

Whole Numbers and Integers

Skill	Achieved ?
Multiply two 2-digit whole numbers without a calculator	
Know the meaning of <i>square number</i>	
Add and subtract two integers without a calculator	
Multiply an integer by a single digit whole number	
Divide 2 whole numbers (which do not divide exactly) without a calculator, writing the answer as a decimal to a specified number of decimal places	

Angles and Bearings

Skill	Achieved ?
Know that <i>parallel lines</i> are ones that never meet	
Know that a <i>transversal</i> is a line that crosses 2 or more lines at different points	
Know that <i>corresponding angles</i> (aka <i>F-angles</i>) are formed when a transversal crosses a pair of parallel lines	
Know that corresponding angles are equal	
Know that <i>alternate angles</i> (aka <i>Z-angles</i>) are formed when a transversal crosses a pair of parallel lines	
Know that alternate angles are equal	
Know that <i>vertically opposite angles</i> (aka <i>X-angles</i>) are formed when two straight lines cross each other	
Know that vertically opposite angles are equal	
Know that the 3 angles in any triangle add up to 180°	
Find a missing angle in a triangle when told the other 2 angles	
Find missing angles in various geometric figures, especially quadrilaterals	
Measure the bearing of one point from another	
Plot a point given the bearing and distance from another point	
Plot points B and C given the bearing and distance of B from A and C from B	
Plot point C given the bearing and distance from 2 points A and B	
Know the bearings of the 4 intercardinal compass directions, i.e. NE (045 °), SE (135 °), SW (225 °) and NW (315 °)	

Fractions, Percentages and Decimals

Skill	Achieved ?
Work out fractions of a whole number without a calculator	
Know that a <i>proper fraction</i> is one where the numerator is smaller than the denominator	
Know that an <i>improper fraction</i> (aka <i>top-heavy</i>) is one where the numerator is bigger than the denominator	
Know that a <i>mixed number</i> is a whole number plus a proper fraction	
Change a mixed number into an improper fraction	
Change an improper fraction into a mixed number	
Know that <i>equivalent fractions</i> are ones that are the same	
Simplify fractions and write fractions in <i>simplest form</i>	
Add and subtract fractions with the same denominator	
Add and subtract fractions with different denominators	
Multiply fractions	
Change simple percentages to fractions, for instance: $70\% = \frac{70}{100} = \frac{7}{10}$	
Work out commonly used percentages (such as 60 %, 5 %) of a whole number or decimal without a calculator	
Work out other percentages with a calculator	
Work out one number as a percentage of another with a calculator	
Given a number that represents a simple percentage (smaller than 100 %, for example 60 %), work out 100 %	
Change simple fractions and percentages to decimals	
Round decimals to a certain number of decimal places	
Add and subtract decimals (up to 3 d.p.)	
Multiply and divide a decimal (up to 3 d.p.) by a single digit whole number	
Multiply and divide a decimal (up to 3 d.p.) by a multiple of 10, 100 or 1 000	
Divide two small whole numbers without a calculator, giving the answer to a certain number of decimal places	

Indices and Scientific Notation

Skill	Achieved ?
Know that an <i>index</i> (plural: <i>indices</i>) is a power	
Know that a^n means $a \times a \times a \times \dots \times a$ (n times), for example: $2^3 = 2 \times 2 \times 2 = 8$	
Write numbers in <i>scientific notation</i> (aka <i>standard form</i>), $a \times 10^n$ where a is a whole or decimal number between 1 and 10 (1 is included, but 10 is not) and n is an integer	
Know that a number strictly between 0 and 1 has $n < 0$	
Know that a number strictly bigger than 10 has $n > 0$	
Know that a number between 1 and 10 has $n = 0$	
Given a number that is written in standard form, write it in full, for example: $6 \cdot 538 \times 10^3 = 6538$ $8 \cdot 4 \times 10^{-2} = 0.084$ $9 \times 10^0 = 9$	
Given a number that is written in full, write it in standard form, for example: $7402 = 7 \cdot 402 \times 10^3$ $0 \cdot 095 = 9 \cdot 5 \times 10^{-2}$ $3 = 3 \times 10^0$	

Length and Perimeter

Skill	Achieved ?
Calculate the perimeter of a composite shape made up of rectangles and triangles	
Calculate the perimeter of a composite shape involving semicircles	

The Straight Line

Skill	Achieved ?
Know that a straight line has a slope which is measured by the gradient	
Calculate the gradient of a line given the vertical height v and the horizontal distance h using the equation: $m = \frac{v}{h}$	
Calculate the gradient of a straight line given two points (x_1, y_1) and (x_2, y_2) on the line using the gradient formula : $m = \frac{y_2 - y_1}{x_2 - x_1}$	
Know that the equation of a straight line with gradient m and y - intercept c is: $y = mx + c$	
Given the equation of a straight line, make a table of values and draw the graph of the line	

Factorisation

Skill	Achieved ?
Know the meaning of factorise	
Factorise expressions such as: $6y + 15$ $7x - 21$	
Know the meaning of factorise fully	
Factorise fully expressions such as: $4p + 12$ $18x - 12y$ $18 + 12t$	

Similar Shapes

Skill	Achieved ?
Know that shapes are similar if the ratios of all corresponding sides are the same	
<p>Know that the length scale factor (LSF) k measures ratios of corresponding sides and is calculated using the equation,</p> $k = \frac{\text{length}_1}{\text{length}_2}$ <p>where length_1 is the length of one side in the shape which has a missing side and length_2 is the length of the corresponding side in the other shape</p>	
Know that if one shape is an enlargement of another, then $k > 1$ and that if one shape is a reduction of another, then $k < 1$	
Know that 2 shapes are congruent if $k = 1$	
Given 2 similar shapes, use the scale factor to work out a missing length, or a side in a rectangle	
Given 2 similar right-angled triangles, use the scale factor to calculate a missing length	

Pythagoras' Theorem

Skill	Achieved ?
Know that in a right-angled triangle the side opposite the right angle is called the hypotenuse	
Know that the hypotenuse is the longest side	
<p>Know the Theorem of Pythagoras (aka Pythagoras' Theorem), namely, that in a right-angled triangle, the square of the hypotenuse c equals the sum of the squares of the other 2 sides a and b, i.e.:</p> $c^2 = a^2 + b^2$	
Use Pythagoras' Theorem to calculate the hypotenuse when told the shorter sides	
Use Pythagoras' Theorem to calculate a shorter side when told the hypotenuse and a shorter side	

Ratio, Proportion and Variation

Skill	Achieved ?
Know that a ratio is a way of dividing up something into 2 or more segments, each segment being made up of equal parts	
Know that a ratio of a to b (written $a : b$) means that for each amount of a there is an amount b (and that the total number of parts = $a + b$); for example, a ratio of 2 boys to 3 girls means that for every 2 boys, there are 3 girls ($2 : 3$)	
Know that a ratio of $a : b$ does not equal a ratio of $b : a$, unless $a = b$	
Know that a ratio of $1 : 1$ means equal parts	
Know what it means to simplify a ratio	
Simplify ratios such as, $2 : 4$, $17 : 51$, $35 : 25$ and $200 : 350$	
Work out problems involving ratios by considering the total number of parts	
Work out problems involving proportion by multiplying or dividing the relevant whole numbers	
Know that direct variation occurs when two quantities increase at the same rate	
Know that a graph of direct proportion is a straight line passing through the origin	
<p>Know that if two quantities x and y are in direct proportion, then we say that x varies directly with (as) y and write,</p> $x \propto y$ <p>and that an equivalent way of writing this is,</p> $x = ky$ <p>where k is the proportionality constant (aka constant of proportionality)</p>	
Solve direct proportion problems using the constant of proportionality, such as, if the cost of a carpet varies directly as its length and a 5 metre long carpet costs £ 340 (i) how much will a carpet of 8 metres cost (ii) how long is a carpet which costs £238 ?	
Know that inverse proportion (aka inverse variation) occurs when one quantity decreases at the same rate as another quantity increases	

Coordinates

Skill	Achieved ?
Know that a coordinate grid can be divided into 4 quadrants	
Plot coordinates in all four quadrants	
Given 3 points on a coordinate grid, plot another point to complete a quadrilateral	
Given 2 points on a coordinate grid, plot 2 other points to complete a quadrilateral	
Given the area of a quadrilateral and 1 or 2 vertices as coordinates, plot a coordinate (or 2) to complete the quadrilateral	

Symmetry

Skill	Achieved ?
Know that rotational symmetry is a type of symmetry which leaves a shape unchanged after turning it through some angle	
Know that a shape has half-turn symmetry if it looks the same after rotating it by 180°	
Complete a shape on squared paper so that it has half-turn symmetry	
Know that a shape has quarter-turn symmetry if it looks the same after rotating it by 90°	
Complete a shape on squared paper so that it has quarter-turn symmetry	

Speed, Distance and Time

Skill	Achieved ?
Change minutes to hours	
Change hours to minutes	
Calculate time differences over midnight	
Given distance and time, work out speed using the equation: $S = \frac{D}{T}$	
Given distance and speed, work out time using the equation: $T = \frac{D}{S}$	
Interpret and use distance-time graphs	

Money

Skill	Achieved ?
Know the meaning of <i>time-and-a-half</i>	
Solve problems involving basic rate, overtime, number of normal working hours and number of overtime hours	
Calculate the <i>(simple) interest</i> over a certain number of months	
Calculate <i>percentage profit</i> using the equation: $\text{Percentage profit} = \frac{s - b}{b} \times 100\%$ where $s = \text{selling price}$ and $b = \text{buying price}$	
Calculate <i>percentage loss</i> using the equation: $\text{Percentage loss} = \frac{b - s}{b} \times 100\%$ where $s = \text{selling price}$ and $b = \text{buying price}$	
Given the hire purchase price, deposit and number of instalments, work out the cost of each instalment in a hire purchase agreement	
Given the hire purchase price, deposit and cost of each instalment, work out the number of instalments in a hire purchase agreement	
Given the hire purchase price, number of instalments and cost of each instalment, work out the deposit in a hire purchase agreement	
Know the meaning of <i>exchange rate</i>	
Change money from one currency to another using an exchange rate	
Complete an electricity bill knowing how many units of electricity are used	

Patterns and Sequences

Skill	Achieved ?
Given a picture pattern, work out (from a table) a formula for the number of items in the n^{th} picture	
Given the n^{th} picture in a pattern, use the <i>n^{th} term formula</i> to calculate the number of items in that picture	
Given the number of items in the n^{th} picture in a pattern, use the <i>n^{th} term formula</i> to calculate the value of n	

Algebraic Expressions

Skill	Achieved ?
Know that an algebraic expression is a combination of numbers and letters with brackets, multiplication, division, addition or subtraction and possibly indices	
Multiply simple expressions such as: $2 \times 3b = 6b$	
Know what it means to collect like terms	
Expand brackets (aka break brackets) where there is a number outside the brackets, for example: $2(x + 5) = 2x + 10$ $3(a - 7) = 3a - 21$ $7(2x - 3y) = 14x - 21y$	
Expand brackets and collect like terms	

Geometry of the Circle

Skill	Achieved ?
Know that the circumference of a circle with radius r is the perimeter and calculated using the equation: $C = 2\pi r$	
Know that a tangent to a circle is a straight line that touches the circle exactly once	
Know that a tangent to a circle is at 90° to a radius which meets the tangent at a common point	
Know that a line drawn at 90° to the radius' endpoint P is tangent to the circle at P	
Know that a line drawn at 90° to a circle's tangent (at the point of contact) passes through the centre of the circle	
Know that any triangle inside a semi-circle, with one side the same as the surrounding circle's diameter (and opposite vertex on the circle), has a right angle opposite that side	
Know that a triangle in a circle, with one vertex coinciding with the circle's centre and the other 2 vertices on the edge of the circle, is isosceles	

Solving Equations and Inequations

Skill	Achieved ?
Know that an equation describes things that are the same by the equality symbol , and that solving an equation is achieved by changing each side of the equation in the same way to eventually get the solution (aka unknown)	
Know that RHS stands for Right Hand Side and LHS stands for Left Hand Side	
Know the meaning of solve algebraically	
Solve algebraically simple equations (that have positive solutions) such as: $x + 2 = 7$ $2x = 5$	
Solve algebraically equations where the unknown is on both sides or where the equation has brackets such as: $3x - 5 = x + 11$ $4(3x + 2) = 68$ $5m - 3 = 37 + m$	
Know that an inequation describes things that are not necessarily the same using inequality symbols , and solve an inequation	
Know the meanings of the 4 inequality symbols: $<$ - less than $>$ - greater than \leq - less than or equal to \geq - greater than or equal to	
Solve simple inequations such as: $2x < 7$ $2x + 1 \geq 10$	

3D Shapes

Skill	Achieved ?
Know that a prism is a shape with a flat side (base) that is projected along a direction of 90° to the base	
Recognise and name a triangular prism (prism with a triangle as base)	

Trigonometry

Skill	Achieved ?
Know that in a right-angled triangle, the side opposite a marked angle is called the opposite side <i>O</i> , the side opposite the right angle is the hypotenuse <i>H</i> , and the remaining side is the adjacent side <i>A</i>	
Know that the 3 basic trigonometric ratios are sine , cosine and tangent and that they are calculated using a right-angled triangle: $\sin x^\circ = \frac{O}{H}$ $\cos x^\circ = \frac{A}{H}$ $\tan x^\circ = \frac{O}{A}$	
Know the mnemonic SOH CAH TOA for remembering the trigonometric ratios	
Know how to use the mnemonic SOH CAH TOA	
Know how to use the trigonometric buttons on your calculator	
Given 1 angle and the hypotenuse in a right-angled triangle, calculate the opposite side using sine	
Given 1 angle and the hypotenuse in a right-angled triangle, calculate the adjacent side using cosine	
Given 1 angle and the adjacent side in a right-angled triangle, calculate the opposite side using tangent	
Given the opposite and hypotenuse sides in a right-angled triangle, calculate the angle between these 2 sides using sine	
Given the adjacent side and hypotenuse in a right-angled triangle, calculate the angle between these 2 sides using cosine	
Given the opposite and adjacent sides in a right-angled triangle, calculate the angle between these 2 sides using tangent	
Solve trigonometric problems in context	

Areas and Volumes

Skill	Achieved ?
Given the area of a square, work out the length of a side	
Work out the area A of any triangle with base b and height h using the equation: $A = \frac{1}{2} bh$	
Work out the area A of a kite or rhombus with diagonal lengths c and d using the equation: $A = \frac{1}{2} cd$	
Work out the area A of a parallelogram when told the base B and height H using the equation: $A = B \times H$	
Work out the area of a circle using the equation: $A = \pi r^2$	
Know that a composite shape is one made up of simple shapes such as squares, rectangles, triangles and semi-circles	
Work out the area of a composite shape	
Know that the surface area of a 3D shape is the total area of all sides of the shape	
Work out the surface area of a cube and cuboid	
Work out the surface area of a triangular prism	
Work out the curved surface area A of a cylinder using the equation: $A = 2\pi rh$	
Given the curved surface area and radius of a cylinder, work out the height	
Given the curved surface area and height of a cylinder, work out the radius	
Work out the volume of a cylinder	
Given the volume of a cuboid and 2 lengths (or base area), work out the remaining side	
Calculate how many small identical cuboids can fit inside a larger cuboid when the volumes of each cuboid are known	
Calculate the volume of a prism given the base area and length	

Statistics and Probability

Skill	Achieved ?
Know that a data set is a list of things (usually numbers)	
Know that the median of a data set is the middle number when the list is arranged from lowest to highest; in the case of 2 numbers in the middle, the average of these is taken to find the median	
Calculate the median of a given data set	
Calculate the mean of a data set that has 0 and negative numbers	
Calculate the range of a data set using the equation: $\text{Range} = \text{Highest number} - \text{Lowest number}$	
Compare the mean of 2 data sets	
Compare individual data points with the mean or mode	
Calculate the median, mean and range from a frequency table	
Know what a stem-and-leaf diagram is and draw one	
Know what an ordered stem-and-leaf diagram is and draw one	
Interpret information in a stem-and-leaf diagram	
Work out the median and range from an ordered stem-and-leaf-diagram	
Know what a best-fitting straight line is and draw one on a scattergraph	
Use a best-fitting straight line to estimate the value of one variable when told the value of the other variable	
Know the meaning of positive correlation, negative correlation and no correlation in a scattergraph	
Know that probability measures the likelihood (the 'chances') of something (event or outcome) happening	
Know that probability is calculated using the equation: $\text{Probability} = \frac{f}{t}$ where $f = \text{number of favourable outcomes}$ and $t = \text{total number of outcomes}$	
Know that probability can be expressed in any of the following forms: fraction decimal percentage	

Know that probability expressed as a fraction always has the numerator less than or equal to the denominator	
Know that probability expressed as a decimal always has a value between 0 and 1 (including both these values)	
Know that probability expressed as a percentage has a value between 0 % and 100 % (including both these values)	
Know that a probability of 0 (or 0 %) means no chance of a given event occurring	
Know that a probability close to 0 (or 0 %) means (very) unlikely to happen	
Know that a probability of 1 (or 100 %) means certainty	
Know that a probability close to 1 (or 100 %) means (very) likely to happen	
Calculate the probability of simple events (such as obtaining a 5 from rolling a fair 6-sided die numbered from 1 to 6), leaving the answer as a fraction	
Calculate the probability of a value occurring in a frequency table, leaving the answer as a fraction	

2D Shapes

Skill	Achieved ?
Know that an isosceles triangle is one that has 2 sides the same length and the remaining side different (equivalently, 2 angles the same and the remaining angle different)	
Know that an equilateral triangle has all sides the same length (equivalently, 3 angles the same)	
Reflect a quadrilateral on a coordinate grid in the x -axis or y -axis	
Know that a parallelogram is a quadrilateral with (i) 2 pairs of parallel sides (different length) (ii) 2 equal, opposite, acute and 2 equal, opposite, obtuse angles (iii) 2 diagonals that bisect each other (iv) half-turn symmetry, but no lines of symmetry	
Know that a rhombus is a quadrilateral with (i) 2 pairs of parallel lines (all 4 lines have the same length) (ii) 2 equal, opposite, acute and 2 equal, opposite, obtuse angles (iii) 2 diagonals (different length) that bisect each other at 90° (iv) 2 lines of symmetry	
Know that a kite is a quadrilateral with (i) 2 pairs of equal sides (each pair a different length), with none parallel (ii) 2 equal opposite angles (iii) 2 diagonals that bisect each other at 90° (iv) 1 line of symmetry	
Draw an irregular quadrilateral given 3 sides and the 2 angles made by these sides	