

## Year 8 End of Year Exams Revision List

All students will be expected to be confident with the appropriate year 7 learning objectives as follows

Target 1-3 must be confident with year 7 target 1-3

Target 2-4 must be confident with year 7 target 1-3

Target 3-5 must be confident with year 7 target 2-4

Target 4-6 must be confident with year 7 target 3-5

### **Target 1-3**

#### Number

- To be able to use simple fractions that are several parts of a whole
- To understand when two simple fractions are equivalent
- To be able to solve whole number problems including multiplication and division that may give rise to remainders
- To be able to recognise and use unit fractions ( $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{10}$ ) & to understand how to use them to find fractions of shapes and numbers
- To be able to use diagrams to compare 2 or more simple fractions
- To be able to interchange decimal notation for tenths and hundredths
- To be able to add and subtract whole numbers and decimals using column method
- To be able to multiply a 3-digit number by a 1-digit number using a written method
- To be able to begin to understand simple ratio
- To be able to recognise approximate proportions of a whole and use simple fractions and percentages to describe these
- To be able to use a range of mental methods of computation with all operations
- To know how to use efficient written methods of addition, subtraction, multiplication and division
- To understand how to multiply a simple decimal by a single digit
- To be able to solve problems with or without a calculator
- To understand how to check the reasonableness of results with reference to the context or size of numbers
- To be able to add and subtract decimals using column method
- To be able to solve simple problems involving ratio and proportion

- To be able to use and interpret maps and scale drawing
- To be able to use knowledge of equivalent fractions and/or convert to decimals in order to compare or order fractions
- To be able to calculate equivalent simple fractions and decimals e.g.  $0.2 = \frac{2}{10}$
- To be able to order a set of fractions and mixed numbers and show where they would be on a number line
- To know that percentage is parts per hundred and be able to find simple percentages of small whole numbers in real life contexts
- To understand and be able to use the equivalence between fractions and order fractions and decimals
- To know how to reduce a fraction to its simplest form by cancelling common factors
- To understand simple ratio
- To be able to solve simple problems involving ratio and proportion
- To be able to use known facts, place value, knowledge of operations and brackets to calculate using all four operations with decimals to 2dp
- To know how to use a calculator where appropriate to calculate fractions and percentages of quantities and measurements
- To be able to multiply and divide whole numbers simple decimals using written methods
- To understand how to apply inverse operations and approximate to check answers to problems are of the correct order of magnitude
- To be able to simplify fractions
- To be able to add and subtract fractions with common denominators & be able to use this in simple real life problem solving situations
- To be able to order fractions, decimals and percentages by finding their equivalence
- To be able to calculate simple fractions of amounts and measurements
- To be able to find a percentage of a quantity using a multiplier
- To be able to express a given number as a percentage of another
- To be able to calculate any percentage e.g. 17.5% by finding 10%, 5% and 2.5%
- To be able to multiply and divide all decimals
- To be able to use proportional reasoning to solve a problem
- To be able to use a ratio to find 1 quantity when the other is known

- To be able to multiply and divide by 0.1 or 0.01
- To be able to recognise and use unit fractions ( $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{10}$ ) and to understand how to use them to find fractions of shapes and numbers
- To understand when two simple fractions are equivalent
- To be able to use diagrams to compare 2 or more simple fractions
- To be able to interchange decimal notation for tenths and hundredths
- To be able to explain the relationship between fractions and division and to interchange simple fractions and decimals
- To understand how to order a set of fractions and mixed numbers and to be able to show where they would be positioned on a number line
- To know that percentage is parts per hundred and to be able to find simple percentages of small whole numbers in real life contexts, for example in money or measures
- To be able to calculate equivalent simple fractions and decimals e.g.  $0.2 = \frac{2}{10}$
- To be able to multiply a simple decimal by a single digit
- To be able to use knowledge of equivalent fractions and/or convert to decimals in order to compare or order fractions
- To be able to simplify fractions
- To understand how to add and subtract simple fractions with common denominators and to be able to use this in simple real life problem solving situations
- To be able to calculate simple fractions of amounts and measurements
- To understand the equivalence of fractions, decimals and percentages and to be able to use percentages to compare proportions in real life contexts, for example to compare nutritional value in food products
- To be able to use knowledge of equivalent fractions and/or convert fractions to decimals in order to compare and order fractions
- To be able to calculate any percentage e.g. 17.5% by finding 10%, 5% and 2.5%
- To be able to order fractions, decimals and percentages
- To be able to express a given number as a percentage of another
- To be able to find a percentage of a quantity using a multiplier

### Algebra

- To be able to begin to understand the role of the = sign

- To be able to recognise and use inequality symbols
- To be able to complete simple mappings
- To be able to use and interpret coordinates in the first quadrant
- To be able to plot  $x = ?$  and  $y = ?$  where  $?$  is a positive integer
- To be able to use function machines to find coordinates
- To be able to draw, label and scale axes
- To be able to read values from straight-line graphs for real-life situations
- To be able to use and interpret coordinates in all four quadrants
- To know how to generate coordinate pairs that satisfy a simple linear rule
- To understand how to plot the graphs of simple linear functions
- Know notation for inequalities and be able to display inequalities on a number line
- To be able to draw straight line graphs for real-life situations
- To be able to plot a simple distance time graph

### Geometry

- To be able to measure accurately using a ruler
- To be able to suggest suitable units to estimate or measure length
- To know how to read scales on measuring instruments in a real life context, for example, how heavy is the baby, how much taller is Wayne than Tracey?
- To be able to tell the time
- To be able to find the perimeter of a shape by counting squares
- To be able to find the perimeter of a square/rectangle
- To understand that area is measured in square units
- To be able to measure lines to the nearest mm
- To be able to recognise and visualise the reflection in a mirror line of a 2D shape
- To be able to translate a shape on a square/coordinate grid with written instructions (e.g. move right 2 and down 1)
- To be able to identify all the symmetries of 2D shapes
- To be able to construct diagrams of everyday 2D situations involving rectangles, triangles, perpendicular and parallel lines
- To be able to tessellate combinations of polygons and explain why some polygons will not tessellate

- To be able to explain the terms perimeter and area for example to write an explanation to clarify these to someone who confuses the meaning of the two
- To know how to find perimeters of simple shapes
- To be able to measure shapes to find perimeters and areas
- To be able to use the formula for the area of a rectangle/square
- To be able to calculate the area of simple compound shapes made from rectangles
- To be able to use nets to calculate the surface area of simple cuboids
- To be able to use units of measurement to estimate and solve problems in everyday contexts involving length, area, volume, mass, time and angle
- To be able to interpret, with appropriate accuracy, numbers on a range of measuring instruments
- To be able to measure and draw angles to the nearest degree
- To be able to colour in missing squares to complete a reflection
- To be able to recognise and visualise rotation about a given point (rotation point must be outside the shape)
- To be able to recognise where a shape will be after a translation
- To understand and use the language associated with reflections and rotations
- To be able to calculate the perimeter and area of more complex shapes made from rectangles
- To be able to calculate the area of a triangle and parallelogram
- To be able to calculate the area of compound shapes involving rectangles and to be able to use this in real life examples such as calculating surface areas of packaging materials
- To be able to calculate the surface area of cuboids without the use of nets
- To be able to solve simple problems involving units of measurement in the context of length and areas
- To be able to use a protractor to measure and draw reflex angles to the nearest degree
- To be able to draw or complete diagrams with a given number of lines of symmetry
- To be able to draw or complete diagrams with a given order of rotational symmetry

- To recognise and visualise the rotational symmetry of a 2D shape
- To understand and use the language associated with translations

### Statistics

- To be able to collect and organise discrete data for a real life purpose for example collecting data about students in school
- To know how to represent data collected in a tally chart or frequency table
- To be able to extract and interpret information presented in simple tables, lists, bar charts and pictograms
- To know how to solve a simple problem by collecting, organising and representing data in tables, charts, graphs and diagrams, including those generated by a computer
- To be able to construct bar charts and pictograms, where the symbol represents a group of units
- To be able to construct tally charts and frequency tables
- To be able to find the mode from any bar chart
- To be able to calculate the mode and range from a small set of data
- To be able to use the vocabulary of probability to discuss the likelihood of events and be able to justify thinking
- To be able to identify tree diagrams and sample space diagrams
- To be able to design a data collection sheet and a questionnaire for grouped, discrete and continuous data
- To be able to interpret data in tables, graphs and charts and be able to draw simple conclusions based on the evidence
- To be able to find the modal group from a grouped bar chart
- To be able to solve a problem by representing and extracting and interpreting data in tables, graphs and charts
- To be able to use Venn and Carroll diagrams to record sorting and classifying of information
- To be able to draw a dual bar chart
- To know how to group data, where appropriate in equal class intervals
- To be able to interpret simple pie charts using simple fractions and percentages and multiples of 10% sections
- To understand and be able to use the mode and range from a bar chart

- To be able to calculate the mean, median, mode and range for continuous and discrete data
- To be able to find the modal class for a small set of grouped discrete data
- To understand the probability scale for 0 to 1 and to be able to use this when discussing the likelihood of events
- To be able to mark events and/or probabilities on a probability scale of 0 to 1
- To understand that a sample space diagram lists all the possible combinations of two events
- To understand which diagram, graph or chart is most appropriate for the data being presented
- To be able to communicate interpretations and results of a statistical survey using selected tables, graphs and diagrams in support
- To be able to use simple two way tables
- To be able to interpret and find the mode and total frequency from simple pie charts
- To be able to calculate the mode and range from a simple frequency table
- To be able to explain where sampling of data is appropriate and know how to do this
- To know and be able to use the fact that the sum of all mutually exclusive outcomes is 1 in solving problems, stretch to probability of something not happening
- To know the difference between experimental and theoretical probabilities and be able to compare these.
- To understand that the probability of an event not happening is  $1-p$  (where  $p$  is the probability of it happening)
- To be able to work out probabilities from frequency tables
- To be able to find and justify probabilities based on equally likely outcomes in simple contexts
- To be able to identify all possible mutually exclusive outcomes of a single event
- To understand that different outcomes may result from repeating an experiment

- To be able to explain why, when estimating probabilities for experimental data, the greater the number of times the experiment is repeated, the better the estimate will be

### **Target 2-4**

**All students completing the target 2-4 must also be confident with all learning objectives for target 1-3**

### Number

- To be able to begin to understand simple ratio
- To be able to recognise approximate proportions of a whole and use simple fractions and percentages to describe these
- To be able to use a range of mental methods of computation with all operations
- To know how to use efficient written methods of addition, subtraction, multiplication and division
- To understand how to multiply a simple decimal by a single digit
- To be able to solve problems with or without a calculator
- To understand how to check the reasonableness of results with reference to the context or size of numbers
- To be able to add and subtract decimals using column method
- To be able to solve simple problems involving ratio and proportion
- To be able to use and interpret maps and scale drawing
- To be able to use knowledge of equivalent fractions and/or convert to decimals in order to compare or order fractions
- To be able to calculate equivalent simple fractions and decimals e.g.  $0.2 = \frac{2}{10}$
- To be able to order a set of fractions and mixed numbers and show where they would be on a number line
- To know that percentage is parts per hundred and be able to find simple percentages of small whole numbers in real life contexts
- To understand and be able to use the equivalence between fractions and order fractions and decimals
- To know how to reduce a fraction to its simplest form by cancelling common factors
- To understand simple ratio



- To be able to solve simple problems involving ratio and proportion
- To be able to use known facts, place value, knowledge of operations and brackets to calculate using all four operations with decimals to 2dp
- To know how to use a calculator where appropriate to calculate fractions and percentages of quantities and measurements
- To be able to multiply and divide whole numbers simple decimals using written methods
- To understand how to apply inverse operations and approximate to check answers to problems are of the correct order of magnitude
- To be able to simplify fractions
- To be able to add and subtract fractions with common denominators & be able to use this in simple real life problem solving situations
- To be able to order fractions, decimals and percentages by finding their equivalence
- To be able to calculate simple fractions of amounts and measurements
- To be able to find a percentage of a quantity using a multiplier
- To be able to express a given number as a percentage of another
- To be able to calculate any percentage e.g. 17.5% by finding 10%, 5% and 2.5%
- To be able to multiply and divide all decimals
- To be able to use proportional reasoning to solve a problem
- To be able to use a ratio to find 1 quantity when the other is known
- To be able to multiply and divide by 0.1 or 0.01
- To understand how to use the equivalence of fractions, decimals and percentages to compare proportions
- To know how to divide a quantity into more than two parts in a given ratio
- To be able to convert between metric units
- To be able to reduce a ratio to its simplest form including 3-part ratios and when there are different units
- To be able to use the unitary method to solve word problems involving ratio and direct proportion
- To understand how to use a calculator efficiently and appropriately in a range of contexts
- To be able to add, subtract, multiply and divide fractions without common denominators
- To be able to use division to convert a fraction to a decimal

- To know the basic fractional equivalents to key recurring decimals e.g.  $0.3333333333 = 1/3$
- To be able to multiply and divide all decimals
- To be able to use proportional reasoning to solve a problem
- To be able to use a ratio to find 1 quantity when the other is known
- To be able to multiply and divide by 0.1 or 0.01
- To be able to explain the relationship between fractions and division and to interchange simple fractions and decimals
- To understand how to order a set of fractions and mixed numbers and to be able to show where they would be positioned on a number line
- To know that percentage is parts per hundred and to be able to find simple percentages of small whole numbers in real life contexts, for example in money or measures
- To be able to calculate equivalent simple fractions and decimals e.g.  $0.2 = 2/10$
- To be able to multiply a simple decimal by a single digit
- To be able to use knowledge of equivalent fractions and/or convert to decimals in order to compare or order fractions
- To be able to simplify fractions
- To understand how to add and subtract simple fractions with common denominators and to be able to use this in simple real life problem solving situations
- To be able to calculate simple fractions of amounts and measurements
- To understand the equivalence of fractions, decimals and percentages and to be able to use percentages to compare proportions in real life contexts, for example to compare nutritional value in food products
- To be able to use knowledge of equivalent fractions and/or convert fractions to decimals in order to compare and order fractions
- To be able to calculate any percentage e.g. 17.5% by finding 10%, 5% and 2.5%
- To be able to order fractions, decimals and percentages
- To be able to express a given number as a percentage of another
- To be able to find a percentage of a quantity using a multiplier
- To understand how to calculate percentages and to be able to find the outcome of percentage increase or decrease, for example when working out discounts and finding best value for money

- To be able to add, subtract, multiply and divide fractions
- To be able to add and subtract mixed numbers without common denominators
- To be able to multiply and divide all decimals
- To be able to use division to convert a fraction to a decimal
- To be able to calculate percentage increase and decrease using a multiplier e.g. when working out the best value

### Algebra

- To be able to use and interpret coordinates in the first quadrant
- To be able to plot  $x = ?$  and  $y = ?$  where  $?$  is a positive integer
- To be able to use function machines to find coordinates
- To be able to draw, label and scale axes
- To be able to read values from straight-line graphs for real-life situations
- To be able to use and interpret coordinates in all four quadrants
- To know how to generate coordinate pairs that satisfy a simple linear rule
- To understand how to plot the graphs of simple linear functions
- Know notation for inequalities and be able to display inequalities on a number line
- To be able to draw straight line graphs for real-life situations
- To be able to plot a simple distance time graph
- To be able to plot the graphs of linear functions, where  $y$  is given explicitly in terms of  $x$
- To know that equations of the form  $y = mx + c$  correspond to straight line graphs
- To be able to construct functions arising from real life problems and plot their corresponding graphs
- To be able to interpret graphs arising from real life situations
- To be able to solve linear inequalities

### Geometry

- To be able to explain the terms perimeter and area for example to write an explanation to clarify these to someone who confuses the meaning of the two
- To know how to find perimeters of simple shapes

- To be able to measure shapes to find perimeters and areas
- To be able to use the formula for the area of a rectangle/square
- To be able to calculate the area of simple compound shapes made from rectangles
- To be able to use nets to calculate the surface area of simple cuboids
- To be able to use units of measurement to estimate and solve problems in everyday contexts involving length, area, volume, mass, time and angle
- To be able to interpret, with appropriate accuracy, numbers on a range of measuring instruments
- To be able to measure and draw angles to the nearest degree
- To be able to colour in missing squares to complete a reflection
- To be able to recognise and visualise rotation about a given point (rotation point must be outside the shape)
- To be able to recognise where a shape will be after a translation
- To understand and use the language associated with reflections and rotations
- To be able to calculate the perimeter and area of more complex shapes made from rectangles
- To be able to calculate the area of a triangle and parallelogram
- To be able to calculate the area of compound shapes involving rectangles and to be able to use this in real life examples such as calculating surface areas of packaging materials
- To be able to calculate the surface area of cuboids without the use of nets
- To be able to solve simple problems involving units of measurement in the context of length and areas
- To be able to use a protractor to measure and draw reflex angles to the nearest degree
- To be able to draw or complete diagrams with a given number of lines of symmetry
- To be able to draw or complete diagrams with a given order of rotational symmetry
- To recognise and visualise the rotational symmetry of a 2D shape
- To understand and use the language associated with translations
- To be able to find the area of triangles by counting i.e. adding full and partial squares

- To be able to calculate the perimeter and area of compound shapes made from triangles, rectangles and other 2D shapes
- To know the formulae for the volume of a cube and cuboid
- To understand how to use a straight edge and compasses to do standard constructions
- Be able to use a straightedge and compasses to construct the midpoint and perpendicular bisector of a line segment
- Be able to draw a circle given the radius or diameter
- To know and understand the term congruent
- To know that translations, rotations and reflections preserve length and angle and map objects onto congruent images
- Be able to recognise that enlargements preserve angle but not length
- To know that triangles given SSS, SAS, ASA or RHS are unique, but that triangles given SSA or AAA are not.

### Statistics

- To be able to design a data collection sheet and a questionnaire for grouped, discrete and continuous data
- To be able to interpret data in tables, graphs and charts and be able to draw simple conclusions based on the evidence
- To be able to find the modal group from a grouped bar chart
- To be able to solve a problem by representing and extracting and interpreting data in tables, graphs and charts
- To be able to use Venn and Carroll diagrams to record sorting and classifying of information
- To be able to draw a dual bar chart
- To know how to group data, where appropriate in equal class intervals
- To be able to interpret simple pie charts using simple fractions and percentages and multiples of 10% sections
- To understand and be able to use the mode and range from a bar chart
- To be able to calculate the mean, median, mode and range for continuous and discrete data
- To be able to find the modal class for a small set of grouped discrete data
- To understand the probability scale for 0 to 1 and to be able to use this when discussing the likelihood of events

- To be able to mark events and/or probabilities on a probability scale of 0 to 1
- To understand that a sample space diagram lists all the possible combinations of two events
- To understand which diagram, graph or chart is most appropriate for the data being presented
- To be able to communicate interpretations and results of a statistical survey using selected tables, graphs and diagrams in support
- To be able to use simple two way tables
- To be able to interpret and find the mode and total frequency from simple pie charts
- To be able to calculate the mode and range from a simple frequency table
- To be able to explain where sampling of data is appropriate and know how to do this
- To know and be able to use the fact that the sum of all mutually exclusive outcomes is 1 in solving problems, stretch to probability of something not happening
- To know the difference between experimental and theoretical probabilities and be able to compare these.
- To understand that the probability of an event not happening is  $1-p$  (where  $p$  is the probability of it happening)
- To be able to work out probabilities from frequency tables
- To be able to find and justify probabilities based on equally likely outcomes in simple contexts
- To be able to identify all possible mutually exclusive outcomes of a single event
- To understand that different outcomes may result from repeating an experiment
- To be able to explain why, when estimating probabilities for experimental data, the greater the number of times the experiment is repeated, the better the estimate will be
- To be able to criticise questions for a questionnaire
- To be able to interpret and/or compare bar graphs and frequency diagrams which are misleading (with false origins, different scales etc.)
- To be able to produce simple pie charts with two or three categories
- To be able to compare two distributions using the range of data

- To be able to calculate the mean, mode and range from a frequency table
- To understand how to find and record all possible mutually exclusive outcomes for single events and two successive events in a systematic way
- To be able to estimate the number of times an event will occur, given the probability and the number of trials
- To be able to write probabilities in words, fractions, decimals and percentages
- To be able to record, describe and analyse outcomes of events in tables and grids
- To be able to draw and use sample space diagrams
- To be able to work out probabilities from two-way tables

### **Target 3-5**

**All students completing the target 3-5 must also be confident with all learning objectives for target 1-3 and target 2-4**

#### Number

- To understand and be able to use the equivalence between fractions and order fractions and decimals
- To know how to reduce a fraction to its simplest form by cancelling common factors
- To understand simple ratio
- To be able to solve simple problems involving ratio and proportion
- To be able to use known facts, place value, knowledge of operations and brackets to calculate using all four operations with decimals to 2dp
- To know how to use a calculator where appropriate to calculate fractions and percentages of quantities and measurements
- To be able to multiply and divide whole numbers simple decimals using written methods
- To understand how to apply inverse operations and approximate to check answers to problems are of the correct order of magnitude
- To be able to simplify fractions
- To be able to add and subtract fractions with common denominators & be able to use this in simple real life problem solving situations

- To be able to order fractions, decimals and percentages by finding their equivalence
- To be able to calculate simple fractions of amounts and measurements
- To be able to find a percentage of a quantity using a multiplier
- To be able to express a given number as a percentage of another
- To be able to calculate any percentage e.g. 17.5% by finding 10%, 5% and 2.5%
- To be able to multiply and divide all decimals
- To be able to use proportional reasoning to solve a problem
- To be able to use a ratio to find 1 quantity when the other is known
- To be able to multiply and divide by 0.1 or 0.01
- To understand how to use the equivalence of fractions, decimals and percentages to compare proportions
- To know how to divide a quantity into more than two parts in a given ratio
- To be able to convert between metric units
- To be able to reduce a ratio to its simplest form including 3-part ratios and when there are different units
- To be able to use the unitary method to solve word problems involving ratio and direct proportion
- To understand how to use a calculator efficiently and appropriately in a range of contexts
- To be able to add, subtract, multiply and divide fractions without common denominators
- To be able to use division to convert a fraction to a decimal
- To know the basic fractional equivalents to key recurring decimals e.g.  $0.3333333333 = 1/3$
- To be able to multiply and divide all decimals
- To be able to use proportional reasoning to solve a problem
- To be able to use a ratio to find 1 quantity when the other is known
- To be able to multiply and divide by 0.1 or 0.01
- Recognise and use reciprocals
- Understand and use proportionality and calculate the result of any proportional change using only multiplicative methods
- To know that a recurring decimal is an exact fraction
- To be able to divide an integer by a fraction



- To be able to use percentages in real life situations: simple interest, VAT, value of profit or loss and income tax calculations
- To be able to express a multiplicative relationship between 2 quantities as a ratio or a fraction
- To be able to compare ratios by changing them to the form 1:n or n:1
- To be able to write a ratio as a fraction
- To be able to convert between metric and imperial units
- To be able to use and interpret maps using proper map scales (1:25000)
- To be able to solve ratio problems in real life contexts
- To be able to simplify fractions
- To understand how to add and subtract simple fractions with common denominators and to be able to use this in simple real life problem solving situations
- To be able to calculate simple fractions of amounts and measurements
- To understand the equivalence of fractions, decimals and percentages and to be able to use percentages to compare proportions in real life contexts, for example to compare nutritional value in food products
- To be able to use knowledge of equivalent fractions and/or convert fractions to decimals in order to compare and order fractions
- To be able to calculate any percentage e.g. 17.5% by finding 10%, 5% and 2.5%
- To be able to order fractions, decimals and percentages
- To be able to express a given number as a percentage of another
- To be able to find a percentage of a quantity using a multiplier
- To understand how to calculate percentages and to be able to find the outcome of percentage increase or decrease, for example when working out discounts and finding best value for money
- To be able to add, subtract, multiply and divide fractions
- To be able to add and subtract mixed numbers without common denominators
- To be able to multiply and divide all decimals
- To be able to use division to convert a fraction to a decimal
- To be able to calculate percentage increase and decrease using a multiplier e.g. when working out the best value
- Know that a recurring decimal is an exact fraction
- To be able to add, subtract, multiply and divide fractions

- To be able to recognise and use reciprocals
- To be able to divide an integer by a fraction
- To be able to use percentages in real life situations: simple interest, VAT, value of profit or loss and income tax calculations

### Algebra

- To be able to use and interpret coordinates in all four quadrants
- To know how to generate coordinate pairs that satisfy a simple linear rule
- To understand how to plot the graphs of simple linear functions
- Know notation for inequalities and be able to display inequalities on a number line
- To be able to draw straight line graphs for real-life situations
- To be able to plot a simple distance time graph
- To be able to plot the graphs of linear functions, where  $y$  is given explicitly in terms of  $x$
- To know that equations of the form  $y = mx + c$  correspond to straight line graphs
- To be able to construct functions arising from real life problems and plot their corresponding graphs
- To be able to interpret graphs arising from real life situations
- To be able to solve linear inequalities
- Be able to investigate the gradients of parallel lines and lines perpendicular to these lines
- Be able to plot and draw quadratic graphs
- Be able to solve linear inequalities where the unknown is on both sides
- To be able to find the coordinates of the midpoint of a line from a given graph
- To be able to represent inequalities on a graph
- To be able to draw distance-time graphs and velocity-time graphs
- To be able to solve simultaneous equations graphically

### Geometry

- To be able to calculate the perimeter and area of more complex shapes made from rectangles
- To be able to calculate the area of a triangle and parallelogram

- To be able to calculate the area of compound shapes involving rectangles and to be able to use this in real life examples such as calculating surface areas of packaging materials
- To be able to calculate the surface area of cuboids without the use of nets
- To be able to solve simple problems involving units of measurement in the context of length and areas
- To be able to use a protractor to measure and draw reflex angles to the nearest degree
- To be able to draw or complete diagrams with a given number of lines of symmetry
- To be able to draw or complete diagrams with a given order of rotational symmetry
- To recognise and visualise the rotational symmetry of a 2D shape
- To understand and use the language associated with translations
- To be able to find the area of triangles by counting i.e. adding full and partial squares
- To be able to calculate the perimeter and area of compound shapes made from triangles, rectangles and other 2D shapes
- To know the formulae for the volume of a cube and cuboid
- To understand how to use a straight edge and compasses to do standard constructions
- Be able to use a straightedge and compasses to construct the midpoint and perpendicular bisector of a line segment
- Be able to draw a circle given the radius or diameter
- To know and understand the term congruent
- To know that translations, rotations and reflections preserve length and angle and map objects onto congruent images
- Be able to recognise that enlargements preserve angle but not length
- To know that triangles given SSS, SAS, ASA or RHS are unique, but that triangles given SSA or AAA are not
- Be able to calculate lengths, areas and volumes in right prisms
- Know be able to use the formulae for the circumference and area of a circle given the radius or diameter
- To be able to deduce and use the formula for the area of a trapezium

- To be able to calculate surface areas and volumes of shapes made from cuboids, for lengths given as whole numbers
- Be able to draw and label the parts of a circle
- Be able to identify 2D shapes that are congruent or similar by reference to sides and angles
- To be able to recognise that all corresponding angles in similar shapes are equal in size when the corresponding lengths are not
- To be able to use a straight edge and compasses to construct the bisector of an angle
- Be able to use a straight edge and compasses to construct a triangle given 3 sides SSS (including an equilateral triangle)
- Be able to construct a regular hexagon inside a circle
- Be able to enlarge 2D shapes given a centre of enlargement and a positive whole number scale factor
- Be able to find the centre of enlargement

### Statistics

- To understand which diagram, graph or chart is most appropriate for the data being presented
- To be able to communicate interpretations and results of a statistical survey using selected tables, graphs and diagrams in support
- To be able to use simple two way tables
- To be able to interpret and find the mode and total frequency from simple pie charts
- To be able to calculate the mode and range from a simple frequency table
- To be able to explain where sampling of data is appropriate and know how to do this
- To know and be able to use the fact that the sum of all mutually exclusive outcomes is 1 in solving problems, stretch to probability of something not happening
- To know the difference between experimental and theoretical probabilities and be able to compare these.
- To understand that the probability of an event not happening is  $1-p$  (where  $p$  is the probability of it happening)
- To be able to work out probabilities from frequency tables

- To be able to find and justify probabilities based on equally likely outcomes in simple contexts
- To be able to identify all possible mutually exclusive outcomes of a single event
- To understand that different outcomes may result from repeating an experiment
- To be able to explain why, when estimating probabilities for experimental data, the greater the number of times the experiment is repeated, the better the estimate will be
- To be able to criticise questions for a questionnaire
- To be able to interpret and/or compare bar graphs and frequency diagrams which are misleading (with false origins, different scales etc.)
- To be able to produce simple pie charts with two or three categories
- To be able to compare two distributions using the range of data
- To be able to calculate the mean, mode and range from a frequency table
- To understand how to find and record all possible mutually exclusive outcomes for single events and two successive events in a systematic way
- To be able to estimate the number of times an event will occur, given the probability and the number of trials
- To be able to write probabilities in words, fractions, decimals and percentages
- To be able to record, describe and analyse outcomes of events in tables and grids
- To be able to draw and use sample space diagrams
- To be able to work out probabilities from two-way tables
- Identify possible sources of bias and plan how to minimise it
- To be able to interpret scatter graphs; recognise correlation, draw lines of best fit and estimate values from this.
- To be able to produce ordered back-to-back stem and leaf diagrams and calculate the median, mode and range
- To be able to use information provided to produce a two-way table
- To be able to estimate the mean from a grouped frequency table and understand why it is an estimate
- To be able to construct and use frequency polygons to compare sets of data

- To know the definition of random sampling and understand what is meant by sample and population
- To be able to use tree diagrams to calculate the probability of two independent events
- To be able to identify conditions for a fair game
- To be able to identify which graphs are the most useful in the context of the problem

### **Target 4-6**

**All students completing the target 4-6 must also be confident with all learning objectives for target 1-3, target 2-4 and target 3-5**

### Number

- To understand how to use the equivalence of fractions, decimals and percentages to compare proportions
- To know how to divide a quantity into more than two parts in a given ratio
- To be able to convert between metric units
- To be able to reduce a ratio to its simplest form including 3-part ratios and when there are different units
- To be able to use the unitary method to solve word problems involving ratio and direct proportion
- To understand how to use a calculator efficiently and appropriately in a range of contexts
- To be able to add, subtract, multiply and divide fractions without common denominators
- To be able to use division to convert a fraction to a decimal
- To know the basic fractional equivalents to key recurring decimals e.g.  $0.3333333333 = 1/3$
- To be able to multiply and divide all decimals
- To be able to use proportional reasoning to solve a problem
- To be able to use a ratio to find 1 quantity when the other is known
- To be able to multiply and divide by 0.1 or 0.01
- Recognise and use reciprocals
- Understand and use proportionality and calculate the result of any proportional change using only multiplicative methods
- To know that a recurring decimal is an exact fraction

- To be able to divide an integer by a fraction
- To be able to use percentages in real life situations: simple interest, VAT, value of profit or loss and income tax calculations
- To be able to express a multiplicative relationship between 2 quantities as a ratio or a fraction
- To be able to compare ratios by changing them to the form 1:n or n:1
- To be able to write a ratio as a fraction
- To be able to convert between metric and imperial units
- To be able to use and interpret maps using proper map scales (1:25000)
- To be able to solve ratio problems in real life contexts
- To know a number multiplied by its reciprocal is 1
- To be able to use algebraic methods to convert a recurring decimal to a fraction
- To be able to calculate and use compound interest and reverse percentages
- To understand how to calculate percentages and to be able to find the outcome of percentage increase or decrease, for example when working out discounts and finding best value for money
- To be able to add, subtract, multiply and divide fractions
- To be able to add and subtract mixed numbers without common denominators
- To be able to multiply and divide all decimals
- To be able to use division to convert a fraction to a decimal
- To be able to calculate percentage increase and decrease using a multiplier e.g. when working out the best value
- Know that a recurring decimal is an exact fraction
- To be able to add, subtract, multiply and divide fractions
- To be able to recognise and use reciprocals
- To be able to divide an integer by a fraction
- To be able to use percentages in real life situations: simple interest, VAT, value of profit or loss and income tax calculations
- To be able to use algebraic methods to convert a recurring decimal to a fraction
- To be able to calculate and use compound interest
- To be able to use percentages in real life situations: compound interest, depreciation, percentage profit & loss

- To be able to calculate and use reverse percentages

### Algebra

- To be able to plot the graphs of linear functions, where  $y$  is given explicitly in terms of  $x$
- To know that equations of the form  $y = mx + c$  correspond to straight line graphs
- To be able to construct functions arising from real life problems and plot their corresponding graphs
- To be able to interpret graphs arising from real life situations
- To be able to solve linear inequalities
- Be able to investigate the gradients of parallel lines and lines perpendicular to these lines
- Be able to plot and draw quadratic graphs
- Be able to solve linear inequalities where the unknown is on both sides
- To be able to find the coordinates of the midpoint of a line from a given graph
- To be able to represent inequalities on a graph
- To be able to draw distance-time graphs and velocity-time graphs
- To be able to solve simultaneous equations graphically

### Geometry

- To be able to find the area of triangles by counting i.e. adding full and partial squares
- To be able to calculate the perimeter and area of compound shapes made from triangles, rectangles and other 2D shapes
- To know the formulae for the volume of a cube and cuboid
- To understand how to use a straight edge and compasses to do standard constructions
- Be able to use a straightedge and compasses to construct the midpoint and perpendicular bisector of a line segment
- Be able to draw a circle given the radius or diameter
- To know and understand the term congruent
- To know that translations, rotations and reflections preserve length and angle and map objects onto congruent images
- Be able to recognise that enlargements preserve angle but not length



- To know that triangles given SSS, SAS, ASA or RHS are unique, but that triangles given SSA or AAA are not
- Be able to calculate lengths, areas and volumes in right prisms
- Know be able to use the formulae for the circumference and area of a circle given the radius or diameter
- To be able to deduce and use the formula for the area of a trapezium
- To be able to calculate surface areas and volumes of shapes made from cuboids, for lengths given as whole numbers
- Be able to draw and label the parts of a circle
- Be able to identify 2D shapes that are congruent or similar by reference to sides and angles
- To be able to recognise that all corresponding angles in similar shapes are equal in size when the corresponding lengths are not
- To be able to use a straight edge and compasses to construct the bisector of an angle
- Be able to use a straight edge and compasses to construct a triangle given 3 sides SSS (including an equilateral triangle)
- Be able to construct a regular hexagon inside a circle
- Be able to enlarge 2D shapes given a centre of enlargement and a positive whole number scale factor
- Be able to find the centre of enlargement
- Be able to calculate lengths, surface areas and volumes in right prisms including cylinders
- Be able to calculate the radius or diameter given the area or circumference
- To be able to calculate the perimeters and areas of semicircles, quarter circles and sectors
- To be able to use Pythagoras to calculate missing lengths in right-angled triangles
- Be able to justify if a triangle is right-angled given its three lengths
- Be able to use a straight edge and compasses to construct the perpendicular from or to a point on a line segment
- Be able to use a straight edge and compasses to construct a triangle given right angle, hypotenuse and side (RHS)
- Be able draw the locus equidistant between 2 points or from a point

- Be able to produce shapes and paths by using descriptions of loci (including from a point, line and corner)
- Be able to enlarge 2D shapes given a fractional or negative scale factor
- Be able to use vector notation for translations
- Be able to describe transformations fully
- Be able to construct angles of  $60^\circ$ ,  $90^\circ$ ,  $30^\circ$  and  $45^\circ$
- Be able to use similarity to solve problems in 2D shapes
- Be able to transform 2D shapes by a more complex combinations of rotations, reflections and translations
- Be able to use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)

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