Scope and Sequence: National Curriculum Mathematics from Haese Mathematics (7 – 10A)

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Note: Exercises in red text indicate material in the 10A textbook

	Year level			
Subtopic	**7**	**8**	**9**	**10 / 10A**
Number and Algebra				
Number and place value				
Addition and subtraction Year 7 • Compare, order, add and subtract integers (ACMNA280)	1B: Number strategies 1C: Rounding 1D: Estimation 1E: Operating with numbers 1H: Order of operations 4B: The number line 4C: Adding and subtracting negatives 4F: Combined operations 4G: Using your calculator			
Special types of numbers and index notation Year 7 • Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149) • Investigate and use square roots of perfect square numbers (ACMNA150) Year 8 • Use index notation with numbers to establish the index laws with positive integral indices and the zero index (ACMNA182) Year 9 **From the Real Numbers subtopic:** • Apply index laws to numerical expressions with integer indices (ACMNA209) • Express numbers in scientific notation (ACMNA210)	1F: Index notation 1G: Square numbers 3C: Prime and composite numbers 3D: Highest common factor 3E: Multiples of natural numbers 3F: Square roots of whole numbers	1C: Index notation 1E: Primes and composites 6A: Index laws 6C: The zero index law	2A: Evaluating indices 2B: Index laws 2C: Scientific notation	
Solving problems using more complex operations Year 7 • Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151) Year 8 • Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies (ACMNA183)	1B: Number strategies 1E: Operating with numbers 1H: Order of operations	1B: Integers 1D: Order of operations 3B: Operations with fractions 3D: Operations with decimal numbers		
Fractions and decimals / Real numbers				
Comparing fractions and equivalence Year 7 • Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (ACMNA152)	5D: Placing fractions on a number line 5E: Equal fractions and simplifying 5F: Comparing fractions			
Fractions of a quantity Year 7 • Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)	5E: Equal fractions and simplifying 5K: Evaluating fractions using a calculator 5L: Problem solving			
Operations with fractions Year 7 • Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153) • Multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)	5G: Adding and subtracting fractions 5H: Multiplying fractions 5J: Dividing fractions 5K: Evaluating fractions using a calculator 5L: Problem solving			

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Operations with decimals Year 7 • Multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)	6F: Multiplying by powers of 10 6G: Dividing by powers of 10 6H: Multiplying decimal numbers 6I: Dividing decimal numbers			
Percentages Year 7 • Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157) • Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies. (ACMNA158) Year 8 • Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies (ACMNA187)	6B: Converting decimals to fractions 8A: Understanding percentages 8B: Interchanging number forms 8C: One quantity as a percentage of another 8D: Finding a percentage of a quantity	5B: Expressing one quantity as a percentage of another 5C: Finding a percentage of a quantity 5D: Percentage increase or decrease 5E: Finding a percentage change 5F: Business applications		
Ratios and proportion Year 7 • Recognise and solve problems involving simple ratios (ACMNA173) Year 8 • Solve a range of problems involving rates and ratios, with and without digital technologies (ACMNA188) Year 9 • Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (ACMNA208)	13A: Ratio 13B: Writing ratios as fractions 13C: Equal ratios 13D: Problem solving using ratios 13E: Rates 13F: Comparing prices	13C: Proportions 13D: Using ratios to divide quantities 13E: Scale diagrams 14A: Rates 14B: Speed 14D: Density 14E: Converting rates	19A: Direct proportion 19B: Other direct proportions	
Rational and irrational numbers Year 7 • Round decimals to a specified number of decimal places (ACMNA156) Year 8 • Investigate terminating and recurring decimals (ACMNA184) • Investigate the concept of irrational numbers, including π (ACMNA186) Year 10A • Define rational and irrational numbers and perform operations with surds and fractional indices (ACMNA264)	6C: Rounding decimal numbers	3E: Rational numbers 3F: Irrational numbers		1B: Rational (fractional) indices 3A: Radicals and surds 3B: Simplifying radicals 3C: Adding and subtracting radicals 3D: Multiplications involving radicals 3E: Division by radicals
Logarithms Year 10A • Use the definition of a logarithm to establish and apply the laws of logarithms (ACMNA265)				20E: Logarithms
Money and financial mathematics				
Further calculations with money Year 7 • Investigate and calculate 'best buys', with and without digital technologies (ACMNA174) Year 8 • Solve problems involving profit and loss, with and without digital technologies (ACMNA189)	13F: Comparing prices	5F: Business applications		

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Interest calculations Year 9 • Solve problems involving simple interest (ACMNA211) Year 10 • Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229)			3G Simple interest	14D: Compound interest
Patterns and algebra				
Introduction to algebra Year 7 • Introduce the concept of variables as a way of representing numbers using letters (ACMNA175) • Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176) • Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)	7A: Building expressions 7B: Key words in algebra 7C: Simplifying expressions 7D: Algebraic products 7E: Evaluating algebraic expressions 7F: Formulae 7G: Practical problems using formulae			
Algebraic manipulation using the four basic operations Year 8 • Simplify algebraic expressions involving the four operations (ACMNA192) Year 10 • Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232)		4C: Collecting like terms 4D: Product and quotient simplification 4E: Generalising arithmetic 6E: Simplifying algebraic expressions		1C: Indices (not in 10A textbook) 1A: Index laws 4C: Multiplying and dividing algebraic fractions 4D: Adding and subtracting algebraic fractions
Algebraic manipulation using index laws Year 9 • Extend and apply the index laws to variables, using positive integer indices and the zero index (ACMNA212) Year 10 • Simplify algebraic products and quotients using index laws (ACMNA231)			2B: Index laws	1A: Index laws 1C: Indices
Expansion and factorisation Year 8 • Extend and apply the distributive law to the expansion of algebraic expressions (ACMNA190) • Factorise algebraic expressions by identifying numerical factors (ACMNA191) Year 9 • Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate (ACMNA213) Year 10 • Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230) • Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233)		6B: Expansion laws 6D: The distributive law 6F: Brackets with negative coefficients 6G: Factorisation of algebraic expressions	1D: Collecting like terms 5A: The distributive law 5B: The product $(a+b)(c+d)$ 5C: Difference of two squares 5D: Perfect squares expansion 5E: Further expansion 5F: The binomial expansion	2A: Expansion laws 2B: Further expansion 2C: The binomial expansion 2D: Revision of factorisation 2E: Factorising expressions with four terms 2F: Factorising quadratic trinomials 2G: Factorising $ax^2+bx+c, a \neq 1$ 2G / 2H: Miscellaneous factorisation

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Using formulae Year 10 • Substitute values into formulas to determine an unknown (ACMNA234)				5C: Linear equation problems 8A: Formula construction 8B: Formula substitution 8D: Rearrangement and substitution 22A: Polynomials 22B: Polynomial operations 22C: The Remainder theorem 22D: The Factor theorem
Introduction to polynomials Year 10A • Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems (ACMNA266)				
Linear and non-linear relationships				
The Cartesian plane Year 7 • Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178) Year 9 • Find the distance between two points located on the Cartesian plane using a range of strategies, including graphing software (ACMNA214) • Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294) Year 10 • Solve problems involving parallel and perpendicular lines (ACMNA238)	11B: Number grids 11C: Positive and negative coordinates 11D: Plotting points from a table of values		10A: The distance between two points 10B: Midpoints 10C: Gradient	11D: Parallel and perpendicular lines
Solving single linear equations Year 7 • Solve simple linear equations (ACMNA179) Year 8 • Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution (ACMNA194) Year 10 • Solve problems involving linear equations, including those derived from formulas (ACMNA235) • Solve linear equations involving simple algebraic fractions (ACMNA240)	9B: Solving simple equations 9C: Maintaining balance 9D: Inverse operations 9E: Algebraic flowcharts 9F: Solving equations 9G: Equations with a repeated variable 9I: Problem solving	7A: Solutions of an equation 7B: Linear equations 7C: Maintaining balance 7D: Inverse operations 7E: Algebraic flowcharts 7F: Solving equations 7G: Equations with a repeated unknown 12F: Points on lines 12G: Using graphs to solve equations 16A: Writing problems as equations 16B: Problem solving with algebra		5A: Solving linear equations 5B: Equations with fractions (not in 10A textbook) 5C / 5B: Linear equation problems 8A: Formula construction 8B: Formula substitution 8D: Rearrangement and substitution
Solving systems of linear equations Year 10 • Solve linear simultaneous equations, using algebraic and graphical techniques, including using digital technology (ACMNA237)				15A / 16A: Graphical solution 15B / 16B: Solution by substitution 15C / 16C: Solution by elimination 15D / 16D: Problem solving
Linear inequalities Year 10 • Solve linear inequalities and graph their solutions on a number line (ACMNA236)				5D / 5C: Linear inequalities 5E / 5D: Solving linear inequalities 5F / 5E: Linear inequality problems

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Solving non-linear equations Year 10 • Solve simple quadratic equations using a range of strategies (ACMNA241) Year 10A • Solve simple exponential equations (ACMNA270) • Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts (ACMNA269)				10A: Quadratic equations of the form $x^2 = k$ 10B: The Null Factor law 10C: Solution by factorisation 10D: Completing the square 10E: The quadratic formula 10F: Problem solving
Graphing and interpreting relationships Year 7 • Investigate, interpret and analyse graphs from authentic data (ACMNA180) Year 8 • Plot linear relationships on the Cartesian plane with and without the use of digital technologies (ACMNA193) Year 9 • Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215) • Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations (ACMNA296) Year 10 • Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate (ACMNA239) Year 10A • Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations (ACMNA267) • Apply understanding of polynomials to sketch a range of curves and describe the features of these curves from their equation (ACMNA268)	14A: Properties of line graphs 14B: Estimating from line graphs 14C: Travel graphs	12B: Plotting points from a table of values 12C: Linear relationships 12D: Plotting graphs of linear equations 12E: Horizontal and vertical lines	10E: The equation of a line 10F: Graphing lines from equations 10G: Vertical and horizontal lines 10H: Finding the equation of a line 21A: Quadratic functions 21B: Axes intercepts 21C: Drawing quadratics from their axes intercepts 21D: Circles	18B / 19B: Graphs of quadratic functions 18C / 19C: Axes intercepts 18D / 19D: Axis of symmetry 18E / 19E: Vertex 18F / 19F: Quadratic optimisation 19B / 20B: Graphs of exponential functions 19C / 20C: Growth and decay 20A / 24A: Circles 20B / 24B: Ellipses 24C: Hyperbolae
Measurement and geometry				
Units of measurement				
Units of physical measurement Year 8 • Choose appropriate units of measurement for area and volume and convert from one unit to another (ACMMG195)		9D: Area 11A: Volume		
Calculating quantities of two-dimensional spatial measure Year 7 • Establish the formulas for areas of rectangles, triangles and parallelograms, and use these in problem-solving (ACMMG159) Year 8 • Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites (ACMMG196) • Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area (ACMMG197) Year 9 • Calculate areas of composite shapes (ACMMG216)	12C: Area 12D: The area of a rectangle 12E: Other areas	9B: Perimeter 9C: Circumference 9D: Area 9E: Area of polygons 9F: The area of a circle	9E: Areas of composite figures	

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Calculating quantities of three-dimensional spatial measure Year 7 • Calculate volumes of rectangular prisms (ACMMG160) Year 8 • Develop formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving volume (ACMMG198) Year 9 • Calculate the surface area and volume of cylinders and solve related problems (ACMMG217) • Solve problems involving the surface area and volume of right prisms (ACMMG218) Year 10 • Solve problems involving surface area and volume for a range of prisms, cylinders and composite solids (ACMMG242) Year 10A • Solve problems involving surface area and volume of right pyramids, right cones, spheres and related composite solids (ACMMG271)	12F: Volume	11A: Volume 11B: Volume formulae	11B: Surface area 11C: Volume	7C: Surface area 7D: Volume Note: Exercises include sections on right pyramids, right cones, spheres and related composite solids.
Units of time Year 9 • Investigate very small and very large time scales and intervals (ACMMG219)			11E: Time	
Applications of time Year 8 • Solve problems involving duration, including using 12- and 24-hour time within a single time zone (ACMMG199)		11G: Time 11H: Time calculations 11I: 24-hour time		
Shape				
Drawing and representing shapes Year 7 • Draw different views of prisms and solids formed from combinations of prisms (ACMMG161)	18A: Drawing rectangular solids 18B: Views of solids			
Location and transformation				
Transformations on the Cartesian plane Year 7 • Describe translations, reflections in an axis and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)	17A: Translations 17B: Reflections and line symmetry 17C: Rotations and rotational symmetry 17D: Combinations of transformations			
Geometric reasoning				
Parallel lines Year 7 • Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (ACMMG163) • Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)	2A: Points and lines 2C: Angle properties 2D: Angle pairs 2E: Parallel lines 2F: Geometric construction			
Properties of triangles and quadrilaterals Year 7 • Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165) • Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral (ACMMG166)	10B: Triangles 10C: Angles of a triangle 10D: Isosceles triangles 10E: Quadrilaterals 10F: Angles of a quadrilateral			

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Congruence and similarity of polygons Year 8 • Define congruence of plane shapes using transformations (ACMMG200) • Develop the conditions for congruence of triangles (ACMMG201) • Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning (ACMMG202) Year 9 • Use the enlargement transformation to explain similarity and develop the conditions for triangles to be similar (ACMMG220) • Solve problems using ratio and scale factors in similar figures (ACMMG221) Year 10 • Formulate proofs involving congruent triangles and angle properties (ACMMG243) • Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes (ACMMG244)		17A: Transformations 17B: Congruent figures 17C: Congruent triangles 17D: Proof using congruence	16A: Enlargements and reductions 16B: Similar figures 16C: Similar triangles 16D: Problem solving 16E: Area of similar objects	9A: Congruence of figures 9B: Congruent triangles 9C: Proof using congruence 9D: Similarity 9E: Similar triangles
Circle geometry Year 10A • Prove and apply angle and chord properties of circles (ACMMG272)				6E: Circle problems 21A: Circle theorems 21B: Further circle theorems 21C: Geometric proof
Pythagoras and trigonometry				
Right angled trigonometry Year 9 • Investigate Pythagoras' Theorem and its application to solving simple problems involving right angled triangles (ACMMG222) • Use similarity to investigate the constancy of the sine, cosine and tangent ratios for a given angle in right-angled triangles (ACMMG223) • Apply trigonometry to solve right-angled triangle problems (ACMMG224) Year 10 • Solve right-angled triangle problems including those involving direction and angles of elevation and depression (ACMMG245) Year 10A • Apply Pythagoras' Theorem and trigonometry to solving three-dimensional problems in right-angled triangles (ACMMG276)			8D: Pythagoras' theorem 8E: The converse of Pythagoras' theorem 8G: Problem solving using Pythagoras 17A: Labelling right angled triangles 17B: The trigonometric ratios 17C: Finding side lengths 17D: Finding angles 17E: Problem solving with trigonometry	6A: Pythagoras' theorem 6B: The converse of Pythagoras' theorem 6D: Problem solving using Pythagoras' theorem 6E: Circle problems 6F: Three-dimensional problems 12C: Finding side lengths 12D: Finding angles 12E: Problem solving with trigonometry 12F: True bearings 12G: 3-dimensional problem solving
Non-right angled trigonometry Year 10A • Establish the sine, cosine and area rules for any triangle and solve related problems (ACMMG273)				15B: The area of a triangle 15C: The sine rule 15D: The cosine rule 15E: Problem solving using the sine and cosine rules
Trigonometric functions Year 10A • Use the unit circle to define trigonometric functions, and graph them with and without the use of digital technologies (ACMMG274) • Solve simple trigonometric equations (ACMMG275)				23A: The unit circle 23B: The relationship between $\sin\theta$ and $\cos\theta$ 23C: The multiples of 30° and 45° 23D: Trigonometric functions 23E: Trigonometric equations

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Statistics and probability				
Chance				
Numerical representations of probability Year 7 • Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)	15B: Assigning numbers to probabilities 15D: Theoretical probability			
Venn diagrams and events Year 8 • Identify complementary events and use the sum of probabilities to solve problems (ACMSP204) • Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and'. (ACMSP205) • Represent events in two-way tables and Venn diagrams and solve related problems (ACMSP292) Year 9 • Calculate relative frequencies from given or collected data to estimate probabilities of events involving 'and' or 'or' (ACMSP226) Year 10 • Use the language of 'if ....then', 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (ACMSP247)		15C: Theoretical probability 15D: Complementary events 15E: Experimental probability 15F: Probabilities from tabled data 15G: Probabilities from Venn diagrams	15A: Experimental probability 15B: Probabilities from tabled data 15C: Life tables 15G: Compounds events 15J: Probabilities from Venn diagrams	16B / 17B: Compound events 16D / 17D: Conditional probability
Simple chance experiments Year 7 • Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)	15A: Describing probability 15C: Sample space			
Multi-level chance experiments Year 9 • List all outcomes for two-step chance experiments, both with and without replacement using tree diagrams or arrays. Assign probabilities to outcomes and determine probabilities for events (ACMSP225) Year 10 • 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 (ACMSP246)			15D: Sample spaces 15E: Theoretical probability 15F: Using 2-dimensional grids 15G: Compound events 15H: Using tree diagrams 15I: Sampling with and without replacement	16A / 17A: Theoretical probability 16B / 17B: Compound events 16C / 17C: Expectation 16D / 17D: Conditional probability
Data representation and interpretation				
Data collection Year 8 • Investigate techniques for collecting data, including census, sampling and observation (ACMSP284) Year 9 • Identify everyday questions and issues involving at least one numerical and at least one categorical variable, and collect data directly and from secondary sources (ACMSP228)		18A: Categorical data 18B: Numerical data 18C: Grouped data 18E: Data collection	14A: Types of data 14B: Discrete numerical data 14C: Continuous numerical data 14G: Data collection	

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Analysis of data collection methods Year 7 • Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169) Year 8 • Explore the practicalities and implications of obtaining data through sampling using a variety of investigative processes (ACMSP206) Year 9 • ***From the chance subtopic***: Investigate reports of surveys in digital media and elsewhere for information on how data were obtained to estimate population means and medians (ACMSP227) Year 10A • ***From the chance subtopic:*** Investigate reports of studies in digital media and elsewhere for information on their planning and implementation (ACMSP277)	16A: Data collection 16C: Numerical data	18E: Data collection	14G: Data collection	13A: Discrete data 13B: Continuous data 13D: Cumulative data 13H: Evaluating reports
Data representation Year 7 • Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170) Year 9 • Construct back-to-back stem-and-leaf plots and histograms and describe data, using terms including 'skewed', 'symmetric' and 'bi modal' (ACMSP282) Year 10 • Construct and interpret box plots and use them to compare data sets (ACMSP249)	16B: Categorical data 16C: Numerical data		14B: Discrete numerical data 14F: Comparing numerical data	13F: Box plots
Interpretation of data displays Year 10 • Compare shapes of box plots to corresponding histograms and dot plots (ACMSP250) • Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data (ACMSP253)				13F: Box plots 13G / 13H: Evaluating reports

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Measures of location and spread Year 7 • Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171) • Describe and interpret data displays using median, mean and range (ACMSP172) Year 8 • Explore the variation of means and proportions of random samples drawn from the same population (ACMSP293) • Investigate the effect of individual data values, including outliers, on the mean and median (ACMSP207) Year 9 • Compare data displays using mean, median and range to describe and interpret numerical data sets in terms of location (centre) and spread (ACMSP283) Year 10 • Determine quartiles and interquartile range (ACMSP248) Year 10A • Calculate and interpret the mean and standard deviation of data and use these to compare data sets (ACMSP278)	16B: Categorical data 16C: Numerical data 16D: Measuring the centre and spread	18A: Categorical data 18B: Numerical data 18C: Grouped data 18D: Measuring centre and spread 18E: Data collection	14D: Measuring the centre of a data set 14E: Measuring the spread of data 14F: Comparing numerical data	13C: Measuring the centre 13E: Measuring the spread 13F: Box plots 13G: Standard deviation
Bivariate data Year 10 • Use scatter plots to investigate and comment on relationships between two numerical variables (ACMSP251) • Investigate and describe bivariate numerical data where the independent variable is time (ACMSP252) Year 10A • Use information technologies to investigate bivariate numerical data sets. Where appropriate use a straight line to describe the relationship allowing for variation (ACMSP279)				21A / 25A: Line graphs 21B / 25B: Scalar plots 21C / 25C: Correlation 25D: Measuring correlation 25E: Line of best fit