

GCSE Grade Descriptors: Number (C to A*)

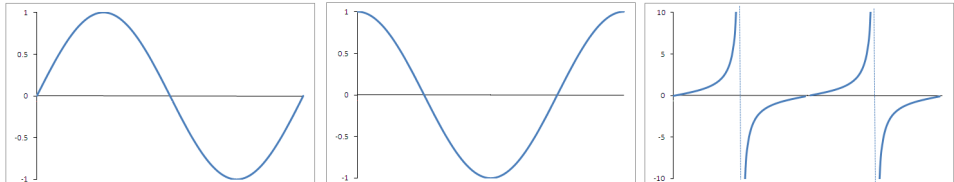
Grade	Skill	Understanding
C	Make estimates when solving problems by first rounding numbers to one significant figure then multiplying or dividing mentally. Eg: $\frac{37.8 \times 195.24}{2.1} \approx \frac{40 \times 200}{2} = \frac{8000}{2} = 4000$	
C	Understanding the effect of multiplying and dividing by numbers between 0 and 1. Eg: $7 \div 0.5 = 14 \quad \text{and} \quad 7 \times 0.2 = 1.4$	
C	Use a calculator effectively and appropriately to multiply or divide any number. Eg: $32883.223 \div 0.0036 = 9134228.611.. = 9134229.6 \text{ to } 1 \text{ d. p.}$	
C	Understand proportional change and use multiplicative methods to calculate this change. Eg: <i>5kg of wax costs £14. How much wax can be bought for £20?</i>	
B	Solve problems involving powers, roots and numbers in standard form. Eg: $\sqrt{25} - 2^3 = \quad \text{or} \quad 2.4 \times 10^8 + 1.6 \times 10^7 =$	
B	Use fractions or percentages to solve problems involving repeated proportional change. Eg: <i>A shirt in a 20% off sale is further reduced in price by half. How much will it cost if it was originally priced at £60?</i>	
B	Calculate the original amount after a proportional change. Eg: <i>A car is in a sale, marked as 35% off, and now costs only £1200. How much did it cost originally?</i>	
A/A*	Recognise and use rational and irrational numbers. Eg: $\sqrt{\frac{9}{16}} = \frac{3}{4} \quad \text{and} \quad 3\sqrt{20} + 4\sqrt{5} = 3(2\sqrt{5}) + 4\sqrt{5} = 10\sqrt{5}$	
A/A*	Determine the bounds of intervals. Eg: <i>Find the maximum possible area of a 3.4cm × 2.8cm rectangle, where measurements are correct to 1 d.p.</i>	
A/A*	Use direct and indirect proportion. Eg: <i>The velocity, V, of a falling stone is directly proportional to the square of the time, T. If it is travelling at 8mph after 3 seconds, find an expression for the velocity in terms of time, and the speed at T = 10.</i>	

GCSE Grade Descriptors: Algebra (C to A*)

Grade	Skill	Understanding
C	Find the nth term of a quadratic sequence. Eg: <i>Find the nth term of the sequence: 3, 9, 19, 33, 51, ...</i>	
C	Expand two sets of brackets, and simplify the answer. Eg: $(x + 2)(x + 3) = x^2 + 5x + 6$	
C	Understand and use the rules of indices. Eg: $x^a \times x^b = x^{a+b}$ and $(x^n)^m = x^{nm}$ and $x^p \div x^q = x^{p-q}$	
C	Solve simultaneous equations using algebraic and graphical methods. Eg: <i>Solve the simultaneous equations $y + x = 7$ and $2y + 3x = 17$. Draw the lines on a graph, and find the crossing point.</i>	
C	Solve simple inequalities algebraically. Eg: $3x \leq 15 - 2x$	
C	Draw line graphs to solve distance-time problems. Eg: <i>A car starts from Brighton and drives 40 miles north in 60 minutes. It is stationary for 3 hours, then returns to Brighton at 60mph. Display this information on a distance – time graph.</i>	
B	Evaluate algebraic formulae by substituting fractions, decimals and negative numbers. Eg: <i>Find the value of y when $x = -\frac{1}{3}$ in the formula: $y = 2x^2 - x$</i>	
B	Calculate the value of one variable given the others in a formula. Eg: <i>If $A = 200$ and $r = 4$, find h when $A = 2\pi r(r + h)$</i>	
B	Rearrange algebraic formulae, equations and expressions. Eg: <i>Make r the subject of this formula: $V = \frac{4}{3}\pi r^3$</i>	
B	Multiply two linear expressions. Eg: $(2x + 3)(3x - 4) = 6x^2 + x - 12$	
B	Factorise linear and quadratic expressions and be able to identify the difference of two squares. Eg: $x^2 + 4x - 5 = (x + 5)(x - 1)$ and $4x^2 - 25 = (2x + 5)(2x - 5)$	
B	Solve quadratic equations by factorising. Eg: $x^2 + 4x - 5 = 0 \Rightarrow (x + 5)(x - 1) = 0 \Rightarrow x = -5 \text{ or } x = 1$	
B	Solve linear inequalities in two variables graphically. Eg: <i>Draw $y = 2x$ and $y = -x + 4$ on a graph, then show the region satisfying: $y \geq 2x$ and $y < -x + 4$ for $x > 0$</i>	

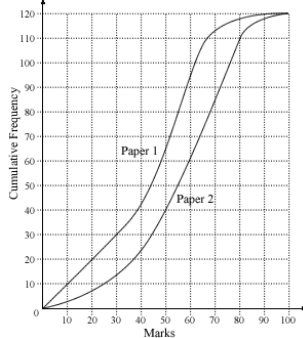
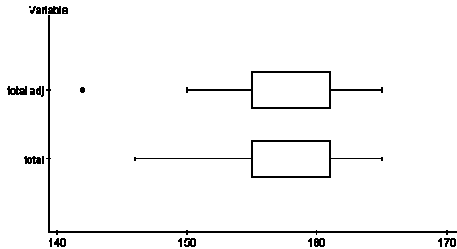
B	Solve a quadratic inequality algebraically. Eg: <i>Find the range of values of x which satisfy: $2x^2 + x > 3$</i>	
B	Understand straight line graphs. Eg: <i>$y = 3x - 4$ has gradient 3 and y - intercept -4</i>	
B	Sketch and interpret linear, quadratic, cubic and reciprocal graphs. Eg: <i>Draw the graph of $y = \frac{3}{x}$, including any asymptotes.</i>	
B	Sketch and interpret graphs that model real life situations. Eg: <i>Sketch a graph showing the level of water in a conical funnel over time.</i>	
A/A*	Simplify algebraic expressions using rules of indices for negative and fractional indices. Eg: $\frac{x^{\frac{5}{2}}}{\sqrt[3]{x^4}} = x^{\frac{7}{6}}$	
A/A*	Find formulae that connect data, and express general laws algebraically. Eg: <i>Prove that the sum of any two consecutive integers is even</i> $n + (n + 1) = 2n + 1$	
A/A*	Solve simultaneous equations in two variables where one is linear and the other quadratic. Eg: <i>Find values of x and y which satisfy: $y = x^2 + 3x - 4$ and $y = 2x - 3$</i>	
A/A*	Solve problems using intersections and gradients of graphs. Eg: <i>Find a line parallel to $y = -2x + 5$ passing through the point $(3, -7)$</i>	

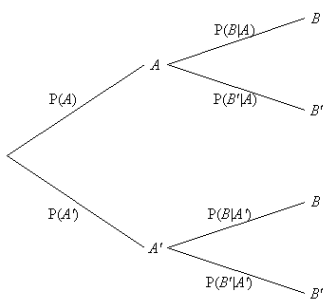
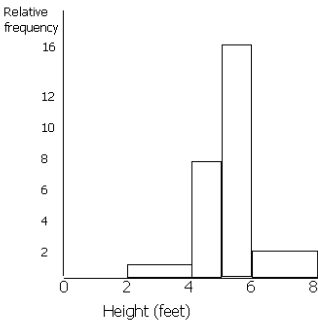
GCSE Grade Descriptors: Shape, Space and Measures (C to A*)

Grade	Skill	Understanding
C	Use Pythagoras' theorem. Eg: <i>The two shortest sides of a right – angled triangle are 5m and 12m. Find the length of the longest side.</i>	
C	Calculate lengths, areas and volumes in plane shapes and prisms. Eg: <i>Find the volume of a cylinder with diameter 10cm and height 20cm.</i>	
C	Enlarge shapes by a fractional scale factor. Understand the similarity of the resulting shapes. Eg: <i>A triangle has vertices at (0,2), (5,4) and (7,1). Enlarge this shape by scale factor $\frac{1}{3}$ with centre of enlargement (0,0).</i>	
C	Determine the locus of an object moving according to a rule. Eg: <i>Draw the locus of points within 5cm of (7,5) and exactly 3cm from (6,6).</i>	
C	Find the upper and lower bounds of a measurement and recognise that it may be inaccurate by up to one half of its stated accuracy in either direction. Eg: <i>A table is measured to be 73.5cm high, to the nearest 0.1cm. State the upper and lower bounds of this measurement.</i>	
C	Understand and use compound measures such as speed. Eg: <i>Find the speed of a car, in mph, which travels 18 miles in 12 minutes.</i>	
B	Understand and use congruence and mathematical similarity in 2D and 3D. Eg: <i>Two similar cones have volumes of 200cm^3 and 350cm^3 respectively. The smaller cone has a surface area of 150cm^2. Find the surface area of the larger cone.</i>	
B	Use sine, cosine and tangent in right-angled triangles. Eg: <i>The height of a telegraph pole is 15m. A ladder is placed against it. The ladder has a length of 22m. If it exactly reaches the top of the pole, what angle will the ladder make with the pole?</i>	
B	Distinguish between formulae for perimeter, area and volume by considering dimensions. Eg: <i>Which of these is an expression for area: $2\pi x^2 y$ $\frac{3h^3}{x}$ $\frac{7l}{5}$ $2k^2 + 3m$</i>	
A/A*	Sketch and interpret the graphs of sine, cosine and tangent functions for any angle. Eg: 	

A/A*	Use sine, cosine and tangent of angles of any size when solving 2D and 3D problems. Eg: <i>Find the angle made with the horizontal when a wire is stretched between opposite corners of a cuboidal room measuring $3 \times 4 \times 8$ metres.</i>	
A/A*	Use Pythagoras' theorem when solving 2D and 3D problems. Eg: <i>Calculate the length of this wire.</i>	
A/A*	Use the conditions for congruent triangles in formal geometric proofs. Eg: <i>Prove that the angle between two tangents is equal to $180^\circ - x$ where x is the angle made by the connected radii at the centre of the circle.</i>	
A/A*	Calculate the lengths of circular arcs and areas of sectors. Eg: <i>Find the perimeter and area of a 30° sector of a circle with radius 5m.</i>	
A/A*	Calculate the surface area of cylinders and volumes of cones and spheres. Eg: <i>Find the surface area and volume of a cone with radius 5cm and vertical height 10cm.</i>	
A/A*	Appreciate the continuous nature of scales that are used to make measurements. Eg: <i>Any two measurements can be bisected to find a measurement in between</i>	

GCSE Grade Descriptors: Handling Data (C to A*)

Grade	Skill	Understanding								
C	<p>Write and test hypotheses using appropriate statistics.</p> <p>Eg: <i>A company carries out a survey to determine the number of men and women who smoke. Make a prediction, and explain the method you will use to test it.</i></p>									
C	<p>Calculate mode, median, mean and range from grouped data.</p> <p>Eg:</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th style="text-align: center;">Age (years)</th> <th style="text-align: center;">Frequency</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">12</td> </tr> <tr> <td style="text-align: center;">11</td> <td style="text-align: center;">16</td> </tr> <tr> <td style="text-align: center;">12</td> <td style="text-align: center;">8</td> </tr> </tbody> </table> <p style="display: inline-block; vertical-align: middle; margin-left: 20px;"><i>Write down the modal age, the median age and the mean from this frequency table.</i></p>	Age (years)	Frequency	10	12	11	16	12	8	
Age (years)	Frequency									
10	12									
11	16									
12	8									
C	<p>Compare distributions by using frequency polygons, averages and range.</p> <p>Eg: <i>Girls have a higher mean average than boys, but there is also a greater range with girls' scores, so boys were more consistent.</i></p>									
C	<p>Draw a line of best fit on a scatter diagram.</p> <p>Eg: <i>Constructing a straight line passing through the mean point with an equal number of points on either side.</i></p>									
C	<p>Understand and use relative frequency as an estimate of probability.</p> <p>Eg: <i>A spinner is spun 600 times and the number 4 has appeared a total of 50 times. Calculate an estimate for the probability of getting a 4.</i></p>									
B	<p>Draw and interpret cumulative frequency curves.</p> <p>Eg:</p> <div style="display: flex; align-items: center; justify-content: space-around;">  <div style="text-align: center;"> <p><i>Calculate the median and the interquartile range for both distributions, and hence compare them.</i></p> </div> </div>									
B	<p>Find median and interquartile range. Use these to compare distributions including the use of box plots.</p> <p>Eg:</p> <div style="display: flex; align-items: center; justify-content: space-around;">  <div style="text-align: center;"> <p><i>Compare these two distributions, making reference to both the medians and the interquartile range.</i></p> </div> </div>									
B	<p>Calculate the probability of two or more events happening including using a tree diagram.</p>									

	<p>Eg:</p>  <p><i>Find the probability of tossing a head then a tail when tossing a coin twice in a row.</i></p>	
A/A*	<p>Draw and interpret histograms.</p> <p>Eg:</p> 	
A/A*	<p>Understand different sampling methods, including stratified random sampling.</p> <p>Eg:</p> <p><i>Give details of two methods of choosing a fair sample. If a population contains 300 girls and 250 boys, how many of each should be chosen for a stratified random sample of 50?</i></p>	
A/A*	<p>Understand when and how to use conditional probability.</p> <p>Eg:</p> <p><i>What is the chance of being dealt an Ace given that 7 cards have been dealt out already and only one of them was an Ace?</i></p>	