Year 10

Number and Algebra

Money and financial mathematics

Content Descriptor	Lesson Names
Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies	• Compound Interest - Months and Weeks • Compound Interest Basic Formula • Rearranging Compound Interest - Months and Weeks • Rearranging the Compound Interest Formula

Patterns and algebra

Content Descriptor	Lesson Names
Factorise algebraic expressions by taking out a common algebraic factor	• Factorisation by Grouping • Factorising • Factorising with Index Laws • Identifying Common Factors • Identifying Common Factors with Indices
Simplify algebraic products and quotients using index laws	• Simplifying Algebraic Products with Index Laws • Simplifying Algebraic Quotients with Index Laws
Apply the four operations to simple algebraic fractions with numerical denominators	• Adding Algebraic Fractions • Subtracting Algebraic Fractions • Multiplying Algebraic Fractions • Dividing Algebraic Fractions
Expand binomial products and factorise monic quadratic expressions using a variety of strategies	• Factorising by Completing the Square • Factorising Differences of Two Squares • Factorising Perfect Squares • Factorising Quadratic Trinomials
Substitute values into formulas to determine an unknown	• Rearranging and Solving Equations • Solving Quadratic Equations by Completing the Square • Using Formulas

Linear and non-linear relationships

Content Descriptor	Lesson Names
Solve problems involving linear equations, including those derived from formulas	• Rearranging and Solving Equations • Rearranging and Solving Equations from Formulas

	• Word Problems • Solving Word Problems • Using Formulas
Solve linear inequalities and graph their solutions on a number line	• Introduction to Inequalities • Rearranging Inequalities • Solving Inequalities • Chained Inequalities • Review Lesson: Inequalities
Solve linear simultaneous equations, using algebraic and graphical techniques, including using digital technology	• Using Elimination to Solve Simultaneous Equations • Using Graphs to Solve Simultaneous Equations • Using Substitution to Solve Simultaneous Equations
Solve problems involving parallel and perpendicular lines	• Parallel Lines • Perpendicular Lines
Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate	• Circles • Exponential Graphs • Parabolas • Transforming Circles • Transforming Parabolas • Transforming Parabolas - Dilation and Reflection • Transforming Parabolas - Translation
Solve linear equations involving simple algebraic fractions	• Rearranging and Solving Equations • Rearranging and Solving Equations from Formulas • Word Problems • Solving Word Problems • Using Formulas
Solve simple quadratic equations using a range of strategies	• Factorising Perfect Squares • Factorising Quadratic Expressions • Grouping • Guess and Check • Completing the Square: Method 1 - Using Rearrangement • Completing the Square: Method 2 - Using Differences of Two Squares • Solving Quadratic Equations Using Technology • The Quadratic Formula

Measurement and Geometry

Using units of measurement

Content Descriptor	Lesson Names
Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids	• Surface Area of Prisms • Surface Area of Cylinders • Surface Area of Complex Solids • Volume of Rectangular Prisms • Calculating Volume of Rectangular Prisms • Calculating Volume of Triangular Prisms • Calculating Volume of Cylinders • Calculating Volume of Other Regular and Irregular Prisms • Types of Prisms • Volume of Composite Solids

Geometric reasoning

Content Descriptor	Lesson Names
Formulate proofs involving congruent triangles and angle properties	• Using Congruence to Determine Angles in Triangles
Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes	• Introduction to Proofs and Logic • Angle Proofs • Parallelogram and Rhombus Proofs • Rectangle and Square Proofs

Pythagoras and trigonometry

Content Descriptor	Lesson Names
Solve right-angled triangle problems including those involving direction and angles of elevation and depression	• Angles of Elevation and Depression • Bearings with Right-Angled Triangles

Statistics and Probability

Chance

Content Descriptor	Lesson Names
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	• Probabilities and Three-Step Experiments • Probabilities of Unequal Outcomes • Three-Step Experiments and Unequal Outcomes • Building Three-Step Tree Diagrams

independence	• Tree Diagrams with Unequal Outcomes • Introduction to Independence • Investigating Independent Events using Chance Diagrams
Use the language of 'if ....then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language	• Introduction to Conditional Probability • Investigating Conditional Probability with Two-Way Tables • Investigating Conditional Probability with Venn Diagrams • Calculating Conditional Probabilities using Arrays • Calculating Conditional Probability Using Tree Diagrams • Word Problems

Data representation and interpretation

Content Descriptor	Lesson Names
Determine quartiles and interquartile range	• Five Point Summary • Quartiles • Range • Interquartile Range • Box and Whisker Plots • Plotting Box and Whisker Plots • Comparing Box and Whisker Plots
Construct and interpret box plots and use them to compare data sets	• Box and Whisker Plots • Plotting Box and Whisker Plots • Comparing Box and Whisker Plots
Compare shapes of box plots to corresponding histograms and dot plots	• Box and Whisker Plots, Histograms and Dot Plots
Use scatter plots to investigate and comment on relationships between two numerical variables	• Plotting Using a Calculator • Plotting Using a Spreadsheet • Analysing Trend by Eye
Investigate and describe bivariate numerical data where the independent variable is time	• Analysing Time Series • Introduction to Time Series
Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data	• Evaluating Statistical Graphs: Making our Graph • Evaluating Statistical Graphs: the Shape of the Graph • Evaluating Statistical Reports and Claims: Data Collection • Evaluating Statistical Reports and Claims: Data Reporting

Year 10A

Number and Algebra

Real numbers

Content Descriptor	Lesson Names
Define rational and irrational numbers and perform operations with surds and fractional indices	• Real Numbers • Introduction to Surds • Multiplying and Dividing Surds • Simplifying Surds • Adding and Subtracting Surds • Index Laws and Fractional Powers • Expanding Surds • Conjugate and Perfect Square Surds • Rationalising Denominators
Use the definition of a logarithm to establish and apply the laws of logarithms	• Introduction to Logarithms • Deriving the Laws of Logarithms • Using the Laws of Logarithms • Combining Log Laws

Patterns and algebra

Content Descriptor	Lesson Names
Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems	• Introduction to Polynomials • Evaluating Polynomials • Adding, Subtracting and Multiplying Polynomials • Dividing Polynomials • The Remainder Theorem • The Factor Theorem • Factorising Cubic Polynomials • Factorising Quartic Polynomials • Solving Polynomials

Linear and non-linear relationships

Content Descriptor	Lesson Names
Solve simple exponential equations	• Applications of Exponential Equations • Solving Exponential Equations
Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations	• Parabolas • Parabola Transformations • Multiple Transformations of Parabolas • Hyperbola Graphs

	• Hyperbola Graph Transformations • Circle Graphs • Exponential Graphs • Inverse Functions and Transformations
Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation	• Features of Polynomial Graphs • Features of Graphs - Roots • Parabolas • Parabola Transformations • Multiple Transformations of Parabolas • Cubics • Expanding Cubic Expressions • Cubic Transformations • Quartics
Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts	• Monic Factorisation • Non-Monic Factorisation • Solving Monic Quadratic Equations • Solving Non-Monic Quadratic Equations • The Quadratic Formula • Writing Quadratic Equations

Measurement and Geometry

Using units of measurement

Content Descriptor	Lesson Names
Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids	• Finding the Height of Right Pyramids • Surface Area of Right Pyramids • Surface Area of Right Cones • Surface Area of Spheres • Surface Area of Composite Solids • Volume of Right Pyramids • Volume of Right Cones • Volume of Spheres • Volume of Composite Solids

Geometric reasoning

Content Descriptor	Lesson Names
Prove and apply angle and chord properties of circles	• Central Angle Theorem • Proof: Central Angle Theorem • Angles Subtended by the Same Arc • Thales' Theorem: Angles in a Semicircle • Proving Thales' Theorem • Cyclic Quadrilaterals

	• Equal Length Chord Properties • Perpendicular Bisector to Chords • Tangents, Secants and the Alternate Segment Theorem • Intersecting Chords, Secants and Tangents

Pythagoras and trigonometry

Content Descriptor	Lesson Names
Establish the sine, cosine and area rules for any triangle and solve related problems	• The Sine Rule • The Sine Rule: The Ambiguous Case • Finding Angles Using the Sine Rule • The Cosine Rule • Finding Angles Using the Cosine Rule • Review Lesson: Trigonometric Rules • Area of a Triangle: ½ ab sin C • Heron's Formula
Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies	• The Unit Circle and Radians • Understanding and Graphing Cosine • Understanding and Graphing Sine • Understanding and Graphing Tangent • Comparing Trigonometric Functions
Solve simple trigonometric equations	• Special Triangles: 30-60-90 • Special Triangles: 45-45-90 • Trigonometric Ratios and Complementary Angles
Apply Pythagoras' Theorem and trigonometry to solving three-dimensional problems in right-angled triangles	• Pythagoras' Theorem in 3D • Trigonometry in 3D • 3D Problems Using Right-Angled Triangles

Statistics and Probability

Chance

Content Descriptor	Lesson Names
Investigate reports of studies in digital media and elsewhere for information on their planning and implementation	• What is Sampling? • Types of Sampling: Non-Probability Sampling • Types of Sampling: Probability Sampling • Sampling Errors • Analysing Sampling in Reports • Misleading Reports • Statistics in Organisations

Data representation and interpretation

Content Descriptor	Lesson Names
Calculate and interpret the mean and standard deviation of data and use these to compare data sets	• Introduction to Standard Deviation • Calculating Standard Deviation • Calculating Standard Deviation Using Technology • Investigating the Standard Deviation • Using the Standard Deviation to Compare Data Sets • Comparing the Measures of Spread
Use information technologies to investigate bivariate numerical data sets. Where appropriate use a straight line to describe the relationship allowing for variation	• Lines of Best Fit by Eye • Least Squares Fitting using a Calculator • Least Squares Fitting using a Spreadsheet