Curriculum: Mathematics

**Excellence.
No Excuses.**

Year	Topic Detail and Sequence	Pre-requisite Knowledge	Key Vocabulary	Demonstrable Skills
7	**Number 1:** Ordering numbers (positive, negative, decimals) Using inequality symbols 4 operations (integers, decimals, fractions (but not mixed numbers) Negative numbers (Directed number,× and ÷) Rounding (Powers of 10, decimal places) **Algebra 1:** Basic Algebraic notation (and writing expressions) Algebraic manipulation (simplifying (likes terms and multiplying/dividing expressions), expand single bracket) **Statistics 1:** Draw and interpret key diagrams - Bar charts (including dual and composite) - Frequency tables - Pictograms - Vertical line charts - Two way tables Classifying data Averages + range from a list (and make basic comparisons) **2D and 3D shapes + Measurements:** Symmetry (lines of and rotational) Measuring lines and angles (reading scales)	Familiarity with positive and negative number line Use of the words hundreds, tens, thousands Confidence in multiplication up to 10 × 10 Exposure to digit value up to 10,000,000 Finding missing number problems e.g 2 + ? = 5 Some pre exposure to number puzzles e.g what 2 numbers could multiply to make 8 and add to make 6 Ability to name simple 2D and 3D shapes Recognition of data displayed in simple tables	Integer Place value Numerator Denominator Addition Subtraction Column Multiplication/ Multiply Round Decimal point Decimal place Power Division/ Divide Positive Negative Coefficient Simplify Like terms Collect Squared Cubed Frequency Qualitative Quantitative Discrete Continuous Composite Pictogram Bar chart Diagram Discrete Continuous Grouped and ungrouped data Primary and secondary data Average Mean Median Mode Range Reflective/ Rotational Symmetry Vertex/edge/Face Scalene/Isosceles Equilateral Perpendicular/Parallel Polygon(s) names Regular/Irregular	**Number 1** • Recognise integers +/- whole numbers, inc. 0 • Order ± numbers given as integers, decimals and fractions, including improper fractions. Including use of a number line. • =, <, ≤, >, ≥,≠ symbols. • Students should know the conventions of an open circle on a number line for a strict inequality and a closed circle for an included boundary • Four operations with integers/decimals/negatives using both mental and written methods (fractions with and without a calculator) • Remainder in context • Recall all positive number complements to 100 • Recall all multiplication facts to 12 × 12 and use them to derive the corresponding division facts • Divide an integer by a fraction • Perform money calculations • Round numbers to powers of 10/decimal places **Algebra 1** • Use and understand notation and symbols correctly • Understand that algebra can be used to generalise the laws of arithmetic • Manipulate an expression by collecting like terms • Multiply a single term over a bracket • Write expressions to solve problems • Write expressions using squares and cubes • Use the index laws for multiplication and division of integer powers. (Also covered in Y8 AC2 Number 2) **Statistics 1** • Draw/understand why/interpret/find information from/ different charts mentioned • Understand that a time series is a series of data points typically spaced over uniform time intervals • Plot and interpret time-series graphs • Use a time-series graph to predict a subsequent value • Understand line of best fit is a trend • Design and use two-way tables • Discrete vs continuous and choosing correct diagram • Grouped vs ungrouped, know advantages/disadvantages • Distinguish between primary and secondary data • Find the mean/median/mode and range from a list **2D and 3D shapes + Measurements** • Acute, obtuse, reflex and right angles - name angles • Use one lower-case letter or three upper-case letters to represent an angle, for example x or ABC • Understand/identify and draw lines that are parallel/perpendicular • Use geometrical language – to describe shapes • Recognise that, for example, in a rectangle ABCD the points A, B, C and D go around in order • Recognise and identify reflection symmetry/rotational of 2D shapes (including order) • Draw or complete a diagram with a given number of lines of symmetry/rotational symmetry • Identify and draw lines of symmetry on a Cartesian grid • Identify the order of rotational symmetry of shapes on a Cartesian grid • Draw or complete a diagram with rotational symmetry on a Cartesian grid • Measure line segments and angles in geometric figures

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8	**Number 1:**
	Ordering numbers (positive, negative, decimals, **fractions**)
	Using inequality symbols
	4 operations (integers, decimals, fractions, **mixed numbers**)
	Negative numbers (Directed number, × and ÷)
	Rounding (Powers of 10, decimal places, **significant figures**)
	BIDMAS
	Reciprocals/Inverse operations
	
	Algebra 1:
	Basic Algebraic notation (and writing expressions)
	Algebraic manipulation (simplifying (likes terms and multiplying/dividing expressions), expand single bracket, **factorise single bracket**, **expand double bracket**)
	Substitution
	Understanding of term, equation, expression, formula
	
	Statistics 1:
	Draw and interpret key diagrams
	- Bar charts (including dual and composite)
	- Frequency tables
	- Pictograms
	- Vertical line charts
	- Two way tables
	- **Scatter diagrams**
	- **Pie Charts**
	
	Classifying data
	Averages + range from a list (and make basic comparisons)
	
	2D and 3D shapes + Measurements:
	Classify 3D shapes (faces edges vertices)
	Symmetry (lines of and rotational)
	Measuring lines and angles (reading scales)
	Scale Drawing
		Place value,
		Knowledge of rounding year 7,
		Use of inequalities,
		BIDMAS operations,
		
		A1 from Y7,
		
		S1 from Y7
		
		Shapes and reminder of terminology used for shape
			Significant figures
			Error interval
			Inverse operation
			Brackets
			Powers
			Roots
			Reciprocals
			
			Substitute
			Formulae
			Expressions
			
			Positive correlation,
			Negative correlation
			No correlation,
			Weak correlation
			Strong correlation.
			
			Faces,
			Surface,
			Edge,
			Vertices,
			Names of shape.
			
			Scale
			Construct
				Number 1
				• Order fractions by size using equivalence
				• 4 operations with mixed numbers
				• Round numbers to a specified number of significant figures
				• Add, subtract, multiply and divide using commutative, associative and distributive laws
				• Understand and use inverse operations
				• Use brackets and the hierarchy of operations
				• Solve problems set out in words
				
				Algebra 1
				• Factorise single bracket and simplify/ Expand double brackets $(x + a)(x + b)$
				• Substitution - use formulae from mathematics and other subjects expressed initially in words and then using letters and symbols. For example, formula for area of a triangle, area of a parallelogram, volume of a prism, conversions between measures, wage earned = hours worked hourly rate + bonus
				• Understand and recognise terms/equations/expressions/formula
				
				Statistics 1
				• Recognise and name positive, negative or no correlation as types of correlation
				• Recognise and name strong, moderate or weak correlation as strengths of correlation
				• Understand that just because a correlation exists, it does not necessarily mean that causality is present
				• Find patterns in data that may lead to a conclusion being drawn
				• Draw a line of best fit by eye for data with strong enough correlation, or know that a line of best fit is not justified due to the lack of correlation
				• Understand outliers and make decisions whether or not to include them when drawing a line of best fit
				• Use a line of best fit to estimate unknown values when appropriate.
				• Look for unusual data values such as a value that does not fit an otherwise good correlation
				• Draw and interpret pie charts
				
				2D and 3D shapes + Measurements
				• Know the terms face, edge and vertex (vertices) for 3D shapes
				• Identify and name common solids, for example cube, cuboid, prism, cylinder, pyramid, cone and sphere
				• Understand that cubes, cuboids, prisms and cylinders have uniform areas of cross section.
				• Scale drawing - can measure line segments and angles in geometric figures, including interpreting scale drawings.
				  1. Use and interpret scale drawings
				  2. Construct scale drawings
				  3. Use scale to estimate a length, for example use the height of a man to estimate the height of a building where both are shown in a scale drawing
				• Make accurate drawings of 2D shapes and scale drawings (including from descriptions)
				• Use 2D representations of 3D shapes
				• Draw nets and show how they fold to make a 3D solid
				• Analyse 3D shapes through 2D projections and cross sections, including plans and elevations
				• Understand and draw front and side elevations and plans of shapes made from simple solids, for example a solid made from small cubes
				• Understand and use isometric drawings

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9	**Number 1:** Ordering numbers (positive, negative, decimals, fractions) Using inequality symbols 4 operations (integers, decimals, fractions, mixed numbers) Negative numbers (Directed number, × and ÷) Rounding (Powers of 10, decimal places, significant figures) BIDMAS Reciprocals/Inverse operations **Estimation** **Algebra 1:** Basic Algebraic notation (and writing expressions) Algebraic manipulation (simplifying (likes terms and multiplying/dividing expressions), expand single bracket, factorise single bracket, expand double bracket)) Substitution Understanding of terms equation, expression, formula **Function Machines (Numerical and algebraic)** **Statistics 1:** Draw and interpret key diagrams - Bar charts (including dual and composite) - Frequency tables - Pictograms - Vertical line charts - Two way tables - Scatter diagrams - Pie Charts Classifying data Averages + range from a list (and make basic comparisons) **Averages from tables** **2D and 3D shapes + Measurements:** Classify 3D shapes (faces edges vertices) Symmetry (lines of and rotational) Measuring lines and angles (reading scales) Scale Drawing **Maps and scales (including ratio scales)**	N1 /N15 year 7 and 8 (Place value, Rounding, four operations) A1/A2 in year 7 and 8 Measurement, map reading skills, scale, angles (measurement of)	Estimate Approximation Height Algebraic laws Term Expression Square (index) Cube (index) Bracket Linear Common factor Factorise Simplify Expand Index Interval Frequency distribution Outliers Conclusion Map Scale Estimation of length Compass points	**Number 1** • Make sensible estimates of a range of measures in everyday settings • Make sensible estimates of a range of measures in real-life situations, for example estimate the height of a man • Evaluate results obtained • Use approximation to estimate the value of a calculation • Work out the value of a calculation and check the answer using approximations **Algebra 1** • Understand and use number machines • Interpret an expression diagrammatically using a number machine • Interpret the operations in a number machine as an expression or function **Statistics 1** • Interpret lists, tables or diagrams • Calculate an estimate of the mean for a grouped frequency distribution, knowing why it is an estimate • Find the interval containing the median for a grouped frequency distribution • Choose an appropriate measure to be the 'average', according to the nature of the data **2D and 3D shapes + Measurements** • Work out a scale from a scale drawing given additional information • Recall and use the eight points of the compass (N, NE, E, SE, S, SW, W, NW) • Scale drawing - can measure line segments and angles in geometric figures, including interpreting maps and scale drawings • Use and interpret maps and scale drawings • Use a scale on a map to work out an actual length • Use a scale with an actual length to work out a length on a map • Construct scale drawings • Use scale to estimate a length, for example use the height of a man to estimate the height of a building where both are shown in a scale drawing

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10	**Number 1:** Ordering numbers (positive, negative, decimals) Using inequality symbols 4 operations (integers, decimals, fractions, mixed numbers) Negative numbers (Directed number, × and ÷) Rounding (Powers of 10, decimal places, significant figures) BIDMAS Reciprocals/Inverse operations Estimation **Error Intervals** **Limits of accuracy/Bounds (H*)** **Algebra 1:** Basic Algebraic notation (and writing expressions) Algebraic manipulation (simplifying (likes terms and multiplying/dividing expressions), expand single bracket, factorise single bracket, expand double bracket) Substitution Understanding of terms equation, expression, formula, **identity (and solve identity problems)** **Factorising Quadratics** Function Machines (Numerical and algebraic) **Complete the square (H*)** **Expand 3 brackets (H*)** **Functions (inverse, composite) (H*)** **Statistics 1:** Draw and interpret key diagrams - Bar charts (including dual and composite) - Frequency tables - Pictograms - Vertical line charts - Two way tables - Scatter diagrams - Pie Charts Classifying data Averages + range from a list (and make basic comparisons) Averages from tables **Sampling** **Cumulative frequency and box plots (H*)** **Histograms (H*)** **2D and 3D shapes + Measurements:** Classify 3D shapes (faces edges vertices) Symmetry (lines of and rotational) Measuring lines and angles (reading scales) Scale Drawing Maps and scales (including ratio scales) **Bearings** **Construction and Loci**	Rounding Depending on context of question pupils will be expected to N16 to any practical question Use of A1 – understanding algebraic notation and language Four operations and inverse, application to algebra Factors, multiples Solving equations, algebraic manipulation Basic number skills including ordering and fraction Coordinates Reading scales How to calculate mean, mode, median and range Use of a ruler, a pair of compasses and protractor 3D shapes and terminology	Limit of accuracy Bound Midpoint of interval Equation Formula Term Expression Prove Identity Factor (number and algebraic) Factorise (sum and product, foil methods) Quadratic Binomial (implied) Cancelling Number machine Function (and notation) Composite function Inverse function Substitution Solve Conclusion Correlation Population Sample Quartile (Upper, Lower, Inter quartile range) Data set Correlation (types of) Line of best fit Scatter graph Angle Scale Construction Angle bisector Parallel Circle Radius Diameter Loci Line segment Net Cross section Plan Elevations Isometric Bearing (3 figure)	**Number 1** • Recognise that measurements given to the nearest whole unit may be inaccurate by up to one half in either direction • Use inequality notation to specify error intervals due to truncation or rounding • Write down the maximum or minimum figure for a value rounded to a given accuracy • Combine upper or lower bounds appropriately to achieve an overall maximum or minimum for a situation • Work with practical problems involving bounds including in statistics. For example, finding the midpoint of a class interval, such as $10 < t \leqslant 20$, in order to estimate a mean **Algebra 1** • Recognise identities • Understand phrases such as 'form an equation', 'use a formula', 'write down a term', 'write an expression' and 'prove an identity' when answering a question • Write an expression • Know the meaning of the word 'factor' for both numerical work and algebraic work • Factorise quadratic expressions (Foil/product sum/complete the square (H), diff of two squares, ax^2 (H)) • Multiply two or more binomial expressions • Simplify by factorising and cancelling expressions of the form $ax^2 + bx + c / dx2 + ex + f$ • Functions – substitute into and solve using • Functions understand and interpret composite and inverse functions **Statistics 1** • Understand that samples may or may not be representative of a population • Understand that the size and construction of a sample will affect how representative it is • Use measures of central tendency and measures of dispersion to describe a population • Use statistical diagrams to describe a population • Understand which diagrams are appropriate for different types of data • Cumulative frequency /Histograms: Construct/interpret suitable diagrams for grouped discrete and continuous data • Box plots: calculate quartiles and inter-quartile range from a small data set (the number of entries in a small data set will be 1 less than multiples of 4) using the positions of the lower quartile $(n + 1)/4$ and upper quartile $3(n + 1)/4$ respectively **2D and 3D shapes + Measurements** • Recall and use the eight points of the compass (N, NE, E, SE, S, SW, W, NW) and their equivalent three-figure bearings • Use compass point and three-figure bearings to specify direction • Mark points on a diagram given the bearing from another point • Draw a bearing between points on a map or scale drawing • Measure the bearing of a point from another given point • Work out the bearing of a point from another given point • Work out the bearing to return to a point, given the bearing to leave that point • Constructions (triangle, equilateral triangle, perpendicular – line given a point, from a given point, angle bisector, angle of 60° • Parallel lines • Draw circles or part circles given the radius or diameter • Construct diagrams of 2D shapes • Construct a region, for example, bounded by a circle and an intersecting line • Construct loci, for example, given a fixed distance from a point and a fixed distance from a given line • Construct loci, for example, given equal distances from two points construct loci, for example, given equal distances from two-line segments • Construct a region that is defined as, for example, less than a given distance or greater than a given distance from a point or line segment • Describe regions satisfying several conditions

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