Mathletics

Victoria Program of Studies

Skill Quests

Years 7 – 8

June, 2022

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Year 7

1 Number and Algebra

1.1 Number and Place Value

Outcome	Quests	Content
Investigate index notation and represent whole numbers as products of powers of prime numbers	Indices	Introducing indices
		Divisibility, indices and factors
Investigate and use square roots of perfect square numbers	Square and cube roots	Working with square roots
		Working with cube roots
		Solving problems with square and cube roots
Apply the associative, commutative and distributive laws to aid mental and written computation and make estimates for these computations	Laws of multiplication and division	Laws of multiplication and division
Compare, order, add and subtract integers	Working with integers	Compare, order, add and subtract integers
		Solving temperature problems

1.2 Real numbers

Outcome	Quests	Content
Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line	Expressing and comparing fractions	Fractions: improper and proper fractions
		Fractions: comparing and ordering
Solve problems involving addition and subtraction of fractions, including those with unrelated denominators	Adding and subtracting fractions	Fractions: adding fractions
		Fractions: subtracting fractions
		Fractions: adding and subtracting fractions
Multiply and divide fractions and decimals using efficient written strategies and digital technologies	Multiplying & dividing fractions & decimals	Multiplying decimals & finding quantities
		Multiplying fractions & finding quantities
		Dividing integers, fractions and decimals
		Dividing fractions by fractions and integers
Express one quantity as a fraction of another, with and without the use of digital technologies	Expressing one quantity as a fraction	Expressing one quantity as a fraction
Round decimals to a specified number of decimal places	Rounding decimals	Rounding decimals

Connect fractions, decimals and percentages and carry out simple conversions	Fractions, decimals and percentages	Converting decimals
		Converting percentages
		Converting fractions to decimals
		Converting fractions to percentages
		Ordering fractions, decimals and percentages
Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies	Percentages of quantities	Percentages of quantities
Recognise and solve problems involving simple ratios	Ratios	Using simple ratios
		Simplifying ratios
		Solve simple problems involving ratios

1.3 Money and financial mathematics

Outcome	Quests	Content
Investigate and calculate 'best buys', with and without digital technologies	Best buys and discounts	Best buys and discounts

1.4 Patterns and algebra

Outcome	Quests	Content
Introduce the concept of variables as a way of representing numbers using letters	Variable and equivalent algebraic expressions	Variable and equivalent algebraic expressions
Create algebraic expressions and evaluate them by substituting a given value for each variable	Algebraic patterns and expressions	Number patterns
		Evaluating formulae
		Creating algebraic expressions
Extend and apply the laws and properties of arithmetic to algebraic terms and expressions	Simplifying algebraic expressions	Simplifying algebraic expressions

1.5 Linear and non-linear relationships

Outcome	Quests	Content
Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point	Using the coordinate system	Using the coordinate system
Solve simple linear equations	Solving equations	Equations introduction
		Solving 1-step equations: addition/subtraction
		Solving 1-step equations: multiplication
		Solving 1-step equations: division

		Solving 1-step equations: mixed operations
		Solving 2-step equations: variable in numerator
		Solving 2-step equations: variable in denominator
Investigate, interpret and analyse graphs from real life data, including consideration of domain and range	Analysing graphs including domain & range	Distance/time graphs
		Graphs and rates extension
		Domain and range

2 Measurement and Geometry

2.1 Using units of measurement

Outcome	Quests	Content
Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving	Solve area problems	Solving area problems involving rectangles
		Solving area problems involving triangles
		Solving area problems involving parallelograms
		Solving area problems: simple composite figures
Calculate volumes of rectangular prisms	Volume of rectangular prisms	Volume of rectangular prisms

2.2 Shape

Outcome	Quests	Content
Draw different views of prisms and solids formed from combinations of prisms	Explore different views of prisms/solids	Explore different views of prisms/solids

2.3 Location and transformation

Outcome	Quests	Content
Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries	Transformations and symmetry	Transformations on the cartesian plane
		Line and rotational symmetry

2.4 Geometric reasoning

Outcome	Quests	Content
Classify triangles according to their side and angle properties and describe quadrilaterals	Triangles and quadrilaterals	Labelling and naming conventions
		Geometry conventions
		Properties of triangles
		Convex and non-convex quadrilaterals
		Properties of quadrilaterals
		Reasoning, sketching and describing quadrilaterals
		Using properties of triangles & quadrilaterals
Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral	Solving problems: interior angle sums	Solving problems: interior angle sums

Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal	Angle relationships and parallel lines	Angles at a point
		Parallel and perpendicular line conventions
		Angle relationships on parallel lines
Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning	Parallel lines and geometric reasoning	Proving parallel lines
		Geometric reasoning using angle properties

3 Statistics and Probability

3.1 Chance

Outcome	Quests	Content
Construct sample spaces for single-step experiments with equally likely outcomes	Chance experiments and sample spaces	Language of chance experiments
		Sample spaces
		Chance experiments
Assign probabilities to the outcomes of events and determine probabilities for events	Probability	Language of probability
		Understanding basic probability

3.2 Data representation and interpretation

Outcome	Quests	Content
Identify and investigate issues involving numerical data collected from primary and secondary sources	Collecting and interpreting data	Issues with data from primary & secondary sources
		Collecting and interpreting data
Construct and compare a range of data displays including stem-and-leaf plots and dot plots	Representing data	Tallies and frequency distribution tables
		Frequency histograms and polygons
		Frequency histograms and polygons: grouped data
		Dot plots
		Ordered stem-and-leaf plots
		Divided bar graphs
		Sector graphs
		Line graphs
		Interpreting a variety of different graphs
Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data	Mean, Median, Mode and Range	Calculating the mean
		Median mode and range
Describe and interpret data displays using median, mean and range	Mean, median and mode to analyse data	Mean, median and mode to analyse data

Year 8

1 Number and Algebra

1.1 Number and place value

Outcome	Quests	Content
Use index notation with numbers to establish the index laws with positive integral indices and the zero index	Investigating index laws	Investigating index laws
Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies and make estimates for these computations	Applying the four operations to integers	Applying the four operations to integers

1.2 Real numbers

Outcome	Quests	Content
Investigate terminating and recurring decimals	Terminating and recurring decimals	Terminating and recurring decimals
Investigate the concept of irrational numbers, including π	Irrational numbers	Investigating irrational numbers
		Exploring irrational numbers (surds)
Solve problems involving the use of percentages, including percentage increases and decreases and percentage error, with and without digital technologies	Working with percentages	Increasing and decreasing amounts
		Problem solving involving percentages
		Percentage error
Solve a range of problems involving rates and ratios, including distance-time problems for travel at a constant speed, with and without digital technologies	Rates and ratios	Solve problems involving ratios
		Ratios involving more than two parts
		Converting ratios
		Using rates

1.3 Money and financial mathematics

Outcome	Quests	Content
Solve problems involving profit and loss, with and without digital technologies	Solving problems involving profit & loss	Solving problems involving profit & loss

1.4 Patterns and algebra

Outcome	Quests	Content
Extend and apply the distributive law to the expansion of algebraic expressions	Extending & applying the distributive law	Extending & applying the distributive law
Factorise algebraic expressions by identifying numerical factors	Factorising algebraic expressions	Factorising algebraic expressions
		Factorising algebraic expressions 2
Simplify algebraic expressions involving the four operations	Simplifying algebraic expressions using mixed operations	Simplifying algebraic expressions using mixed operations

1.5 Linear and non--linear relationships

Outcome	Quests	Content
Plot linear relationships on the Cartesian plane with and without the use of digital technologies	Linear relationships	Working with Linear Sequences
		Table of values
Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution	Solving linear equations	Solving 3-step equations
		Solving equations with variable on both sides
		Solving equations involving brackets
		Solving linear equations graphically
Plot graphs of non-linear real life data with and without the use of digital technologies, and interpret and analyse these graphs	Graphs of non-linear data	Graphs of non-linear data

2 Measurement and Geometry

2.1 Using units of measurement

Outcome	Quests	Content
Choose appropriate units of measurement for area and volume and convert from one unit to another	Units of area and volume	Choosing and converting units of area
		Choosing and converting units of volume
Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites	Perimeter and area of quadrilaterals	Finding the perimeter
		Solving area problems involving trapeziums
		Solving area problems involving rhombuses
		Solving area problems involving kites
Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving determining radius, diameter, circumference and area from each other	Working with circles	Identifying parts of circles
		Working with circumferences of circles
		Finding perimeters of parts of circles
		Finding arc lengths and perimeters of sectors
		Finding arc lengths and perimeters of sectors
		Solving area problems involving circles
		Solving area problems involving parts of circles
Develop the formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving volume	Working with prisms	Finding the volume of prisms
		Finding the volume of rectangular prisms
		Finding the volume of triangular prisms
		Solving problems involving prisms
Solve problems involving duration, including using 12- and 24-hour time within a single time zone	Solve problems involving time	Solving problems involving time
		Rounding and converting time

2.2 Geometric reasoning

Outcome	Quests	Content
Define congruence of plane shapes using transformations and use transformations of congruent shapes to produce regular patterns in the plane including tessellations with and without the use of digital technology	Congruence, patterns and tessellations	Defining and working with congruence
		Patterns and tessellation: congruent shapes
Develop the conditions for congruence of triangles	Determining congruence in triangles	Determining congruence in triangles

Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning	Using properties of congruent triangles	Using properties of congruent triangles

3 Statistics and Probability

3.1 Chance

Outcome	Quests	Content
Identify complementary events and use the sum of probabilities to solve problems	Complementary events	Complementary events
Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and'	Probability language to describe events	Probability language to describe events
Represent events in two-way tables and Venn diagrams and solve related problems	Venn diagrams and two-way tables	Understanding and constructing Venn diagrams
		Using Venn diagrams to solve problems
		Interpreting and constructing two-way tables
		Two-way tables and Venn diagrams

3.2 Data representation and interpretation

Outcome	Quests	Content
Distinguish between a population and a sample and investigate techniques for collecting data, including census, sampling and observation	Collecting data	Collecting data
Explore the practicalities and implications of obtaining data through sampling using a variety of investigative processes	Data sampling and populations	The relationship between a sample & the population
Investigate the effect of individual data values including outliers, on the range, mean and median	Clusters, gaps and outliers in data	Clusters, gaps and outliers in data

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