



Year 10–11 Learning Checklist

Name _____

1 Number

I know:

- How to do long multiplication and long division with and without a calculator.
- How to work out equivalent fractions.
- How to find a fraction of a quantity.
- How to add, subtract, multiply and divide with fractions.
- How to add, subtract, multiply and divide with negative numbers.
- How to round off to the nearest ten, hundred, thousand.
- How to round off to significant figures and to decimal places.
- How to approximate the value of a calculation.



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2 Fractions

I know how to:

- Calculate a percentage of a given amount.
- Express one quantity as a percentage of another.
- Increase or decrease a given amount by a certain percentage.
- Calculate the original amount when a certain percentage of it is known.
- Calculate compound interest on a given amount.



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3 Ratio

I know:

- How to divide any amount in a given ratio.
- The relationships between speed, time and distance.
- That density is a rate. It is the mass of a substance per unit volume – usually expressed in grams/cm^3 .



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4 Shape

I know that the:

- Area of a rectangle is $\text{Length} \times \text{Breadth}$.
- Area of a triangle is $\frac{1}{2} \times \text{Base length} \times \text{Vertical height}$.
- Circumference of a circle is $\pi \times D$, where D is the diameter.
- Area of a circle is $\pi \times r^2$, where r is the radius.
- Area of a trapezium is $\text{Vertical height } (h) \times \text{mean of the lengths of the two parallel sides}$.



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5 Volume and Surface Area

I know that:

- The volume of a cuboid is $\text{Length} \times \text{Breadth} \times \text{Height}$.
- The volume of a prism is $\text{Cross-sectional area} \times \text{Length}$.
- The volume of a cylinder is $\pi \times r^2 \times h$, where r is the radius of the cylinder and h is its height or length.



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6 Algebra 1

I know how to:

- Read and write simple algebraic expressions.
- Substitute fractional and negative values into expressions and formulae and evaluate them.
- Solve simple linear equations, including those containing brackets.
- Solve equations by trial and improvement.



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7 Geometry

I know:

- That vertically opposite angles are equal.
- That the sum of the angles on a straight line is 180° .
- That the sum of angles around a point is 360° .
- That the sum of the three interior angles of a triangle is 180° .
- That a line which intersects parallel lines is called a transversal and the two sets of equal angles thus formed are called respectively alternate angles and corresponding angles.
- How to find the sum of the interior angles of a polygon.
- How to find the exterior angle of a regular polygon.
- The properties of equilateral and isosceles triangles, trapeziums, parallelograms, rhombuses, and kites.



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8 Transformation Geometry

I know:

- The four conditions for two triangles to be congruent.
- What is meant by the terms ‘translation’, ‘reflection’, ‘rotation’ and ‘enlargement’.
- How to change shapes using translations, reflections, rotations and enlargements.



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9 Constructions

I know:

- What bearings are and how to calculate back bearings.
- The three ways of constructing a triangle: two sides and the included angle known; two angles and a side known; all three sides known.
- How to construct a line bisector and an angle bisector.
- How to construct angles of 90° and 60° .



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10 Shape and Symmetry

I know:

- How to recognise and draw the lines of symmetry of plane 2-D shapes.
- How to recognise whether a plane shape has rotational symmetry, and how to find its order of rotational symmetry.
- How to draw 2-D representations of 3-D shapes on square grids and isometric grids.
- How to draw nets of certain common 3-D shapes.
- What tessellations are and how to construct them.
- How to recognise the planes and axes of symmetry of 3-D shapes.



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11 Properties of Number, Indices and Standard Form

I know how to:

- Express a number in its prime factors.
- Divide and multiply by powers of 10.
- Calculate the value of a number raised to any power.
- Multiply and divide powers of the same number.
- Write large and small numbers in standard form and compare their sizes.
- Solve problems using numbers in standard form.



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12 Algebra 2

I know how to solve:

- Pairs of simultaneous equations.
- Linear inequalities and represent their solutions on the number line.
- Inequalities of the types $x^2 < a^2$ and $x^2 > a^2$



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13 Statistics 1

I know how to:

- Find the three averages – mode, median, mean.
- Construct and interpret frequency tables, and find the three averages from frequency tables of both grouped and ungrouped data.
- Recognise the difference between discrete data and continuous data.
- Read and create frequency polygons, bar charts and histograms.
- Read and create pie charts.
- Create a data collection sheet
- Create a questionnaire to test a hypothesis.



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14 Algebra 3

I know how to:

- Expand and simplify expressions containing brackets.
- Factorise an expression into one or two brackets.
- Expand and factorise simple quadratic expressions.
- Solve quadratic equation by factorising.
- Transpose a formula to change its subject.



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15 Graphs 1

I know:

- How to use conversion graphs.
- How to draw and interpret distance–time graphs.
- How to find the gradient of a straight-line graph.
- The relevance of the gradient of a straight-line graph.
- How to find the rule or equation represented by a straight-line graph.



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16 Similarity

I know how to:

- Work out the scale factor between two similar shapes.
- Work out the unknown side in a shape when the corresponding side of a similar shape is known.
- Solve practical problems using similar shapes.



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17 Pythagoras

I know:

- Pythagoras's theorem.
- How to show that I know when to use Pythagoras's theorem.
- How to use Pythagoras's theorem to find the hypotenuse or a short side of a right-angled triangle, given the other two sides.
- How to solve a Pythagoras-type problem without the help of a calculator.
- How to draw out a right-angled triangle from a problem and label it with necessary information.



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18 Trigonometry

I know:

- The three basic trigonometric ratios of a right-angled triangle:
 $\sin x = \frac{O}{H}$, $\cos x = \frac{A}{H}$, $\tan x = \frac{O}{A}$.
- Given one side and one angle (other than the right angle), how to calculate the other two sides of a right-angled triangle.
- Given two sides, how to calculate the two angles (other than the right angle) of a right-angled triangle.
- How to interpret a practical situation to obtain a right-angled triangle which can be used to solve the problem: examples involve angles of elevation and depression, bearings and distances, and isosceles triangles.



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19 Units

I know how to:

- Convert from one metric unit to another.
- Convert from one imperial unit to another.
- Convert between metric and imperial units.
- Use exchange rates in dealing with foreign currencies.
- Compare the prices of products to find the ‘best buys’.



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20 Loci and Angles in a Circle

I know:

- What is meant by a locus.
- How to draw a locus round a point, a line or a plane shape.
- How to draw a locus that depends on the bisecting of lines or angles or both.
- How to recognise when a locus is being asked for.
- That an angle at the centre of a circle is twice any angle at the circumference subtended by the same arc.
- That every angle at the circumference of a semicircle that is subtended by the diameter of the semicircle is a right angle.
- That angles at the circumference in the same segment of a circle are equal.
- That the sum of the opposite angles of a cyclic quadrilateral is 180° .
- That a tangent is a straight line that touches a circle at one point only, which is called the point of contact.
- That a tangent is perpendicular to the radius at the point of contact.



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21 Graphs 2

I know how to:

- Find coordinates using flow diagrams, substitution of values, gradients and intercepts, and how to use these coordinates to draw graphs.
- Find the equation of a straight line from its graph.
- Draw the graphs of linear functions.
- Solve two simultaneous linear equations using their graphs.
- Represent a linear inequality on a graph.



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22 Statistics 2

I know:

- How to plot points on a scatter diagram.
- What correlation means and how to distinguish between positive and negative correlations.
- How to recognise positive and negative correlation when looking at scatter diagrams, and also the condition of no correlation.
- How to draw an accurate line of best fit on a scatter diagram, and use it to predict.
- How to calculate moving averages and plot them on a graph.
- How to construct cumulative frequency diagrams.
- How to find from a cumulative frequency diagram the median, the lower and upper quartiles and the interquartile range.
- How to draw and interpret box plots.



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23 Probability

I know:

- How to put events in order of likelihood.
- How approximately to place events on the probability scale from 0 to 1.
- How to calculate the experimental probability of an event from data supplied.
- How to calculate the theoretical probability of an event from consideration of all outcomes of the event.
- That as the number of trials of an event increases, the experimental probability of the event gets closer to its theoretical probability.
- How to work out the probability of mutually exclusive and exhaustive events.
- How to use a probability diagram, such as a tree diagram, to calculate the probability of combined events.
- How to use AND and OR to solve combined events problems.



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24 Sequences

I know how to:

- Recognise a number pattern and explain how the pattern is made.
- Recognise a linear sequence and find its n th term.
- Form general rules from given number patterns.
- Recognise when a sequence is not linear and therefore look for a quadratic rule.
- Recognise when a sequence is based on n^2 alone.
- Recognise when a sequence is not based on n^2 alone and therefore look for a more complicated quadratic rule.



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25 Graphs 3

I know how to:

- Draw a quadratic graph from its equation, using values of its coordinates between given limits.
- Draw graphs of reciprocal equations and cubic equations, using values of their coordinates between given limits.
- Solve quadratic and cubic equations using their graphs.
- Identify quadratic, cubic, and reciprocal graphs.



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26 Dimensional Analysis

I can:

- Recognise whether a formula represents length, area or volume.
- Recognise when a formula is not consistent and state the reasons why.



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27 Proof

I know:

- The difference between numerical verification of a result and proving it.
- The meaning of the terms ‘verify that’, ‘show that’ and ‘prove that’.
- How to prove some standard results in mathematics, such as Pythagoras’s theorem.
- How to use my knowledge of proof to answer the questions throughout the book that are flagged with the proof icon.