

Maths Y11 GCSE - Higher - SOW 2021-22

Year	Term	Week	Topic	OUP Text book Exercises	GCSE Ref	Specification Content	Specification Notes	MyMaths	Hegarty Maths (Basic Skills)	Hegarty Maths (Intermediate Skills)	Hegarty Maths (Advanced Skills)		
		1	Fractions and Decimals (Number)	5.1s (q1-8) 5.1a (q2-4, 6 and 11) 5.2s, 5.2a, 5.3s (q1 part i, 4 part i, 5-6, 7 part i, 8, 9, 11-13, 16 and 18) 5.3a (q3, 7-9, 11) 17.2s(q3-5)	N2	Apply the four operations, including formal written methods, to simple fractions (proper and improper) and mixed numbers - both positive and negative Apply the four operations, including formal written methods, to decimals – both positive and negative Understand and use place value (e.g. when calculating with decimals)	Including questions set in context Knowledge of terms used in household finance, for example profit, loss, cost price, selling price, debit, credit and balance, income tax, VAT, interest rate		45 46 47 48 49 50 51 59 60 61 62 63 64 65 52 66 67 68 69 70 71 72 73 74 77 78 79 80		53 54		
						N8	Calculate exactly with fractions						
						N10	Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8) including ordering Change recurring decimals into their corresponding fractions and vice versa	including ordering					
					Equations (Algebra)	10.1s, 10.1a	A17	Solve linear equations in one unknown algebraically <u>including those with brackets and with the unknown on both sides of the equation</u>	including use of brackets	1928 1929	176 177 178 179 180 181 182 183 189	184 185 186 188	
					Rearranging formulae (Algebra)	6.1s (q6-12), 6.1a(q1-5, 7)	A5	Rearrange formulae to change the subject	including use of formulae from other subjects in words and using symbols	1170 1171 1186	280 281 282 283 284	224 285 286 287	
				2	Transformations (Geometry and Measures)	7.3s, 7.3a, 7.4s, 7.4a	G7	Identify, describe and construct congruent and similar shapes, including on co-ordinate axes, by considering rotation, reflection, translation and enlargement (<u>including fractional and negative scale factors</u>)		1099 1113 1115 1127 1125	637 638 639 640 641 642 643 648 649 650 651 652 653 654	644 645	646 647 655 656 657
		G24	Describe translations as 2D vectors										
		G8	Describe the changes and invariance achieved by combinations of rotations, reflections and translations				including using column vector notation for translations						
					Scale Diagrams (Geometry and Measures)	7.1s, 7.1a	R2	Use scale factors and maps		1082 1086 1109 1086 1103 1117	455 456 457 458 459 460 461 477 478 479 480 481 482 483 484 485 486 487 492 493 494 495 496 812 813 814 815 821 864 865 866 867 868 869	488 489 490 491 496 870 871	
		G15	Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings										

3	Sequences (Algebra)		A23	Generate terms of a sequence from either a term-to-term or a position-to-term rule	including from patterns and diagrams	196 197 198 261	247 263 264	248 249 250
			A24	<ul style="list-style-type: none"> Recognise and use: <ul style="list-style-type: none"> sequences of triangular, square and cube numbers simple arithmetic progression Fibonacci type sequences quadratic sequences and simple geometric progressions (r^n where n is an integer and r is a rational number ≥ 0) other sequences 	other recursive sequences will be defined in the question	1165 1173 1166 1054 1165 1166 1920		
			A25	Deduce expressions to calculate the n th term of linear and quadratic sequences				
4	Indices (Number)	13.2s, 13.2a, 17.1s, 17.1a	N6	Use positive integer powers and associated real roots (square, cube and higher)	including square numbers up to 15×15	99 100 101	102 103 104	108 109 110 112
				Recognise powers of 2, 3, 4, 5			105 106 107	
			N7	Estimate powers and roots of any given positive number	know that $1000=10^3$ and 1 million $=10^6$	1033 1053 1301 1924 1045		
4	Surds (Number)	13.3s, 13.3a, 17.2s (q2 and 7-10), 17.2a (q4, 6)	N8	Calculate exactly with surds				111 113 114 115
				Simplify surd expressions involving squares (eg $\sqrt{12}$)			116 117 118	
			A24	$=4 \times \sqrt{3} = 2\sqrt{3}$ and rationalise denominators $\frac{1}{\sqrt{4 \times 3}}$		1033 1053 1924 1065 1074		119 120
5	Ratio and proportion (Ratio, Proportion and Rates of Change)	12.1s, 12.1a, 12.2s, 12.2a	N1	Identify and work with fractions in ratio problems		1015 1037	328 329 330 331 332 333 334	335 336 337 338
			R3	Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1		1036 1038 1039 1103	339 340 341 342	
			R4	Use ratio notation, including reduction to simplest form				
			R5	<ul style="list-style-type: none"> 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 and concentrations) 	including better value or best buy problems			
			R6	Express a multiplicative relationship between two quantities as a ratio or fraction				
			R7	Understand and use proportion as equality of ratios				
			R8	Relate ratios to fractions and to linear functions				

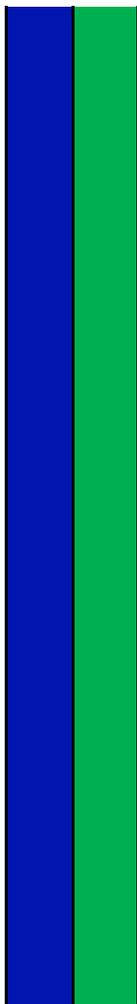
Autumn Term

6

<p style="text-align: center;">Factorising quadratics</p> <p style="text-align: center;">(Algebra)</p>	6.4s, 6.4a	A4	<p>Simplify and manipulate algebraic expressions (including those involving <u>surds</u>) by:</p> <p><u>expanding products of two or more binomials</u></p> <p><u>factorising quadratic expressions of the form $x^2 + bx + c$</u></p> <p><u>including the difference of two squares</u></p> <p>factorising quadratic expressions of the form $x^2 + bx + c$</p> <p>simplifying expressions involving sums, products and powers, including the laws of indices</p>		1150 1151 1156 1157	<p>222</p>	<p>154 162 163 164 165 221 223 166 225 226 227 228</p> <p>224</p>	<p>324 325 326 327</p>
<p style="text-align: center;">Standard form</p> <p style="text-align: center;">(Number)</p>	17.3s, 17.3a	N2	<p>Understand and use place value (e.g. when working with very large or very small numbers)</p>	including questions set in context	1049 1050 1051	<p>121 122 123 124 125 126 127 128</p>		
		N9	<p>Calculate with and interpret standard form $A \times 10^n$ where $1 \leq A < 10$, n integer</p>	with and without a calculator interpret calculator displays				
<p style="text-align: center;">Measures</p> <p style="text-align: center;">(Geometry and Measures)</p>	9.3s (q11-14), 9.3a (q3, 4)	N16	<p><u>Apply and interpret limits of accuracy including upper and lower bounds</u></p>		1067 1006	<p>691 692 693 694 695 696 697 774 775 776</p> <p>698 699 700 701 702 703 704 705 706 707 708 709 710 711</p> <p>712 713 716 717 718 719 720</p>	<p>137 138 139 777</p>	
	9.3s (q1-2), 9.3a (q1-2)	G14	<p>Use standard units of measure and related concepts (length, area, volume / capacity, mass, time, money etc)</p>					
	22.1s, 22.1a, 22.2s, 22.a	R1	<p>Change freely between related standard units (e.g. time, length, area, volume / capacity, mass) and compound units (e.g. speed, rates of pay, prices, <u>density, pressure</u>) in numerical <u>and algebraic contexts</u></p>		1121 1246 1061 1329			
	9.3s (q3-10), 9.3a (q5-10)	R11	<p>Use compound units such as speed, rates of pay, unit pricing, <u>density and pressure</u></p>	including making comparisons	1121 1246			

7	Collecting and representing data (Statistics and Probability)	4.1s 4.1a, 4.3s, 4.3a, 16.4s, 16.4a	S2	Interpret and construct tables, charts and diagrams including, for categorical data: o frequency tables o bar charts o pie charts o pictograms o vertical line charts for ungrouped discrete numerical data o tables and line graphs for time series data o know their appropriate use	including choosing suitable statistical diagrams	1205 1206 1207 1196 1197 1198	401 402 403 425 426 427 428 429	392 393 450 451 452	434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449
		16.2s, 16.2a	S4	Interpret, analyse and compare distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, including CUMULATIVE FREQUENCY GRAPHS and BOXPLOTS	know and understand the terms primary data, secondary data, discrete data and continuous data	1194 1195 1333			
			S3	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					
8-9	Revision and Exams								
10	2D representations of 3D shapes (Geometry and Measures)	15.1s (q5-6), 15.1a (q1-2)	G13	Construct and interpret plans and elevations of 3D shapes		1098		837 838 839 840 841 842 843 844	
	Constructions and loci (Geometry and Measures)	11.4s 11.4a	G2	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 Know that the perpendicular distance from a point to a line is the shortest distance to the line Use these to construct given figures and solve loci problems	including constructing an angle of 60°	1089 1090 1147		660 661 662 663 664 665 666 667 668 669 674 675 676 677 678 679	
11	Solving quadratic equations (Algebra)	10.2s, 10.2a	A18	Solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula		1160 1169 1181 1185 1950	230	231 232 233 234	238 239 241 242

12	Pythagoras' theorem and basic Trigonometry (inc. 3D) (Geometry and Measures)	19.1s, 19.1a, 19.2s, 19.2a 19.4s (except sine and cosine rule questions) 19.4a (except sine and cosine rule questions)	G20 Know the formula for Pythagoras' Theorem. $a^2 + b^2 = c^2$ Apply it to find angles and lengths in right angled triangles and, where possible, general triangles in two and three dimensional figures. Know and use the trigonometric ratios $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$, $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$ and $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$	1064 1112 1131 1133 1943	497 498 499 501 502 508 509 510 511 512 513 514 515	500 503 504 505 506 507 845 846 847 848 849 850 854 855 856 857 858 859 860 861 862 863
		G21 Know the exact values of $\sin \theta$ and $\cos \theta =$ $0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90° Know the exact value of $\tan \theta$ for $\theta =$ $0^\circ, 30^\circ, 45^\circ$ and 60°				
	Sine and cosine rules (Geometry and Measures)	19.3s and 19.3a 19.4s and 19.4a sine and cosine questions	G22 Know and apply the Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ and Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$ to find unknown lengths and angles	1094 1095 1120 1943	517 518 519 521 522 523 524 525 527 528 529 530 531 532 533	
		G23 Know and apply $= \frac{1}{2} abs \sin C$ to calculate the area, sides or angles of any triangle		851 852 853		



15

<p style="text-align: center;">Inequalities (Algebra)</p>	10.5s, 10.5a	A22	<p><u>Solve linear inequalities in one or two variables and quadratic inequalities in one variable</u></p> <p><u>Represent the solution set on a number line, using set notation and on a graph</u></p>	<p>know the conventions of an open circle on a number line for a strict inequality and a closed circle for an included boundary</p> <p>in graphical work the convention of a dashed line for strict inequalities and a solid line for an included inequality will be required</p>	1161 1162 1163 1189		<p>265 266 267</p> <p>268 269 270 271</p> <p>272</p>	<p>273 274 275</p> <p>276 277</p>	
	<p style="text-align: center;">Equations and graphs (Algebra)</p>		14.1s 14.1a	A9	<p>Plot graphs of equations that correspond to straight line graphs in the co-ordinate plane</p> <p>Use the form $y = mx + c$ to identify parallel lines and perpendicular lines</p> <p>Find the equation of the line through two given points, or through one point with a given gradient</p>		1153 1311 1314 1396	<p>196 197 198 199 200 201 202</p> <p>205 206 207</p>	<p>203 204</p> <p>208 209 210 211 212 213 214</p> <p>220</p>
10.1s (q4 - 6), 10.2s (q7, 8)		A18	<p><u>Find approximate solutions using a graph</u></p>			1160 1169 1181 1185 1950	257	252 253 254 255	258 259 260 256
14.2s, 14.2a, 14.3s, 14.3a		A12	<p>Recognise, sketch and interpret graphs of linear and quadratic functions</p>		1180 1312 1180 1185 1959 1960				796 797 798 799
		A11	<p><u>Identify and interpret roots, intercepts and turning points of quadratic functions graphically. deduce roots algebraically and turning points by completing the square</u></p>	<p>including the symmetrical property of a quadratic</p>					
	A21	<p><u>Translate simple situations or procedures into algebraic expressions or formulae</u></p> <p><u>derive an equation, solve the equation and interpret the solution</u></p>	<p>including solution of geometrical problems and problems set in context</p>						

16	Equations and graphs (Algebra)	18.1s, 18.1a, 18.2s (q1-8), 18.2a (q6)	A12	Recognise, sketch and interpret graphs of linear functions, quadratic functions, <u>simple cubic functions and the reciprocal function</u>	1071 1172 1958 1070 1132 1143 1184 1322	299 300 301	302 303 304
		18.3s, 18.3a (this was done under real life graphs in section 12, but not identifying the type of function)		with $x \neq 0$ $y = \frac{1}{x}$, exponential functions $y = kx^k$ for positive values of k , and the trigonometric functions (with arguments in degrees) $y = \sin x$, $y = \cos x$ and $y = \tan x$ for angles of any size			
	Equation of a circle (Algebra)	18.5s, 18.5a	A16	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.	1152	314 315 316 317 318 319 320 778 779	
16	Real life graphs (Algebra)	14.4s, 14.4a 18.3s, 18.3a	A14	Plot and interpret graphs (including <u>reciprocal graphs and exponential graphs</u>) 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	including problems requiring a graphical solution 1322 1323 1184	251 298 876 877	800 801 802 803 881 882 883
			R14	Interpret the gradient of a straight-line graph as a rate of change		874 875 878 879 880 897 898 899 900 901 902	884 885 886 894 895 896
17	Functions and Identities (Algebra)	6.3s, 6.3a	A6	Know the difference between an equation and an identity Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments and proofs	1150 1247 1938 1942	154	293 294 295 296 297 324 325 326 327
		6.2s, 6.2a	A7	Where appropriate, interpret simple expressions as functions with inputs and outputs Interpret the reverse process as the 'inverse function' Interpret the succession of two functions as a 'composite function'	understand and use function notation: $f(x)$, $fg(x)$, $f^{-1}(x)$ is expected at higher tier 1159 1940 1941		

Spring Term

18	Transforming functions (Algebra)	18.2s (q9-14) 18.2a	A13	Sketch translations and reflections of a given function		1126 1188 1955			307 308 311 312
	Area and Volume (Geometry and Measures)	11.1s, 11.1a, 11.2s, 11.2a	G9	Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, <u>tangent, arc, sector and segment</u>			534 535 536	537 538	
			G17	Know and use the formulae: o Circumference of a circle = $2\pi r = \pi d$ o Area of a circle = πr^2	solutions in terms of π may be asked for	1083 1088 1118	539 540 541 592	542 543 544	545 546 547
				Calculate the perimeters of 2D shapes including circles and composite shapes		587 588			
				Calculate areas of circles and composite shapes					
G18	Calculate arc lengths, angles and areas of sectors of circles								
Area and Volume (Geometry and Measures)	3.3s, 3.3a	R12	Compare lengths, areas and volumes using ratio notation			568 569 570	576 577 579	578 583	
			Scale factors		571 572 573		615 616 617		
			<u>Make links to similarity</u>		574 575	580 581 582	618 619 620 621		
	15.2s, 15.2a	G16	Know and apply the formulae to calculate the volume of cuboids and other right prisms (including cylinders)		1137 1138 1139 1246				
15.3s, 15.3a	G17	<u>Calculate the volume of spheres, pyramids, cones and composite solids</u>	including frustums	1136					
	17.2s (q1 and 6), 17.2a (q1-3, 5, 7-8 and 9-11)	N8	Calculate exactly with multiples of π						
19-20	Revision and Mock Exams								

21	Direct and Inverse Proportion, Growth and Decay (Ratio, proportion and rates of change)	22.3s, 22.3a	R10	Solve problems involving direct and inverse proportion, including graphical and algebraic representations		1048 1948 1949	343 346	344 345 347 348	
			R13	<u>Understand that x is inversely proportional to y</u> <u>is equivalent to $\frac{x}{y}$</u> <u>is proportional to $\frac{1}{y}$</u>					
				<u>Construct and interpret equations that describe direct and inverse proportion</u>					
			R14	<u>Recognise and interpret graphs that illustrate direct and inverse proportion</u>					
	Direct and Inverse Proportion, Growth and Decay (Ratio, proportion and rates of change)	22.5s, 22.5a	R16	<u>Set up, solve and interpret the answers in growth and decay problems, including compound interest</u>		1070 1238		94 95	804 805 806 807
	Numerical methods (Number)	9.2s, 9.2a, 10.4s, 10.4a	A20	Find approximate solutions to equations numerically using iteration	including the use of suffix notation in recursive formulae	1043 1932 1933 1956			808 809 810 811
22	Statistical measures (Statistics and Probability) N.B. This topic was covered during lockdown in year 8	4.2s, 4.2a, 16.1s, 16.1a	S4	Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through: appropriate measures of central tendency (median, mean, mode and modal class) spread (range, including consideration of outliers, quartiles and inter-quartile range)	students should know and understand the terms: primary data, secondary data, discrete data and continuous data	1192 1202 1254 1201 1255	404 405 406 407 408 409 410	411 412 418 421	
			S5	Apply statistics to describe a population			413 414 415 416 417 419 420		
			S1	<u>Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling</u>					
	Scatter graphs (Statistics and Probability)	16.3s, 16.3a	S6	Use and interpret scatter graphs of bivariate data Recognise correlation and know that it does not indicate causation <u>Draw estimated lines of best fit</u> <u>Make predictions</u> <u>Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so</u>	know and understand the terms positive correlation, negative correlation, no correlation		1213 1250	453 454	

23	Algebraic fractions (Algebra)	2.4s, 2.4a	A4	Simplify and manipulate algebraic expressions involving algebraic fractions		1149 1151 1164		172 244 229
	Vectors (Geometry and Measures)	19.5s, 19.5a	G25	<u>Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors</u>		1134 1135	622 623 624	627 628 629
				Use vectors to construct geometric arguments and proofs			625 626	630 631 632 633 634 635 636
Circle Theorems (Geometry and Measures)	11.3s, 11.3a	G10	Apply and prove the standard circle theorems concerning angles, radii, tangents and chords and use them to prove related results	including angle at centre is equal to twice angle at circumference; angle in a semi-circle is 90°; angles in the same segment are equal; opposite angles in a cyclic quadrilateral sum to 180°; tangent at any point on a circle is perpendicular to the radius at that point tangents from an external point are equal in length; the perpendicular from the centre to a chord bisects the chord; alternate segment theorem		1087 1142 1321	593 594 595 596 597 598 599 600 601 603 604 605 606 816 817 818 819 820	

	24	Gradients and rate of change (Ratio, proportion and rates of change)	22.4s, 22.4a	R15 Apply the concepts of average and instantaneous rates of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts	1312 1953			887 888 889 890	
		Pre-calculus and area under a curve (Algebra)	18.4s, 18.4a	R14 Interpret the gradient of a straight-line graph as a rate of change A15 Calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs) Interpret the results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts	1128 1312 1944 1953			891 892 893	
Summer Term	25	NUMBER - Tailored revision for each class based on weaknesses							
	26	ALGEBRA - Tailored revision for each class based on weaknesses							
	27	RATIO AND PROPORTION - Tailored revision for each class based on weaknesses							
	28	STATISTICS AND PROBABILITY - Tailored revision for each class based on weaknesses							
	29	GEOMETRY AND MEASURES - Tailored revision for each class based on weaknesses							
	30	PROBLEM QUESTIONS							
	31	EXAM PREPARATION/REVISION							
	32	PAPER 1 (Non-Calculator) - DATE TBA							
	33	PAPER 2 (Calculator) - DATE TBA							
	34	PAPER 3 (Calculator) - DATE TBA							
	NOTE: BASIC SKILLS AND KNOWLEDGE SHOULD BE REVIEWED AS APPROPRIATE FOR THE CLASS.								