

# Mathematics Narrative

*“Beauty is the first test; there is no permanent place in the world for ugly mathematics.” G.H.Hardy)*

We begin our theme of relationships between two or more numbers by exploring ratios and multiplicative change leading into real world scenarios such as currency conversion and recipe scaling. We then build upon this real-world aspect by considering data sets and how they can be manipulated and represented as graphs. We continue our theme of relationships by considering two numbers represented by a fraction and the arithmetic of combining fractions using the four basic operations.

We then follow up by considering the algebraic expression of values that are represented in two dimensions on the Cartesian plane, and expressing relationships between two sets of values as a straight-line graph. We go on to explore the relationships between the relationships of two sets of values in the medium of algebra that forms them. We finish our Autumn term with a set of formal examinations.

When we return after the Christmas break we start with the pure algebra of expanding brackets, factorising etc, followed by the continuation of the grammar of algebraic knowledge in sequences, introducing  $n$ th term for the first time. We also spend some time learning about the grammatical knowledge of algebraic notation of powers, roots and indices in general. We continue with algebra in the context of sequences described as an algebraic expression.

Once we have imparted the knowledge of how powers and roots behave in calculations we can then push further on to standard form and the real-world applications of calculating efficiently with very small and very large numbers.

We then move on to calculating the area of shapes, which we segue into from working on the cartesian plane by drawing 2D shapes accurately on a grid to begin to calculate the area by counting squares for our weakest students. We then build on this by creating more and more complicated shapes such as trapezia and circles.

Continuing our theme of relationships between numbers and sets of numbers, our students then go on to learn about the data handling cycle, learning to draw various charts and graphs (bar/line/pie) as a visual representation of said relationships. Between then and the Christmas break we encourage our teachers to interleave any topics that they wish to revisit, revise or go deeper, perhaps considering CAPD, real life applications etc before recapping all previous topics to give students the best opportunities to perform in a way commensurate with their holistic ability in a formal assessment.

After an interleaving week where teachers can consider the next steps bespoke to their classes using formative assessment, we return to concept of relationships between two numbers and consider the dichotomies of something happening or not happening as an introduction to probability and the relationship between the numbers that represent them, continuing to build on this by learning to extract these probabilities from an organised tabled data set.

To complete our year 8 course before the exam we finally reach the more advanced geometry sections. We begin by recapping and reteaching, if necessary, the grammar of geometry such as 90 degrees in a right angle, 180 on a straight line and so on before moving through a discovery of the relationship between angles in parallel lines and in polygons. After their end of year, students will focus on measures of location as a revisit of the tables they have seen previously but instead of probability or creating a graph from the results they will instead learn to process the data, producing different forms of averages from a group of data. This brings us to the end of the year 8 curriculum with the addition of built-in time during the last few weeks where teachers can, at their discretion, revisit any topics arising from the last assessment and provide feedback so that students know where they stand as they approach the final year of key stage three.

Students are familiar with Sparx Maths - <a href="https://www.sparxmaths.uk/">https://www.sparxmaths.uk/</a> If they have any problems logging in – please contact Mr. Howard (Head of Maths)		
Fractions	Use common factors to simplify fractions; use common multiples to express fractions with the same denominator. Convert between mixed numbers and improper fractions. Compare and order fractions. Add and subtract fractions.	Sparx Maths Clip: M335 Sparx Maths Clip: M939 Sparx Maths Clip: M601 Sparx Maths Clip: M835 Sparx Maths Clip: M931 Sparx Maths Clip: M645
Statistical Diagrams	Draw and interpret bar charts, pictograms and line graphs. Interpret bar charts, pictograms and line graphs and use them to solve problems. Draw and interpret pie charts. Draw and interpret <b>scatter graphs</b>	Sparx Maths Clip: M460 Sparx Maths Clip: M597 Sparx Maths Clip: M574 Sparx Maths Clip: M769 Sparx Maths Clip: M596
Decimals	<b>Multiply</b> any <b>decimals</b> by one or two digit numbers. Multiply two <b>decimal numbers</b> . <b>Divide decimals</b> by whole numbers. <b>Multiply</b> and divide <b>decimals</b> .	<b>Sparx Maths Clip: M803</b> <b>Sparx Maths Clip: M262</b> <b>Sparx Maths Clip: M491</b>
Algebra	Use, simplify and interpret algebraic notation. Substitute numbers into formulae, equations and expressions, including scientific formulae. Simplify and manipulate algebraic expressions by collecting like terms. Expand with single brackets.	Sparx Maths Clip: M813 Sparx Maths Clip: M417 Sparx Maths Clip: M327 Sparx Maths Clip: M795 Sparx Maths Clip: M237
Linear Equations	Use algebraic methods to solve linear equations in one variable. Use algebraic methods to solve linear equations in one variable.	Sparx Maths Clip: M707 Sparx Maths Clip: M634 Sparx Maths Clip: M647
Inequalities	Understand and use the concept and vocabulary of inequalities (meaning and representation on a number line). Use algebraic methods to solve linear inequalities in one variable.	Sparx Maths Clip: M384 Sparx Maths Clip: M118 Sparx Maths Clip: M732
Angles	Derive and use the sum of angles in a triangle and quadrilateral. Apply the properties of angles at a point on a straight line and vertically opposite angles. Finding angles in parallel lines.	Sparx Maths Clip: M606 Sparx Maths Clip: M679 Sparx Maths Clip: M818 Sparx Maths Clip: M351 Sparx Maths Clip: M163
Ratio	Use ratio notation and cancel ratios to their simplest form. Write each part of a ratio as a fraction of the whole amount. Share an amount into a given ratio. Find the missing share in a ratio given the other.	Sparx Maths Clip: M885 Sparx Maths Clip: M801 Sparx Maths Clip: M267 Sparx Maths Clip: M525
Proportion	Solve problems involving simple direct proportion (recipe and best value problems)	Sparx Maths Clip: M478 Sparx Maths Clip: M681
Percentages	Convert percentages to fractions and decimals. Finding percentages of amounts – non-calculator methods. Percentages: Write one value as a percentage of another. Find the percentage change to a value. Calculate percentage increases and decreases using written methods and a calculator.	Sparx Maths Clip: M695 Sparx Maths Clip: M684 Sparx Maths Clip: M437 Sparx Maths Clip: M905 Sparx Maths Clip: M476
Solving Problems	Use unit pricing to solve problems (e.g. 3 apples cost £1.80, how much do 5 apples cost? Find the price of 1 apple first).	Sparx Maths Clip: M681
Measures	Change freely between related standard units (for example time, length, area, volume/capacity and mass)	Sparx Maths Clip: M772 Sparx Maths Clip: M728 Sparx Maths Clip: M924
Substituting Numbers	Substitute numbers into formulae, equations and expressions, including scientific formulae.	Sparx Maths Clip: M417 Sparx Maths Clip: M327
Linear Graphs	Complete a table of values for a function and use it to draw linear graphs.	Sparx Maths Clip: M832
Equations/ Expressions	Form expressions and equations from worded problems or diagrams.	Sparx Maths Clip: M957
Sequences	Generate terms of sequences from either a term-to-term or a position-to-term rule.	Sparx Maths Clip: M381 Sparx Maths Clip: M241

Arithmetic Sequences	Recognise arithmetic sequences and find the nth term	Sparx Maths Clip: M991
Problem Solving	Interpreting data with pie charts. Calculate averages and range for non-grouped data in a table.	Sparx Maths Clip: M574 Sparx Maths Clip: M165

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