

	<h1>Sherborne International</h1>						
	Subject	Mathematics	Year	10	Key stage	4	Hours/week
<b>Mathematics GCSE in 2 years (Year 1)</b>							

10

GCSE Maths 4th Edition FOUNDATION

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GCSE Maths 4th Edition HIGHER

9780008113810

Week	Syllabus identifier	Detail: F H <i>[Black italics is additional and/or legacy from previous specification, but which cannot be assumed students have prior knowledge of. Detail in green is Higher Tier ONLY]</i>	Textbook F H	Key vocabulary
1 05/09/2016	<b>Number: N1, 2, 3, 4, 5, 6, 7</b> <i>Integers and decimals</i>	Order positive and negative integers, decimals and fractions; use the symbols $=, \neq, <, >, \leq, \geq$ ; Apply add, subtract, multiply and divide, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; Understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals); Recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); Use conventional notation for priority of operations, including brackets, powers, roots and reciprocals; Use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem; Apply systematic listing strategies <i>including use of the product rule for counting (i.e. if there are m ways of doing one task and for each of these, there are n ways of doing another task, then the total number of ways the two tasks can be done is m x n ways)</i> ; use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5; <b>estimate powers and roots of any given positive number</b> . Calculate with roots, and with integer and fractional indices; <i>Recall all multiplication facts to 10 x 10 and use them to derive quickly the corresponding division facts; Read and write numbers of any magnitude in words; Recognise odd and even numbers;</i>		Odd, even, factor, multiple, square, cube, square root, cube root, reciprocal, prime number, HCF, LCM, minus, sum, negative, add, reciprocal, addition, subtract, minus, difference, divide, multiply, product, integer
	<b>Number: N2, 10, 12</b> <i>Fractions, decimals and %s</i> <b>Number: N8</b> <i>Fractions</i>	Apply add, subtract, multiply and divide, including formal written methods, to simple fractions (proper and improper), and mixed numbers – all both positive and negative; Work interchangeably with terminating decimals, their corresponding fractions and %s (such as 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$ , 37.5%); change recurring decimals into their corresponding fractions and vice versa; Interpret fractions and %s as operators; Calculate exactly with fractions. <i>Equivalent fractions; Simplifying fractions; Compare fractions; Calculating fraction of a given amount; Express a given amount as a fraction of another; Fractional changes; Reverse fractional changes; Understand that fractions with denominators containing factors of only 2 and 5 have definite decimals.</i>		Denominator, numerator, mixed number, vulgar fraction, improper fraction, recurring
2 12/09/2016	<b>Algebra: A1, 2, 3, 5, 7</b> <i>Simple formulae. Substitution into simple formulae. Rearranging formulae</i>	Use and interpret algebraic manipulation, including: $ab$ in place of $a \times b$ ; $3y$ in place of $y + y + y$ and $3 \times y$ ; $a^2$ in place of $a \times a$ and $a^3$ in place of $a \times a \times a$ , $a^2b$ in place of $a \times a \times b$ ; $\frac{a}{b}$ in place of $a \div b$ ; coefficients written as fractions rather than as decimals, brackets; Substitute numerical values into formulae and expressions, including scientific formulae; Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors; understand and use standard mathematical formulae; rearrange formulae to change the subject; where appropriate, interpret simple expressions as functions with inputs and outputs; <b>Interpret the reverse process as the ‘inverse function’; interpret the succession of two functions as a ‘composite function’ (the use of formal function notation is expected)</b>		Equation, formula, identity, expression, simplify, substitute, expand

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	<b>Algebra: A17, 22</b> <i>Solving linear equations</i>	Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation); solve linear inequalities in one or two variable(s); and quadratic inequalities in one variable; represent the solution set on a number line; using set notation and on a graph		
<b>3</b> 19/09/2016	<b>Number: N8</b> <i>Surds</i> <b>Algebra: A4</b> <i>Simplifying algebraic expressions</i>	<b>Simplify surd expressions involving squares (e.g. <math>\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}</math>) and rationalise denominators.</b> Simplify and manipulate algebraic expressions (including those involving Surds and algebraic fractions) by: collecting like terms, multiplying a single term over a bracket, taking out common factors, expanding products of two or more binomials, factorising quadratic expressions of the form $x^2 + bx + c$ , including the difference of two squares; <b>factorising quadratic expressions of the form <math>ax^2 + bx + c</math></b> ; simplifying expressions involving sums, products and powers, including the laws of indices.		Collect, factor, brackets, subject, difference
<b>4</b> 26/10/2016	<b>Number: N14, 15, 16</b> <i>Approximation and estimation</i>	Estimate answers; Check calculations using approximation and estimation, including answers obtained using technology; Round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures); use inequality notation to specify simple error intervals due to truncation or rounding; Apply and interpret limits of accuracy. <i>Justify appropriate degree of accuracy</i>		Significant figures, decimal places, rounding, approximation, accuracy
	<b>Number: N9, 16</b> <i>Standard form; Limits of accuracy</i>	Calculate with and interpret standard form $A \times 10^n$ , where $1 \leq A < 10$ and $n$ is an integer. <b>Upper and lower bounds for calculations.</b>		Upper, lower bounds
<b>5</b> 03/10/2016 <b>6</b> 10/10/2016	<b>Number: N12</b> <i>Percentage</i> <b>Ratio, proportion and rates of change: R1, 11</b> <i>Measures</i>	Interpret percentages as operators; define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; <i>Calculating percentage of a given amount</i> ; compare two quantities using percentages; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics;		Percentage, increase, decrease, depreciate, appreciate, interest, simple, compound, VAT
<b>7</b> 17/10/2016	<b>Algebra: A8, 9, 10, 11, 17</b> <i>Cartesian co-ordinates; Plotting and interpreting graphs.</i>	Work with coordinates in all four quadrants. <i>3D; Co-ordinates of a midpoint of a line segment</i> Plot graphs of equations that correspond to straight-line graphs in the coordinate plane; use the form $y = mx + c$ to identify parallel lines and perpendicular lines; <i>Conversion graphs</i> ; find the equation of the line through two given points or through one point with a given gradient; identify and interpret gradients and intercepts of linear functions graphically and algebraically; Identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square; find approximate solutions using a graph.		Co-ordinates, axis, dimension, midpoint
24/10/2016	<b>Half Term holiday</b>			
<b>8</b> 31/10/2016 <b>9</b> 07/11/2016	<b>Algebra: 14</b> <i>Interpreting graphs</i> <b>Algebra: 12, 13</b> <i>Plotting and interpreting graphs.</i>	Plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration; Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$ ; <b>exponential functions <math>y = k^x</math> for positive values of <math>k</math>, and the trigonometric functions (with arguments in degrees) <math>y = \sin x</math>, <math>y = \cos x</math> and <math>y = \tan x</math> for angles of any size</b> ; sketch translations and reflections of a given function;		Gradient, intercept, parallel, intersection, inequality, feasible region, transformation, function
<b>10</b> 14/11/2016	<b>Internal examinations</b>			
<b>11</b> 21/11/2016	<b>Algebra: 15, 16</b>	<b>Calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts (this does not include calculus);</b>		Fairness, bias, hypothesis, sampling, random, choice

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	<i>Plotting and interpreting graphs.</i>	recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point		
	<b>Statistics: S1</b> <i>Populations and samples</i>	Infer properties of populations or distributions from a sample, while knowing the limitations of sampling; <i>Fairness; Test hypothesis, taking into account possible bias</i>		
<b>12</b> 28/11/2016	<b>Statistics: S2, 3</b> <i>Tables and charts</i> <i>Cumulative frequency and histograms</i>	Interpret and construct tables, charts and diagrams, including <b>tally methods</b> , <b>2-way tables</b> , frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use; <b>Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use</b>		Pictogram, bar/ column, histogram, pie-chart, frequency, correlation, scatter diagram, line of best fit, discrete, continuous, sort, qualitative, quantitative, grouped, tally, class intervals,
<b>13</b> 05/12/2016	<b>Statistics: S4, 5</b> <i>Analysis and comparison of data sets; Averages and range</i>	Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through: appropriate graphical representation involving discrete, continuous and grouped data <b>including box plots, frequency polygons</b> ; Appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers) <b>quartiles and inter-quartile range</b> ; apply statistics to describe a population. <i>Estimated median, upper and lower quartiles, percentiles and inter-quartile range and use these to compare distributions and to make inferences;</i>		Cumulative frequency, quartiles, box and whisker (plot box); Mean, median, mode, modal, moving average
12/12/2016 19/12/2016 26/12/2016	<b>Christmas holiday</b>			
<b>14</b> 02/01/2017	<b>Statistics: S6</b> <i>Scatter graphs</i>	Use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends while knowing the dangers of so doing.		Scatter graphs; correlation, lines of best fit, interpolate; extrapolate; trends
<b>15</b> 09/01/2017	<b>Number: N11</b> <i>Ratio basics</i> <b>Ratio, proportion and rates of change: R3, 4, 5</b> <i>Using and applying ratio</i>	Identify and work with fractions in ratio problems; Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1; Use ratio notation, including reduction to simplest form; <i>Ratio in form of 1:n or n:1; Unitary method</i> ; Divide a given quantity into two parts in a given part:part or part:whole ratio; Express the division of a quantity into two parts as a ratio; Apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)		Ratio, unitary
<b>16</b> 16/01/2017	<b>Geometry: G1, 4</b> <i>Geometrical properties of polygons</i>	Use conventional terms and notation: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons, and polygons with reflection and/or rotation symmetries; derive and apply the properties and definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language;		Triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon, exterior, interior
<b>17</b> 23/01/2017	<b>Geometry: G3</b> <i>Simple angle properties</i>	Use the standard conventions for labelling and referring to the sides and angles of triangles; draw diagrams from written description; derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons; Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles; understand and use alternate and corresponding angles on parallel lines		Right angle, acute, obtuse, reflex, exterior/ interior, turn, clockwise, anti-clockwise, parallel, opposite, alternate, corresponding, interior, quadrilateral
<b>18</b> 30/01/2017	<b>Geometry: G16, 17</b> <i>Areas of 2D shapes</i> <b>Number: N8</b> <i>Calculate exactly in terms of <math>\pi</math></i>	Know and apply formulae to calculate the area of triangles and special quadrilaterals; Calculate the circumference of a circle = $2\pi r = \pi d$ , area of a circle = $\pi r^2$ ; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes		
<b>19</b> 06/02/2017		Know and apply formulae to calculate the volume of cuboids and other right prisms (including cylinders); Calculate surface area and volume of spheres, pyramids, cones and composite solids <i>Construction of nets</i> . Calculate exactly with multiples of $\pi$ .		
13/02/2017	<b>Half term holiday</b>			
<b>20</b> 20/02/2017	<b>Geometry: G15</b> <i>Bearings</i>	Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings; Use scale factors, scale diagrams and maps;		Bearings, scale

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	<b>Ratio, proportion and rates of change</b> <i>Scale diagrams and maps</i> R2			
<b>21</b> 27/02/2017	<b>Geometry: G7, 8</b> <i>Transformations</i>	Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement (including fractional and negative scale factors); <b>describe the changes and invariance achieved by combinations of rotations, reflections and translations</b> , <i>Line of symmetry, rotational symmetry and planes of symmetry</i> .		Transformation, translation, rotation, enlargement, reflection, mirror, point, anti-, clockwise, scale factor
<b>22</b> 06/03/2017				
<b>23</b> 13/03/2017	<b>Geometry: G2</b> <i>Constructions</i>	Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line; <i>Measure and draw lines to the nearest mm and angles to the nearest degree; Draw 2D shapes using ruler and protractor; Standard constructions, construct equilateral triangle, regular polygons in circle, Isometric representation;</i>		Construction, perpendicular, bisector, nets, plan, elevation
<b>24</b> 20/03/2017	<b>Algebra: A19</b> <i>Simultaneous equations</i>	Solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph		
<b>25</b> 27/03/2017	<b>Probability: P1, 2, 3, 4</b> <i>Application of basic probability</i>	Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees; apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments; relate relative expected frequencies to theoretical probability, using appropriate language and the 0-1 probability scale; apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one		
03/04/2017 10/04/2017	<b>Holy Week/ Easter holiday</b>			
<b>26</b> 17/04/2017	<b>Probability: P5, 6, 7, 8</b> <i>Recording and calculating probability</i>	Understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size; enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams; construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities; calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions.		
<b>27</b> 24/04/2017				
<b>28</b> 01/05/2017	<b>Probability: P9</b> <i>Conditional probability</i>	<b>Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams</b>		
<b>29</b> 08/05/2017 <b>30</b> 15/05/2017	<b>Geometry: G20</b> <i>Pythagoras and trigonometry</i>	know the formulae for: Pythagoras' theorem $a^2 + b^2 = c^2$ , and the trigonometric ratios, $\sin \theta = \text{opposite} \div \text{hypotenuse}$ , $\cos \theta = \text{adjacent} \div \text{hypotenuse}$ and $\tan \theta = \text{opposite} \div \text{adjacent}$ ; apply them to find angles and lengths in right-angled triangles <b>and, where possible, general triangles</b> in two <b>and three</b> dimensional figures		
<b>31</b> 23/05/2017	<b>Revision for end of year examinations</b>			

29/05/2017	<b>Half term holiday</b>		
<b>32</b> 05/06/2017	<b>End of year examinations</b>		

### **Topics which are explored across/within multiple areas**

	Measures and accuracy <b>N13</b> <b>G14</b>	Use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate; use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)		
	Simple terms connected to shape, space and measure	Point, horizontal, vertical, parallel, perpendicular, centre, diameter, radius, arc, circumference, chord, tangent, triangles (scalene, isosceles, equilateral, right-angled), polygons, cube, cuboid, prism, pyramid, cylinder, sphere, cone, face, edge, vertex, sector, segment; Distinguish between line and line segment.		
	Mental methods	Recall squares up to $15^2$ and the corresponding square roots; Recall cubes of 2, 3, 4, 5, 10; Positive complements up to 100; Round to given number of significant figures or decimal places; Checking procedures; simple fraction to decimal conversion; Estimate from known facts eg estimate value of $\sqrt{85}$ ; Estimating answers to calculations to 2 significant figure; Multiply and divide numbers with no more than 2 decimal digit; Add and subtract numbers up to 2 decimal places; Mental multiplication and division of multiples of 10; Multiple and divide mentally numbers of any size rounded to 1 sf; Problems involving rules of indices;		
	Use of calculators (Nv)	+, -, x, ÷, $x^2$ , $\sqrt{x}$ , memory brackets, and appropriate trigonometric and statistical functions; Key in standard form numbers; Do not round up during intermediate stages; Use of calculators to explore exponential growth and decay.		
	Elements not covered this year and to be addressed in year 11	<b>A 6, 18, 20, 21</b> <b>A 23, 24, 25</b> <b>R 6, 7, 8, 10, 12, 13, 14, 15, 16</b> <b>G 5, 6, 9, 10, 11, 12, 13, 18, 19, 21, 22, 23, 24, 25</b>		