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Year 7

# Department of Mathematics

# OVERVIEW

KS3 Maths covers Years 7, 8 and 9 and has an emphasis on problem-solving. Many of the topics met during these years form the groundwork for their GCSE studies. Pupils will be introduced to new topics, such as algebraic manipulation, equations of graphs, methods of analysing and displaying data, calculating probabilities and angle rules. They will also revise and build upon number work involving fractions, decimals, percentages, place value and rounding, negative number rules and order of operations.

## Skills Developed

- Applications of Geometry, shape, measure and construction; algebra; handling data; number rules.
- Accuracy in calculations and constructions.
- Problem-solving involving a logical, independent thought process.
- Knowledge, intrigue and understanding in Mathematics in the world around us.
- Using and reading statistics and understanding when they are misleading.
- Citizenship through Mathematics.

## Topics covered

<b>Number</b>	Number	<ul style="list-style-type: none"> <li>• Use factors, primes, triangular numbers, squares and roots</li> <li>• Use the order of operations, including brackets</li> <li>• Add, subtract, multiply and divide positive and negative integers</li> <li>• Long multiplication and long division</li> <li>• Know how to enter negative numbers on a calculator</li> <li>• Investigate divisibility rules</li> </ul>
	Four rules with decimals	<ul style="list-style-type: none"> <li>• Consolidate efficient written methods of addition, subtraction, multiplication and division of whole numbers and extend to decimals</li> </ul>
	Rounding	<ul style="list-style-type: none"> <li>• Round numbers to the nearest whole number or to one, two or three decimal places</li> <li>• Use rounding to make estimates</li> </ul>
	Fractions, decimals and percentages	<ul style="list-style-type: none"> <li>• Use the equivalence of fractions, decimals and percentages in describing proportions and convert them</li> <li>• Calculate fractions of quantities, multiply and divide an integer by a fraction</li> <li>• Express one number as a percentage of another</li> <li>• Calculate percentages and find the outcome of a given percentage increase or decrease</li> </ul>

	Ratio & Proportion	<ul style="list-style-type: none"> <li>Understand the relationship between ratio and proportion and use ratio and proportion to solve simple problems</li> <li>Compare two ratios</li> <li>Interpret and use ratio in a range of contexts, including solving word problems</li> <li>Use proportional reasoning to solve a problem, choosing the correct numbers to take as 100%, or as a whole</li> </ul>
<b>Algebra</b>	Introduction to Algebra	<ul style="list-style-type: none"> <li>Use letters or symbols to represent unknown numbers or variables</li> <li>Know that algebraic operations follow the same conventions and order as arithmetic operations Simplify linear algebraic expressions by collecting like terms; multiply a single term over a bracket</li> </ul>
	Sequences	<ul style="list-style-type: none"> <li>Generate terms of a sequence using term to term and position to term definitions of the sequence</li> <li>Generate sequences from practical contexts and write an expression to describe the nth term of an arithmetic sequence Deduce properties of the sequences of triangular and square numbers from spatial patterns</li> </ul>
	Equations	<ul style="list-style-type: none"> <li>Construct and solve simple linear equations (variable on one side only), selecting an appropriate method</li> </ul>
	Straight line graphs	<ul style="list-style-type: none"> <li>Generate points in all four quadrants and plot the graphs of linear functions, where y is given explicitly in terms of x</li> </ul>
	Graphs	<ul style="list-style-type: none"> <li>Construct linear functions arising from real life situations and plot their corresponding graphs Simple line graphs for time series</li> </ul>
<b>Geometry, shape and measures</b>	Angles and constructions	<ul style="list-style-type: none"> <li>Use accurately the vocabulary and notation associated with lines and angles</li> <li>Measure angles accurately</li> <li>Recognise and use parallel and perpendicular lines and the sum of angles at a point, on a straight line and in triangles</li> <li>Identify alternate angles and corresponding angles</li> <li>Know the side &amp; angle properties of triangles and quadrilaterals</li> <li>Solve geometrical problems using side and angle properties of equilateral, isosceles and right-angled triangles and special quadrilaterals, explaining reasoning with diagrams and text</li> </ul>
	2D – 3D Isometric	<ul style="list-style-type: none"> <li>Visualise and use 2D representations of 3D objects</li> </ul>

	Area and Volume	<ul style="list-style-type: none"> <li>• Deduce and use formulae for the area of a triangle, parallelogram; calculating areas of compound shapes made from triangles and rectangles</li> <li>• Know and use the formulae for the circumference and area of a circle</li> <li>• Know and use the formulae for the volume of a cuboid; calculate volumes and surface areas of cuboid</li> </ul>
	Pythagoras' Theorem	<ul style="list-style-type: none"> <li>• Understand and apply Pythagoras' Theorem</li> </ul>
	Transformations	<ul style="list-style-type: none"> <li>• Transform 2-D shapes by simple combinations of rotations, reflections and translations</li> <li>• Identify all the symmetries of 2-D shapes</li> <li>• Know that translations, rotations and reflections preserve length and angle and map objects on to congruent images</li> <li>• Tessellations</li> </ul>
<b>Data</b>	Probability	<ul style="list-style-type: none"> <li>• Use vocabulary and ideas of probability when interpreting the results of an experiment; appreciate that random processes are unpredictable</li> <li>• Understand relative frequency as an estimate of probability and use this to compare outcomes of experiments</li> <li>• Know that if the probability of an event occurring is <math>p</math>, then the probability of it not occurring is <math>1 - p</math>; identify all the mutually exclusive outcomes of an experiment; know that the sum of probabilities of all mutually exclusive outcomes is 1 and use this when solving problems</li> <li>• Compare experimental and theoretical probabilities in different contexts; appreciate the difference between mathematical explanation and experimental evidence</li> </ul>
	Mean, median, mode, range	<ul style="list-style-type: none"> <li>• Find the median and mode, and calculate the mean and range of a small data set (ungrouped)</li> <li>• Compare two simple distributions using the range and one of the measures of average</li> </ul>
	Representing data & Interpreting and discussing results	<ul style="list-style-type: none"> <li>• Record data in a frequency table, grouped where appropriate in equal class intervals, for sets of discrete and continuous data</li> <li>• Calculate the mean from a frequency table for ungrouped data only</li> <li>• Construct and interpret pie charts, bar charts, frequency diagrams &amp; stem-and-leaf diagrams</li> </ul>

### How we assess your daughter's progress

- We have two class tests during the year and a final end-of-year exam.
- Your daughter will be given one week's notice and be provided with a revision list.
- One lesson will be set aside for revision before the test and appropriate homework will be set to support your daughter's revision.
- These tests are marked by the teacher after which a lesson will be devoted to reviewing the test.

### How we support and develop your daughter

- Every student has full subscription to Sparx Maths; an online homework resource.
- Expectations of layout of homework are included in a document that your daughter will receive at the beginning of the year.
- There is a Maths Help Club which is run by teachers with Sixth Form students helping out.
- Sixth Form students may assist your daughter as a maths mentor at the request of the Head of Mathematics.
- The library has a wealth of mathematics books for additional reading for your daughter.
- Year 7 students have the opportunity to take part in the UKMT Junior Challenge.

### How you can help your daughter

- Mathematics revision must involve a significant amount of "doing", as opposed to reading through notes. There are facts and formulae to be learnt, but methods are best learned through practice.
- After looking through each topic, take examples from a text book, exercise book, or revision guide and cover over the solution. If your daughter can work through to the correct answer, she and you will feel confident that she has understood
- Ensure that she learns by heart all the formulae she has met, for example for finding areas, calculating the mean etc. and has the application knowledge of these topic.
- On the day of a test, please help your daughter to ensure she has all of the correct equipment, including a protractor, compasses, ruler, pencils, eraser, pen and a scientific calculator.
- There is a wealth of resources available online; a search for any topic will quickly return many suitable resources
- Some suggested websites:
  - Sparx Maths for which they have a paid for subscription.
  - Mr Barton Maths
  - Teachit Maths
  - Corbett Maths
- A number of educational publishers, such as CGP, Pearsons and Collins also produce workbooks and revision guides