

Mathematics Continuum of Learning

Stage 5 to Stage 6 Advanced

Unofficial

Based on *Mathematics K-10 Syllabus, NESA, 2022* and *Mathematics Advanced Stage 6 Syllabus, NESA, 2017*.
This is not an authorised NESA document. It was developed for the purposes of planning.

Stage 5		Advanced	
Core	Path (Adv)	Year 11	Year 12
<p>Numbers of any magnitude</p> <p>MA5-MAG-C-01 solves measurement problems by using scientific notation to represent numbers and rounding to a given number of significant figures</p>		<p><i>Assumed knowledge for Advanced.</i></p>	
<p>Properties of geometrical figures</p> <p>MA5-GEO-C-01 identifies and applies the properties of similar figures and scale drawings to solve problems</p>		<p><i>Assumed knowledge for Advanced.</i></p>	
<p>Area / Area and surface area</p> <p>MA5-ARE-C-01 solves problems involving the surface area of right prisms and practical problems involving the area of composite shapes and solids</p>	<p>Area / Area and surface area</p> <p>MA5-ARE-P-01 applies knowledge of the surface area of right pyramids and cones, spheres and composite solids to solve problems (Path: Stn, Adv)</p>	<p><i>Assumed knowledge for Advanced.</i></p>	
<p>Volume</p> <p>MA5-VOL-C-01 solves problems involving the volume of composite solids consisting of right prisms and cylinders</p>	<p>Volume</p> <p>MA5-VOL-P-01 applies knowledge of the volume of right pyramids, cones and spheres to solve problems involving related composite solids (Path: Stn, Adv)</p>	<p><i>Assumed knowledge for Advanced.</i></p>	

Algebraic techniques

MA5-ALG-C-01 simplifies algebraic fractions with numerical denominators and expands algebraic expressions

Indices

MA5-IND-C-01 simplifies algebraic expressions involving positive-integer and zero indices, and establishes the meaning of negative indices for numerical bases

Equations

MA5-EQU-C-01 solves linear equations of up to 3 steps, limited to one algebraic fraction

Linear relationships

MA5-LIN-C-01 determines the midpoint, gradient and length of an interval, and graphs linear relationships, with and without digital tools

MA5-LIN-C-02 graphs and interprets linear relationships using the gradient/slope-intercept form

Non-linear relationships

MA5-NLI-C-01 identifies connections between algebraic and graphical representations of quadratic and exponential relationships in various contexts

MA5-NLI-C-02 identifies and compares features of parabolas and exponential curves in various contexts

Algebraic techniques

MA5-ALG-P-01 simplifies algebraic fractions involving indices, and expands and factorises algebraic expressions (Path: Adv)

MA5-ALG-P-02 selects and applies appropriate algebraic techniques to operate with algebraic fractions, and expands, factorises and simplifies algebraic expressions (Path: Adv)

Indices

MA5-IND-P-01 applies the index laws to operate with algebraic expressions involving negative-integer indices (Path: Adv)

MA5-IND-P-02 describes and performs operations with surds and fractional indices (Path: Adv)

Equations

MA5-EQU-P-01 solves monic quadratic equations, linear inequalities and cubic equations of the form (Path: Adv)

MA5-EQU-P-02 solves linear equations of more than 3 steps, monic and non-monic quadratic equations, and linear simultaneous equations (Path: Adv)

Linear relationships

MA5-LIN-P-01 describes and applies transformations, the midpoint, gradient/slope and distance formulas, and equations of lines to solve problems (Path: Adv)

Non-linear relationships

MA5-NLI-P-01 interprets and compares non-linear relationships and their transformations, both algebraically and graphically (Path: Adv)

Ratios and rates / Variation and rates of change

MA5-RAT-P-01 identifies and solves problems involving direct and inverse variation and their graphical representations (Path: Stn, Adv)

MA5-RAT-P-02 analyses and constructs graphs relating to rates of change (Path: Adv)

Polynomials

MA5-POL-P-01 defines, operates with and graphs polynomials and applies the factor and remainder theorems to solve problems (Path: Adv, Ext)

Functions and other graphs

MA5-FNC-P-01 uses function notation to describe and graph functions of one variable and graphs inequalities in one and 2 variables (Path: Adv)

Functions	
F1 Working with Functions	F2 Graphing Techniques
F1.1 Algebraic techniques	
F1.2 Introduction to functions	
F1.3 Linear, quadratic and cubic functions	
F1.4 Further functions and relations	

Core	Path (Adv)	Year 11	Year 12
<p>Trigonometry</p> <p>MA5-TRG-C-01 applies trigonometric ratios to solve right-angled triangle problems</p> <p>MA5-TRG-C-02 applies trigonometry to solve problems, including bearings and angles of elevation and depression</p>	<p>Trigonometry</p> <p>MA5-TRG-P-01 applies Pythagoras' theorem and trigonometry to solve 3-dimensional problems and applies the sine, cosine and area rules to solve 2-dimensional problems, including bearings (Path: Stn, Adv)</p> <p>MA5-TRG-P-02 establishes and applies the properties of trigonometric functions and finds solutions to trigonometric equations (Path: Adv)</p>	<p>Trigonometric Functions</p> <p>T1 Trigonometry and Measure of Angles</p> <p>T1.1 Trigonometry</p> <p>T1.2 Radians</p> <p>T2 Trigonometric Functions and Identities</p>	<p>T3 Trigonometric Functions and Graphs</p>
<p>Area / Area and surface area</p> <p>MA5-ARE-C-01 solves problems involving the surface area of right prisms and practical problems involving the area of composite shapes and solids</p> <p>Volume</p> <p>MA5-VOL-C-01 solves problems involving the volume of composite solids consisting of right prisms and cylinders</p>	<p>Area / Area and surface area</p> <p>MA5-ARE-P-01 applies knowledge of the surface area of right pyramids and cones, spheres and composite solids to solve problems (Path: Stn, Adv)</p> <p>Volume</p> <p>MA5-VOL-P-01 applies knowledge of the volume of right pyramids, cones and spheres to solve problems involving related composite solids (Path: Stn, Adv)</p>	<p>Calculus</p> <p>C1 Introduction to Differentiation</p> <p>C1.1 Gradients of tangents</p> <p>C1.2 Difference quotients</p> <p>C1.3 The derivative function and its graph</p> <p>C1.4 Calculating with derivatives</p>	<p>C2 Differential Calculus</p> <p>C2.1 Differentiation of trigonometric, exponential and logarithmic functions</p> <p>C2.2 Rules of differentiation</p> <p>C3 Applications of Differentiation</p> <p>C3.1 The first and second derivatives</p> <p>C3.2 Applications of the derivative</p> <p>C4 Integral Calculus</p> <p>C4.1 The anti-derivative</p> <p>C4.2 Areas and the definite integral</p>
<p>Indices</p> <p>MA5-IND-C-01 simplifies algebraic expressions involving positive-integer and zero indices, and establishes the meaning of negative indices for numerical bases</p>	<p>Indices</p> <p>MA5-IND-P-01 applies the index laws to operate with algebraic expressions involving negative-integer indices (Path: Adv)</p> <p>MA5-IND-P-02 describes and performs operations with surds and fractional indices (Path: Adv)</p> <p>Logarithms</p> <p>MA5-LOG-P-01 establishes and applies the laws of logarithms to solve problems (Path: Adv)</p>	<p>Exponential and Logarithmic Functions</p> <p>E1 Logarithms and Exponentials</p> <p>E1.1 Introducing logarithms</p> <p>E1.2 Logarithmic laws and applications</p> <p>E1.3 The exponential function and natural logarithms</p> <p>E1.4 Graphs and applications of exponential and logarithmic functions</p>	

Data classification and visualisation / Data Analysis

MA5-DAT-C-01 compares and analyses datasets using summary statistics and graphical representations

MA5-DAT-C-02 displays and interprets datasets involving bivariate data

Probability

MA5-PRO-C-01 solves problems involving probabilities in multistage chance experiments and simulations

Data classification and visualisation / Data Analysis

MA5-DAT-P-01 plans, conducts and reviews a statistical inquiry into a question of interest (Path: Stn, Adv)

Probability

MA5-PRO-P-01 solves problems involving Venn diagrams, 2-way tables and conditional probability (Path: Adv)

Statistical Analysis

S1 Probability and Discrete Probability Distributions

S1.1 Probability and Venn diagrams

S1.2 Discrete probability distributions

S2 Descriptive Statistics and Bivariate Data Analysis

S2.1 Data (grouped and ungrouped) and summary statistics

S2.2 Bivariate data analysis

S3 Random Variables

S3.1 Continuous random variables

S3.2 The normal distribution

Financial mathematics

MA5-FIN-C-01 solves financial problems involving simple interest, earning money and spending money

MA5-FIN-C-02 solves financial problems involving compound interest and depreciation

Financial Mathematics

M1 Modelling Financial Situations

M1.1 Modelling investments and loans

M1.2 Arithmetic sequences and series

M1.3 Geometric sequences and series

M1.4 Financial applications of sequences and series