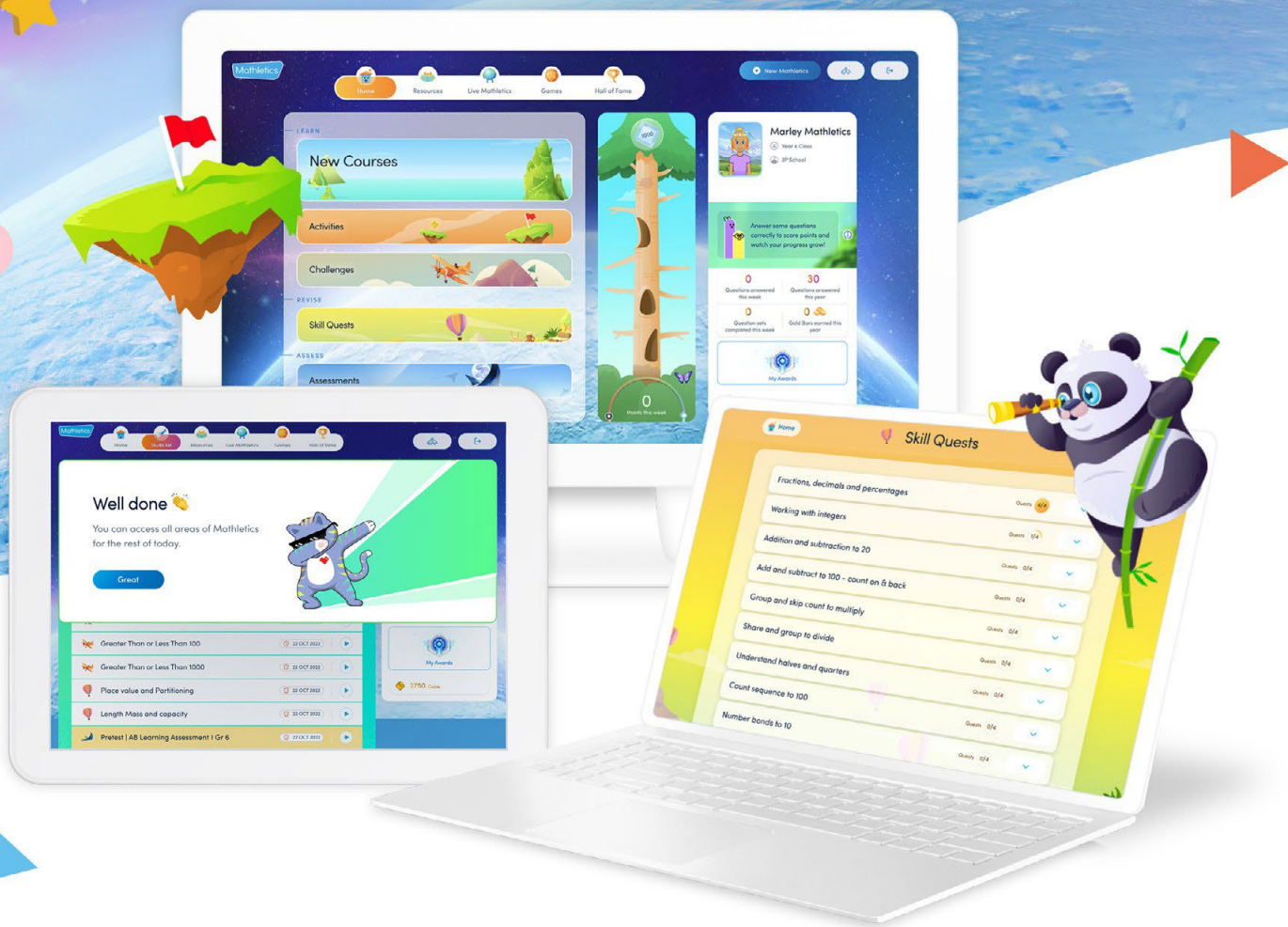
# Mathletics

## Victorian Mathematics V2.0

Activities (Courses) and Skill Quests




**Years 9 – 10**

January, 2025

Mathletics

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## Victorian Mathematics V2.0

Activities (Courses) & Skill Quests

January, 2025

# Year 9

## 1 Number

| VC2M9N01<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Number properties | Inequalities on a Number Line: Mixed Basics |
| | Inequalities on a Number Line: Basics |
| | Graphing Inequalities on Number Line |
| | Real Formulae |
| **Topics** | **Skill Quests** |
| Teacher directed | |

## 2 Algebra

| VC2M9A01<br>apply the exponent laws to numerical expressions with integer exponents and the zero exponent, and extend to variables | |
|---|---|
| **Course Topics** | **Activities** |
| Exponent laws | Negative Indices |
| | Index Notation and Algebra |
| | Multiplication with Indices |
| | Index Laws and Algebra |
| | Index Laws with Brackets |
| | Zero Index and Algebra |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M9A02<br>simplify algebraic expressions, apply the distributive law to expand algebraic expressions including binomial products, and factorise monic quadratic expressions | |
|---|---|
| **Course Topics** | **Activities** |
| Algebraic expressions | Expanding Binomial Products |
| | Factorising Quadratics 1 |
| **Topics** | **Skill Quests** |
| Expand binomials | Expanding binomials |
| Factorise monic quadratics | Factorising monic quadratics |

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

| VC2M9A04<br>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** |
| Coordinate Geometry | Gradient |
| | Distance Between Two Points |
| | Midpoint by Formula |
| **Topics** | **Skill Quests** |
| Coordinate Geometry | Finding the gradient without the formula |
| | Finding the gradient using the formula |
| | 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 |

| VC2M9A05<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| 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 |
| **Topics** | **Skill Quests** |
| 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 |

| **VC2M9A06**<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Algebra applications | Modelling Linear Relationships |
| | Constructing Formulae |
| **Topics** | **Skill Quests** |
| Solve financial context problems | Solving simple interest problems |
| | Understanding hire purchase agreements |

| **VC2M9A07**<br>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

| **VC2M9M01**<br>solve problems involving the volume and surface area of right prisms, cylinders and composite objects using appropriate units | |
|---|---|
| **Course Topics** | **Activities** |
| Volume & Surface Area | Surface Area: Rectangular Prisms |
| | Surface Area: Triangular Prisms 1 |
| | Surface Area: Triangular Prisms |
| | Surface Area: Cylinders |
| | Volume: Cylinders |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M9M02<br>solve problems involving very small and very large measurements, timescales and intervals expressed in scientific notation | |
|---|---|
| **Course Topics** | **Activities** |
| Scientific Notation & Errors | Scientific Notation |
| | Scientific notation to decimal |
| | Ordering Scientific Notation |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M9M03<br>solve spatial problems, applying angle properties, scale, similarity, ratio, Pythagoras' theorem and trigonometry in right-angled triangles | |
|---|---|
| **Course Topics** | **Activities** |
| Solving spatial problems | Scale Factor |
| | Similar Areas and Volumes |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M9M04<br>calculate and interpret absolute, relative and percentage errors in measurements | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Calculate errors in measurements | Calculating percentage errors |

| VC2M9M05<br>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** |
| Rates & Ratio problems | Purchase Options |
| | Wages and Salaries |
| | Commission |
| | Working Overtime |
| | Special Allowances |
| | Bonuses and Leave Loading |
| | Piecework and Royalties |

| Topics | Skill Quests |
|---|---|
| Solve problems with rates | Solving problems with rates |
| | Converting rates |
| | Direct proportion |
| | Inverse proportion |
| | Direct & inversely proportionate graphs |
| | Interpreting & using conversion graphs |
| | Graphing equations of direct proportion |
| | Solving distance, speed & time problems |
| | Travel graphs |

## 4 Space

| VC2M9SP01<br>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** |
| Right-angled triangles | Hypotenuse, Adjacent, Opposite |
| | Sin A |
| | Cos A |
| | Tan A |
| | Finding Angles From Ratios |
| | Find Unknown Sides |
| | Find Unknown Angles |
| **Topics** | **Skill Quests** |
| Use trigonometry to solve problems | Introducing trigonometry |
| | Establishing sine, cosine & tangent ratios |
| | Identifying trigonometric ratios |
| | Finding a side length using trig ratios |
| | Finding an angle using trig ratios |
| | Solving 2D & 3D problems using trig ratios |

| VC2M9SP02<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Use scale factors | Using scale factors |
| | Applying scale factors |
| | Area & volume scale factors |

| VC2M9SP03<br>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

| VC2M9ST01<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Analyse reports from secondary sources | Analysing reports from secondary sources |

| VC2M9ST02<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Analyse sampling methods | Analysing sampling methods |

| VC2M9ST03<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Statistical displays | Frequency Histograms |
| | Double Stem and Leaf Plots |
| | Histograms for Grouped Data |
| **Topics** | **Skill Quests** |
| Describe shape | Describing shape |
| Compare summary statistics | Comparing summary statistics |

| VC2M9ST04<br>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** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Display data | Choosing appropriate graph for data |
| | Constructing data displays |

| VC2M9ST05<br>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** |
| Teacher directed | |

## 6 Probability

| VC2M9P01<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Probability | Probability With Replacement |
| | Probability Without Replacement |
| | Tree Diagrams |
| **Topics** | **Skill Quests** |
| Describe 2 step chance experiments | Describing 2 step experiments with replacement |
| | Describing 2 step experiments without replacement |

| VC2M9P02<br>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 relative frequencies | Calculating & using relative frequency |

| VC2M9P03<br>design and conduct repeated chance experiments and simulations using digital tools to estimate probabilities that cannot be determined exactly | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

# Year 10

## 1 Number

| VC2M10N01<br>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

| VC2M10A01<br>factorise algebraic expressions by taking out a common algebraic factor | |
|---|---|
| **Course Topics** | **Activities** |
| Algebraic expressions & fractions | Factorising with Indices |
| **Topics** | **Skill Quests** |
| Factorise algebraic expressions | Taking out a numerical factor |
| | Taking out an algebraic factor |
| | Taking out the HCF |

| VC2M10A02<br>simplify algebraic products and quotients using exponent laws | |
|---|---|
| **Course Topics** | **Activities** |
| Algebraic expressions & fractions | Multiplication and Division with Indices |
| | Simplifying with Index Laws 2 |
| | Algebraic Fractions 1 |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M10A03<br>apply the 4 operations to simple algebraic fractions with numerical or single variable denominators | |
|---|---|
| **Course Topics** | **Activities** |
| Algebraic expressions & fractions | Algebraic Fractions 2 |
| | Algebraic Fractions 3 |
| | Simplify Algebraic Fractions by Factorising |
| | Factorising and Fractions 1 |
| | Grouping in Pairs |

| Topics | Skill Quests |
|---|---|
| Algebraic fractions | Algebraic fractions: numerical denominators |
| | Algebraic fractions: single variable denominators |

| VC2M10A04<br>expand binomial products and factorise monic quadratic expressions using a variety of strategies | |
|---|---|
| **Course Topics** | **Activities** |
| Algebraic expressions & fractions | Special Binomial Products |
| | Completing the Square |
| | Completing the Square 2 |
| **Topics** | **Skill Quests** |
| Expand binomial products | Expanding binomial products |
| | Expanding special products |
| | Further binomial expansions |
| Factorise monic quadratics | Factorising monic quadratics |

| VC2M10A05<br>substitute values into formulas to determine an unknown and rearrange formulas to solve for a particular term | |
|---|---|
| **Course Topics** | **Activities** |
| Algebraic expressions & fractions | Rearranging the Equation |
| **Topics** | **Skill Quests** |
| Work with formulas | Substituting into formulas |
| | Rearranging formulas |

| VC2M10A06<br>implement algorithms that use data structures using pseudocode or a general purpose programming language | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| VC2M10A07<br>solve problems involving linear equations, including those derived from formulas | |
|---|---|
| **Course Topics** | **Activities** |
| Linear equations & inequalities | Equations to Solve Problems |
| | Write an Equation: Word Problems |
| **Topics** | **Skill Quests** |
| Problems involving linear equations | Word problems |

| VC2M10A08<br>solve linear inequalities and graph their solutions on a number line | |
|---|---|
| **Course Topics** | **Activities** |
| Linear equations & inequalities | Solving Inequalities 1 |
| | Solving Inequalities 2 |
| | Linear Regions |
| | Intersecting Linear Regions |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M10A09<br>solve simultaneous linear equations, using algebraic and graphical techniques including using digital tools | |
|---|---|
| **Course Topics** | **Activities** |
| Simultaneous equations | Simultaneous Equations 1 |
| | Simultaneous Equations 2 |
| | Solve Systems by Graphing |
| | Simultaneous Linear Equations |
| **Topics** | **Skill Quests** |
| Simultaneous linear equations | Solving simultaneous equations graphically |
| | Solving simultaneous equations algebraically |
| | Solving simultaneous equations in context |

| VC2M10A10<br>solve problems involving gradients of parallel and perpendicular lines | |
|---|---|
| **Course Topics** | **Activities** |
| Linear equations & inequalities | Are they Parallel? |
| | Are they Perpendicular? |
| | Equation of a Line 3 |
| | Perpendicular and Parallel Lines |
| **Topics** | **Skill Quests** |
| Parallel & perpendicular lines | Parallel lines |
| | Perpendicular lines |
| | Equations of lines: Parallel & perpendicular lines |
| | Problems involving parallel & perpendicular lines |

| VC2M10A11<br>explore the connection between algebraic and graphical representations of relations such as simple quadratic, reciprocal, circle and exponential, using digital tools as appropriate | |
|---|---|
| **Course Topics** | **Activities** |
| Non-linear relationships | Graphing Circles |
| | Graphing Exponentials |
| | Exponential Growth and Decay |

| Topics | Skill Quests |
|---|---|
| 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 |

| VC2M10A12<br>solve linear equations involving simple algebraic fractions | |
|---|---|
| **Course Topics** | **Activities** |
| Linear equations & inequalities | Solving More Equations |
| | Equations with Grouping Symbols |
| | Equations with Decimals |
| | Equations with Fractions |
| **Topics** | **Skill Quests** |
| Solve equations with algebraic fractions | Solving equations with algebraic fractions |

| VC2M10A13<br>solve simple quadratic equations using a range of strategies, including null factor law | |
|---|---|
| **Course Topics** | **Activities** |
| Non-linear relationships | Quadratic Equations 1 |
| | Quadratic Formula |
| | Nature of Solutions of Quadratics |
| **Topics** | **Skill Quests** |
| Solve simple quadratic equations | Solving simple quadratic equations |

| VC2M10A14<br>solve simple exponential equations | |
|---|---|
| **Course Topics** | **Activities** |
| Non-linear relationships | Exponential Equations |
| **Topics** | **Skill Quests** |
| Solve simple exponential equations | Solving simple exponential equations |

| VC2M10A15<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| 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 |
| **Topics** | **Skill Quests** |
| Compound & simple interest | Compound interest |
| | Solving problems with compound interest |
| | Comparing simple & compound interest |

| **VC2M10A16**<br>solve equations graphically or using systematic numerical guess-check-and-refine with digital tools, with consideration of whether all solutions have been found | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

## 3 Measurement

| **VC2M10M01**<br>solve problems involving the surface area and volume of composite objects using appropriate units | |
|---|---|
| **Course Topics** | **Activities** |
| Volume & Surface Area | Volume: Composite Figures |
| **Topics** | **Skill Quests** |
| Surface area of composite solids | Calculating the surface area of composite solids |
| Volume of composite solids | Calculating the volume of composite solids |

| **VC2M10M02**<br>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 | |

| **VC2M10M03**<br>solve practical problems by applying Pythagoras' theorem and trigonometry to right-angled triangles, including problems involving direction and angles of elevation and depression | |
|---|---|
| **Course Topics** | **Activities** |
| Pythagoras & Trigonometry | Bearings |
| | True and Compass Bearings |
| | Degrees and Minutes |
| | Elevation and Depression |
| | Trigonometry Problems 2 |
| | Trigonometry Problems 1 |

| | |
|---|---|
| | Elevations |
| **Topics** | **Skill Quests** |
| 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 |

| **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 | |
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

## 4 Space

| **VC2M10SP01** | |
|---|---|
| apply deductive reasoning to formulate 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 proofs | Solving problems using geometric proofs |

| **VC2M10SP02** | |
|---|---|
| interpret networks and network diagrams used to represent relationships in practical situations and describe connectedness | |
| **Course Topics** | **Activities** |
| Networks | Networks Introduction |
| | Minimum Spanning Trees |
| **Topics** | **Skill Quests** |
| Teacher directed | |

## 5 Statistics

| VC2M10ST01<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| 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 |
| **Topics** | **Skill Quests** |
| Interquartile range | Interquartile range |
| Displays for continuous data | Constructing & interpreting histograms |
| | Constructing & interpreting box plots |
| | Describing shape |

| VC2M10ST02<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Statistical data | Correlation |
| **Topics** | **Skill Quests** |
| Use scatter plots | Constructing scatter plots |
| | Constructing a line of best fit |
| | Making predictions & drawing conclusions |
| | Bivariate data over time |

| VC2M10ST03<br>construct two-way tables and discuss possible relationship between categorical variables | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| VC2M10ST04<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Evaluate statistical reports | Evaluating statistical reports |

| VC2M10ST05<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

## 6 Probability

| VC2M10P01<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Probability | Two-way Table Probability |
| | Conditional probability |
| | Probability - 'And' and 'Or' |
| **Topics** | **Skill Quests** |
| Use conditional probability | Using conditional probability |
| | More on conditional probability |
| | Using two-way tables |
| | Using tree diagrams |
| | Using arrays |
| | Using Venn diagrams & set theory |

| VC2M10P02<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Describe 3 step chance experiments | Describing 3 step experiments with replacement |
| | Describing 3 step experiments without replacement |
| Understand independent events | Understanding independent events |

# Year 10A

## 1 Number

| VC2M10AN01<br>define rational and irrational numbers and perform operations with surds and fractional indices | |
|---|---|
| **Course Topics** | **Activities** |
| Surds | Simplifying Surds |
| | Adding and Subtracting Surds |
| | Multiplying Surds |
| | Dividing Surds |
| | Expanding Surd Expressions |
| | Expanding Binomial Surds |
| | Rationalising the Denominator |
| | Rationalising and Binomials |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M10AN02<br>perform operations on numbers involving fractional exponents and surds | |
|---|---|
| **Course Topics** | **Activities** |
| Surds | Surd Form to Index Form |
| | Fractional Indices |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| VC2M10AN03<br>use the definition of a logarithm to establish and apply the laws of logarithms and investigate logarithmic scales in measurement | |
|---|---|
| **Course Topics** | **Activities** |
| Logarithms | Log Laws |
| | Change of Base |
| | Log Base 'e' |
| **Topics** | **Skill Quests** |
| 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 |

## 2 Algebra

| VC2M10AA01<br>investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems | |
|---|---|
| **Course Topics** | **Activities** |
| Factor theorem | Polynomial Long Division |
| | Polynomial Factor Theorem |
| **Topics** | **Skill Quests** |
| Polynomials | Introducing polynomials |
| Remainder & factor theorems | Remainder theorem |
| | Factor theorem |

| VC2M10AA02<br>devise and use algorithms and simulations to solve mathematical problems | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| VC2M10AA03<br>simplify combinations of linear expressions with rational coefficients and the solution of related equations | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| VC2M10AA04<br>explore the inverse relationship between exponential functions and logarithmic functions and the solution of related equations | |
|---|---|
| **Course Topics** | **Activities** |
| Logarithms | Equations with Logs |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| VC2M10AA05<br>describe, interpret, and sketch parabolas, hyperbolas, circles and exponential functions and their transformations | |
|---|---|
| **Course Topics** | **Activities** |
| Non-linear relationships | Graphing Hyperbolas |
| | Non Linear Graphs |
| | Identifying Graphs |

| Topics | Skill Quests |
|---|---|
| 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 |

| VC2M10AA06<br>apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Sketch polynomials | Sketching polynomials |
| | Sketching more polynomials |

| VC2M10AA07<br>factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts | |
|---|---|
| **Course Topics** | **Activities** |
| Algebraic expressions & fractions | Factorising Quadratics 2 |
| | Factorising and Fractions 2 |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M10AA08<br>use function notation to describe the relationship between dependent and independent variables in modelling contexts | |
|---|---|
| **Course Topics** | **Activities** |
| Functions | Function Notation 1 |
| | Function Notation 2 |

| | |
|---|---|
| | Domain |
| | Domain and Range |
| | Piecemeal Functions |
| | Function Notation 3 |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| **VC2M10AA09**<br>solve linear and non-linear simultaneous equations using graphing or systematic guess-check-and-refine with digital tools | |
|---|---|
| **Course Topics** | **Activities** |
| Simultaneous equations | Simultaneous Equations 3 |
| | Intersection: Line & Parabola |
| | Intersection: Line & Circle |
| | Intersection: Two Parabolas |
| | Intersection: Line & Hyperbola |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| **VC2M10AA10**<br>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

| **VC2M10AM01**<br>solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids | |
|---|---|
| **Course Topics** | **Activities** |
| 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 |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M10AM02<br>explore the effect of increasingly small changes in the value of variables on the average rate of change and in relation to limiting values | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

## 4 Space

| VC2M10ASP01<br>prove and apply relationships between angles and various lines associated with circles (radii, diameters, chords, tangents) | |
|---|---|
| **Course Topics** | **Activities** |
| Circle geometry | Circle Terms |
| | Circle Theorems |
| | Tangents and Secants |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M10ASP02<br>establish the sine, cosine and area rules for any triangle and solve related problems | |
|---|---|
| **Course Topics** | **Activities** |
| 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 |
| **Topics** | **Skill Quests** |
| Trigonometry: Non right-angled triangles | Applying the sine rule |
| | Applying the cosine rule |
| | Applying the area rule |
| | Solving problems with non-right angled triangles |

| VC2M10ASP03<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Trigonometry functions | Trigonometric Relationships |
| | Unit Circle Reductions |
| | Converting Radians and Degrees |
| | Exact Trigonometric Ratios |
| | Which Quadrant? |
| | Sign of the Angle |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M10ASP04<br>solve simple trigonometric equations | |
|---|---|
| **Course Topics** | **Activities** |
| Trigonometry equations | Period and Amplitude |
| | Trig Equations 1 |
| | Trig Equations 2 |
| | Trig Equations 3 |
| | Trig Equations 4 |
| **Topics** | **Skill Quests** |
| Solve simple trigonometric equations | Solving simple trigonometric equations |

| VC2M10ASP05<br>apply Pythagoras' theorem and trigonometry to solving three-dimensional problems in right-angled triangles | |
|---|---|
| **Course Topics** | **Activities** |
| Trigonometry: Non right-angled triangles | 3D Trigonometry |
| **Topics** | **Skill Quests** |
| Solve problems in three dimensions | Solving problems in three dimensions |

| VC2M10ASP06<br>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

| VC2M10AST01<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Statistical data | Calculating Standard Deviation |
| | Interpreting Standard Deviation |
| | Data Terms |
| | Data Analysis: Scatter Plots |
| **Topics** | **Skill Quests** |
| 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 |

| VC2M10AST02<br>identify measures of spread, and understand their interpretation and usefulness with respect to different data distributions | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

| VC2M10AST03<br>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 | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

## 6 Probability

| VC2M10AP01<br>explore counting principles, and factorial notation as a representation that provides efficient counting in multiplicative contexts, including calculations of probabilities | |
|---|---|
| **Course Topics** | **Activities** |
| Probability | Calculating Binomial Probability |
| | Introduction to Binomial Probability |
| **Topics** | **Skill Quests** |
| Fundamental counting principle | Understanding the counting principle |

| VC2M10AP02<br>investigate reports of studies in digital media and elsewhere for information on their planning and implementation | |
|---|---|
| **Course Topics** | **Activities** |
| Teacher directed | |
| **Topics** | **Skill Quests** |
| Teacher directed | |

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