# Mathematics Stage 5: Sample scope and sequence (Core and selected Paths)

The Core–Paths structure is designed to encourage aspiration in students and provide the flexibility needed to enable teachers to create pathways for students working towards Stage 6. The structure is intended to extend students as far along the continuum of learning as possible and provide solid foundations for the highest levels of student achievement. The structure allows for a diverse range of endpoints up to the end of Stage 5.

This scope and sequence is one example of a pathway towards Stage 6 Mathematics Advanced and Extension.

Students should not be locked into a definitive pathway in Stage 4. Teachers are best placed to make programming decisions about pathways towards Stage 6 courses in the middle of students’ Stage 5 learning.

In Mathematics 7–10 there is one overarching **Working mathematically outcome.**

A student develops understanding and fluency in mathematics through: exploring and connecting mathematical concepts; choosing and applying mathematical techniques to solve problems; and communicating their thinking and reasoning coherently and clearly.

Stn (Standard), Adv (Advanced) and Ext (Extension) have been used to suggest Paths for related Stage 6 courses.

## Year 9 – Term 1

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| Weeks 1–4 | Weeks 5–6 | Weeks 7–9 | Week 10 |
| **Unit:** Algebraic techniques  **Focus area(s):** Algebraic techniques A  simplifies algebraic fractions with numerical denominators and expands algebraic expressions | **Unit:** Indices  **Focus area(s):** Indices A and  Indices B  simplifies algebraic expressions involving positive-integer and zero indices, and establishes the meaning of negative indices for numerical bases  applies the index laws to operate with algebraic expressions involving negative-integer indices | **Unit:** Equations  **Focus area(s):** Equations A and Equations B  solves linear equations of up to 3 steps, limited to one algebraic fraction  solves monic quadratic equations, linear inequalities and cubic equations of the form | **Unit:** Numbers of any magnitude  **Focus area(s):** Numbers of any magnitude  solves measurement problems by using standard form to represent numbers and rounding to a given number of significant figures |
| Outcomes: MA5-ALG-C-01  Life Skills outcomes: MALS-PAT-01 | Outcomes: MA5-IND-C-01,  MA5-IND-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-EQU-C-01,  MA5-EQU-P-01  Life Skills outcomes: MALS-ADS-01, MALS-MDI-01 | Outcomes:  MA5-MAG-C-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 9 – Term 2

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| Weeks 1–4 | Weeks 5–7 | | Weeks 8–10 |
| **Unit:** Financial mathematics  **Focus area(s):** Financial mathematics A and Financial mathematics B  applies algebraic and numerical techniques to solve financial problems involving simple interest, earning money and spending money  **solves financial problems involving compound interest and depreciation** | | **Unit:** Properties of geometrical figures  **Focus area(s):** Properties of geometrical figures A, and Properties of geometrical figures B (Ext)  identifies and applies the properties of similar figures and scale drawings to solve problems  establishes conditions for congruent triangles and similar triangles and solves problems relating to properties of similar figures and plane shapes | **Unit:** Data analysis  **Focus area(s):** Data analysis A  compares and analyses datasets using summary statistics and graphical representations |
| Outcomes: MA5-FIN-C-01, MA5-FIN-C-02  Life Skills outcomes: MALS-FIN-01, MALS-FIN-02 | | Outcomes: MA5-GEO-C-01, MA5-GEO-P-01  Life Skills outcomes: MALS-GEO-01 | Outcomes: MA5-DAT-C-01  Life Skills outcomes: MALS-DAT-02 |

## Year 9 – Term 3

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| Weeks 1–3 | Weeks 4–7 | Weeks 8–9 | Week 10 |
| **Unit:** Probability  **Focus area(s):** Probability A and Probability B (Adv)  solves problems involving probabilities in multistage chance experiments  solves problems involving Venn diagrams,  2-way tables and conditional probability | **Unit:** Right-angled trigonometry  **Focus area(s):** Trigonometry A and Trigonometry B  applies trigonometric ratios to solve right-angled triangle problems  applies trigonometry to solve problems, including bearings and angles of elevation and depression | **Unit:** Area and surface area  **Focus area(s):** Area and surface area A  solves problems involving the surface area of right prisms and practical problems involving the area of composite shapes and solids | **Unit:** Volume  **Focus area(s):** Volume A  solves problems involving the volume of composite solids consisting of right prisms and cylinders |
| Outcomes: MA5-PRO-C-01, MA5-PRO-P-01  Life Skills outcomes: MALS-PRO-01 | Outcomes: MA5-TRG-C-01, MA5-TRG-C-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-ARE-C-01  Life Skills outcomes: MALS-ARE-01 | Outcomes: MA5-VOL-C-01  Life Skills outcomes: MALS-VOL-01 |

## Year 9 – Term 4

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| Weeks 1–3 | Weeks 4–5 | Weeks 6–8 | Weeks 9–10 |
| **Unit:** Linear relationships  **Focus area(s):** Linear relationships A, Linear relationships B, and Linear relationships C (Adv)  determines the midpoint, gradient and length of an interval, and graphs linear relationships with and without digital tools  graphs and interprets linear relationships using the gradient/slope-intercept form  applies the midpoint, gradient/slope and distance formulas  solves further linear equation problem  describes symmetry, translations, reflections and rotations on the Cartesian plane | **Unit:** Variation and rates of change  **Focus area(s):** Variation and rates of change A (Stn, Adv)  identifies and solves problems involving direct and inverse variation and their graphical representations | **Unit:** Introduction to networks  **Focus area(s):** Introduction to networks (Stn)  solves problems involving the characteristics of graphs/networks, planar graphs and Eulerian trails and circuits | **Revision** |
| Outcomes: MA5-LIN-C-01, MA5-LIN-C-02, MA5-LIN-P-01 (Adv)  Life Skills outcomes: MALS-POS-01 | Outcomes: MA5-RAT-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-NET-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | **Revision** |

## Year 10 – Term 1

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| Weeks 1–2 | Weeks 3–4 | Weeks 5–7 | Weeks 8–10 |
| **Unit:** Algebraic techniques  **Focus area(s):** Algebraic techniques B (Adv)  simplifies algebraic fractions involving indices, and expands and factorises algebraic expressions | **Unit:** Algebraic techniques (continued)  **Focus area(s):** Algebraic techniques C (Adv)  selects and applies appropriate algebraic techniques to operate with algebraic fractions, and expands, factorises and simplifies algebraic expressions | **Unit:** Indices and surds  **Focus area(s):** Indices C  describes rational and irrational numbers and performs operations with surds and fractional indices | **Unit:** Bivariate data analysis  **Focus area(s):** Data analysis B  displays and interprets datasets involving 2-variable data |
| Outcomes: MA5-ALG-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-ALG-P-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-IND-P-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-DAT-C-02  Life Skills outcomes: MALS-DAT-02 |

## Year 10 – Term 2

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| Weeks 1–3 | Weeks 4–7 | Weeks 8–9 | | Week 10 |
| **Unit:** Equations  **Focus area(s):** Equations C (Adv)  solves linear equations of more than 3 steps, monic and non-monic quadratic equations, and linear simultaneous equations | **Unit:** Non-right-angled trigonometry  **Focus area(s):** Trigonometry C (Stn, Adv)  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 | | **Unit:** Area and surface area  **Focus area(s):** Area and surface area B (Stn, Adv)  applies knowledge of the surface area of right pyramids and cones, spheres and composite solids to solve problems | **Unit:** Volume  **Focus area(s):** Volume B (Stn, Adv)  applies knowledge of the volume of right pyramids, cones and spheres to solve problems involving related composite solids |
| Outcomes: MA5-EQU-P-02  Life Skills outcomes: MALS-ADS-01, MALS-MDI-01 | Outcomes: MA5-TRG-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | | Outcomes: MA5-ARE-P-01  Life Skills outcomes: MALS-ARE-01 | Outcomes:  MA5-VOL-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 10 – Term 3

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| Weeks 1–4 | Weeks 5–7 | Weeks 8–10 |
| **Unit:** Non-linear relationships  **Focus area(s):** Non-linear relationships A, Non-linear relationships B, and Non-linear relationships C (Adv)  identifies connections between algebraic and graphical representations of quadratic and exponential relationships in various contexts  identifies and compares features of parabolas and exponential curves in various contexts  interprets and compares non-linear relationships and their transformations, both algebraically and graphically | **Unit:** Functions  **Focus area(s):** Functions and other graphs (Adv)  uses function notation to describe and graph functions of one variable and graph inequalities in one and 2 variables | **Unit:** Trigonometric functions and equations  **Focus area(s):** Trigonometry D (Adv)  establishes and applies the properties of trigonometric functions and finds solutions to trigonometric equations |
| Outcomes: MA5-NLI-C-01, MA5-NLI-C-02, MA5-NLI-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-FNC-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-TRG-P-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes |

## Year 10 – Term 4

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| Weeks 1–2 | Weeks 3–5 | Weeks 6–7 | | Weeks 8–10 |
| **Unit:** Variation and rates of change  **Focus area(s):** Variation and rates of change B (Adv)  analyses and constructs graphs relating to rates of change | **Unit:** Polynomials  **Focus area(s):** Polynomials (Adv, Ext)  defines, operates with, and graphs polynomials and applies the factor and remainder theorems to solve problems | **Unit:** Logarithms  **Focus area(s):** Logarithms (Adv)  establishes and applies the laws of logarithms to solve problems | **Revision and preparation for Year 11** | |
| Outcomes: MA5-RAT-P-02  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-POL-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | Outcomes: MA5-LOG-P-01  Life Skills outcomes: Review and consolidate prior Life Skills outcomes | **Revision and preparation for Year 11** | |