| Sep 22 - Jul 23 | Half term 1 | Half term 2 | Half term 3 | Half term 4 | Half term 5 | Half term 6 |
|---|---|---|---|---|---|---|
| | | | **Year 7** | | | |
| Learning | Sequences<br><br>Understanding and use algebraic notation<br><br>Equality and Equivalence | Place Value and Ordering integers and Decimals<br><br>Fraction, Decimal and Percentage Equivalence | Solving Problems with Addition and Subtractions<br><br>Solving Problems with Multiplication and Division<br><br>Fractions & Percentage of Amounts | Four Operations with Directed Number<br><br>Addition and Subtraction of Fractions | Construction, measuring and using Geometric Notation<br><br>Developing Geometric Reasoning | Develop Number Sense<br><br>Sets and Probability<br><br>Prime Number and Proof |
| Concepts | ALGEBRA | NUMBER | NUMBER<br>GEOMETRY<br>PROBABILITY AND STATISTICS | NUMBER | GEOMETRY | NUMBER<br>ALGEBRA<br>PROBABILITY AND STATISTICS |
| What is needed to master the Knowledge | Describe and Continue sequences in diagram and number form, both linear and non-linear<br><br>Use and interpret algebraic notation.<br>Understand and use inverse operations.<br>Form and substitute into expressions<br><br>Collect like terms. Form and solve one-step equations. Understand equivalence of algebraic expressions. | Understand and use place value.<br>Compare and order numbers. Round to powers of 10 and 1SF<br><br>Interchange between fractions and decimals below 1.<br>Explore fractions above 1 | Solve problems in the context of perimeter, money and frequency trees and tables<br><br>Evaluate areas of triangles, triangles and parallelograms .<br>Order of operations<br><br>Work out simple fractions and percentages of amounts, with/without a calculator | Order directee numbers, both in contextualised and abstract situations<br><br>Add and subtract fractions and decimals | Construct triangles given SSS, SAS, ASA<br>Draw and interpret pie charts<br><br>Calculate and use angles and a point, on a straight line and vertically opposite angles.<br>Calculate missiong angles in 2D shapes | Prime Number and Proof<br><br>Draw and interpret Venn Diagrams<br>Understand and use the language of probability<br><br>Express a number as a product of prime factors<br>Powers and roots |
| Common Misconceptions | Students often show lack of understanding for what 'n' represent<br>A sequence such as 1,4,7,10 is often described as n + 3 rather than 3n - 2<br><br>Students often forget ab = ba = a x b and b + a = a + b<br><br>Students can forget to apply the same operation to both sidesof the equation therefore leaving it unbalanced<br>Students often struggle knowing when to add or subtract the equations to eliminate the unknown. Review addition with negatives to address this | Aligning the correct value digits for column addition and subtraction can prove troublesome. Encourage use of the place value table.<br><br>A shape that is split in two is not necessarily split in half. A half must be two equal proportions of a shape.<br>A fraction with a larger denominator has the greater value.<br>A fraction with a smaller denominator has a lesser value.<br><br>Students often don't appreciate equivalence of fractions and decimals | When subtracting, students may find knowing when to 'borrow' confusing and instead incorrectly subtracting the smaller digit from the larger one. E.g., 43 – 25 = 22<br><br>When calculating the area of a triangle or parallelogram students tend to use the slanted height rather than the correct perpendicular height.<br><br>Students often consider percentages to limited to 100%. A key learning point is to understand how percentages can exceed 100%.<br>Students sometimes confuse 70% with a magnitude of 70 rather than 0.7. | Students often incorrectly consider negative numbers with a larger magnitude than positives to have a greater value. For example, -3 < 2 Common incorrect answers to -4 + 6 are -2 (4 – 6) and -10 (-4 – 6)<br><br>When adding and subtracting fractions, students think they can simply add and subtract fractions regardless of the denominator | Students often have difficulty constructing smooth arcs using a pair of compasses. Encourage them to try different techniques such as rotating the paper rather than the compasses.<br>It is important to leave in construction lines as these form the working out.<br><br>When measuring angles using a 180° degree protractor students often confuse the upper and lower scale.<br>Understanding basic angle properties such as acute and reflex angles helps with this. | Ratios amounts are often confused with fractions involving the same digits. For instance 2 : 3 is confused with 2⁄3 or 1 : 2 = 1⁄2.<br>When writing ratios into the form 1 : n students incorrectly assume that n has to be an integer or greater than 1.<br><br>Writing probabilities as a ratio is a common misconception. When creating Venn diagrams students often forget to place the remaining events outside the circles.<br><br>Students often define a prime number as 'divides by 1 and itself'. This leads to the incorrect assumption of 1 to be prime number. |

| Concept | Explanation of concept |
|---|---|
| 1. Number | Addition and subtraction. Multiplication and division.Four operations with decimals,fractions and surds.Place value and ordering.Equivalence of fractions, decimals and percentages.Ratios and fractions.Fractions and percentages of amounts. Using percentages.Directed number. Factors, multiples, primes, squares, square roots.Indices, standard form. Mathematics and money. Problem solving. |
| 2. Algebra | Algebraic notation, brackets, equations and inequalities.Expanding and Factorising.Simultaneous equations.Equality and equivalence.Forming and solving equations. Working with formulas. Testing conjectures, proof.Indices. Sequences. Straight line graphs. Changing the subject. Functions. |
| 3. Statistics and probability | Collecting,representing and interpreting data.The data handling cycle.Sets and venn diagrams. Probability |
| 4. Geometry | Lines and angles.Transformations, symmetry.Area and volume. Circles.2d and 3d shapes. Similarity and congruence. Constructions.Pythagoras' theorem, trigonometry. Vectors.Loci |
| 5. Ratio and proportion | Ratio, scale. Enlargement and similarity.Multiplicative change.Proportion.Rates. Gradients and rates of change.Ratios and fractions. Compound measures: speed, distance, time, density, pressure |

| Sep 22 - Jul 23 | Half term 1 | Half term 2 | Half term 3 | Half term 4 | Half term 5 | Half term 6 |
|---|---|---|---|---|---|---|
| | | | **Year 8** | | | |
| **Learning** | Ratio and scale<br><br>Multiplicative change<br>Multiplying and dividing fractions | Working in the Cartesian Plane<br><br>Representing data<br><br>Probability | Brackets, Equations & Inequalities<br>Sequences<br><br>Indices | Fractions and Percentages<br><br>Standard Index Form<br><br>Number Sense | Angles in parallel lines and polygons<br>Area of Trapezia & Circles<br><br>Line Symmetry & Reflection | The Data Handling Cycle<br><br>Measures of location |
| **Concepts** | Ratio and Proportion<br>Number | Algebra<br>Proportion<br>Statistics and Probability<br>Geometry | Algebra<br>Number | Number<br>Geometry | Number<br>Geometry | Statistics and probability<br>Geometry |
| **What is needed to master the Knowledge** | Understand ratio and ratio notation<br>Solve ratio problems<br>Dividing into ratios<br>Simplifying ratios including using the form 1:n and n:1<br><br>Use scale factors (linking to ratio) to solve simple direct proportion problems<br>Convert between currencies, numerically and graphically<br><br><br>Multiply and divide fractions by integers<br>Multiply and divide fractions by a fraction<br>Multiply and divide fractions by mixed numbers | Understand and use the equations of a straight line, including lines parallel to the axes<br>Make links between direct proportion and straight lines of the form y=kx<br><br>Understand grouped and ungrouped, discrete and continuous data<br>Contruct and interpret frequency tables, grouped and ungrouped, and two way tables<br><br>Construct sample spaces for more than one event<br>Use sample spaces, tables and Venn diagrams to find probabilities | Expand and factorise into single brackets<br>Form and solve equations and inequalities with and without brackets<br>Substitute into expressions<br><br>Generate sequences using more complex rules, e.g. with brackets and squared terms, both in words and algebraically<br>Find the rule for the nth term of a linear sequence<br><br>Form expressions using indices<br>Understand and use the addition and subtraction rules for indices<br>Explore powers of powers | Develop understanding of fractions, decimals and percentages<br>Evaluate percentage increase and decrease<br>Use multipliers to solve percentages problems<br><br>Convert between numbers in ordinary and standard form<br>Compare numbers given in standard form<br>Calculate with numbers given in standard form, with and without calculators<br><br>Develop mental strategies for the four operations<br>Convert between metric measures and units<br>Rounding to a given number of decimal places and significant figures including estimation<br>Use the order of operation<br>Convert area and volume measures | Work out angles in special quadrilaterals<br>Find and use sum of interior and exterior angles of polygons<br>Prove simple geometric facts<br><br>Calculate the area of a trapezium<br>Calculate the area of a circle, and the area of parts of a circle<br>Use significant figures and decimal places<br>Calculate the area of compound shapes<br><br><br>Recognise line symmetry in polygons and other shapes<br>Reflect shapes in horizontal, vertical and diagonal lines | Understand and use primary and secondary sources of data<br>Construct and interpret pie charts<br>Compare distributions using charts<br><br>Finding the total given the mean<br>Identify outliers<br>Finding the mean from a grouped or ungrouped frequency table<br>Choose the appropriate average |
| **Common Misconceptions** | Ratios amounts are often confused with fractions involving the same digits. For instance 2 : 3 is confused with 2⁄3 or 1 : 2 = 1⁄2.<br>When writing ratios into the form 1 : n students incorrectly assume that n has to be an integer or greater than 1.<br><br>Students sometimes fail to recognise that imperial and metric units are two distinct sets of measurements. Remembering the metric/imperial conversions often prove difficult for most students<br><br>Dividing fractions is equivalent to multiplying fractions<br>Can't have 5/2 of a number | A linear function does not have to pass through the origin. The gradient can be calculated from any two points along the graph. Not necessarily from the origin.<br><br>Students often have difficulty designing two-way tables. Students often try to represent continuous data using methods that are only applicable for discrete sets.<br><br>Writing probabilities as a ratio is a common misconception. When creating Venn diagrams students often forget to place the remaining events outside the circles. | Students can forget to apply the same operation to both sides of the equation therefore leaving it unbalanced. Equations need to be aligned so that unknowns can be easily added or subtracted. If equations are not aligned students may add or subtract with non like variables.<br><br>Students often show lack of understanding for what 'n' represents<br>A sequence such as 1,4,7,10 is often described as n + 3 rather than 3n - 2<br><br>$x^2$ is often incorrectly taken as 2x. | A shape that is split in two is not necessarily split in half. A half must be two equal proportions of a shape.<br>A fraction with a larger denominator has the greater value.<br>A fraction with a smaller denominator has a lesser value.<br><br>Students often have difficulty when dealing with negative powers. For instance, they assume, $1.2 \times 10^{-2}$ to have a value of -120.<br><br>Aligning the correct value digits for column addition and subtraction can prove troublesome. Encourage use of the place value table. | Students often forget the definition of properties associated to angles in parallel lines.<br>Exterior angles in a polygon have to travel in the same direction for the sum to be 360°.<br><br>When calculating the area of a triangle or parallelogram students tend to use the slanted height rather than the correct perpendicular height.<br><br>Students often confuse the term translation for transformation.<br>Students often have more difficulty describing single transformations rather than performing them.<br>Writing vectors in their simplest form by collecting like terms is often a problem in examinations | Bar charts are often drawn with unequal width bars.<br>The frequency is often incorrectly taken as the angle when drawing pie charts.<br>Diagrams are often drawn without the correct labels and missing title.<br><br>Students tend to confuse the median, mode and mean averages.<br>Students often find it difficult to calculate the median average from data presented in a frequency table. |

| Concept | Explanation of concept |
| --- | --- |
| 1. Number | Addition and subtraction. Multiplication and division.Four operations with decimals,fractions and surds. Place value and ordering.Equivalence of fractions, decimals and percentages.Ratios and fractions. Fractions and percentages of amounts. Using percentages.Directed number.Factors, multiples, primes, squares, square roots.Indices, standard form. Mathematics and money. Problem solving. |
| 2. Algebra | Algebraic notation, brackets, equations and inequalities.Expanding and Factorising. Simultaneous equations.Equality and equivalence.Forming and solving equations. Working with formulas.Testing conjectures, proof.Indices. Sequences. Straight line graphs. Changing the subject. Functions. |
| 3. Statistics and probability | Collecting,representing and interpreting data.The data handling cycle.Sets and venn diagrams. Probability |
| 4. Geometry | Lines and angles.Transformations, symmetry.Area and volume. Circles.2d and 3d shapes. Similarity and congruence. Constructions.Pythagoras' theorem, trigonometry. Vectors.Loci |
| 5. Ratio and proportion | Ratio, scale. Enlargement and similarity.Multiplicative change.Proportion.Rates. Gradients and rates of change.Ratios and fractions. Compound measures: speed, distance, time, density, pressure |

| September 2022- July 2023 | Half term 1 | Half term 2 | Half term 3 | Half term 4 | Half term 5 | Half term 6 |
|---|---|---|---|---|---|---|
| **Year 9** | | | | | | |
| **Learning** | Straight Line Graphs<br>Forming and Solving Equations<br>Testing Conjectures | Three-dimensional Shapes<br>Constructions and Congruency | Numbers<br>Using Percentages<br>Maths and Money | Deduction<br>Rotation and Translation<br>Pythagoras' Theorem | Enlargement and Similarity<br>Solving Ratio and Proportion Problems<br>Rates | Probability<br>Algebraic Representation<br>Revision |
| **Concepts** | ALGEBRA | GEOMETRY | NUMBER | GEOMETRY | RATIO AND PROPORTION | STATISTICS AND PROBABILITY<br>ALGEBRA |
| **What is needed to master the knowledge** | Equations of lines parallel to the axis and y = x and y = -x<br>Four operations with directed numbers, substitution into formulas.<br>Compare gradients<br>Compare intercepts<br>Understand and use y = mx + c<br>Write an equation in the form y = mx + c<br>Find the equation of a straight line from a graph<br>Interpret gradient and intercept of real life graphs<br><br>Solve equations with unknowns on both sides<br>Solve inequalities with unknowns on both sides<br>Inequalities with negative numbers<br>Equations and inequalities in other mathematical contexts<br>Formulae and equations<br>Rearrange formulae (one-step)<br>Rearrange formulae (two-step)<br>Rearrange complex formulae<br><br>Factors, multiples and primes<br>True or false<br>Always, sometimes, never<br>Show that<br>Conjectures about number<br>Expand a pair of binomials<br>Conjectures with algebra<br>Explore the 100 grid | Know names of 2-D and 3-D shapes<br>Recognise prisms<br>Accurate nets of cuboids and 3-D shapes<br>Sketch and recognise nets of cuboids and other 3-D shapes<br>Plans and elevations<br>Area of plane shapes including circles.<br>Surface area of cubes and cuboids<br>Surface area of triangular prisms<br>Surface area of a cylinder<br>Volume of cubes and cuboids<br>Volume of other 3-D shapes<br>Explore volumes of cones, pyramids and spheres<br><br>Draw and measure angles<br>Construct and interpret scale drawings<br>Understand the concept of a locus<br>Locus of distance from a point<br>Locus of distance from a straight line / shape<br>Locus equidistant from two points<br>Construct a perpendicular from a point<br>Construct a perpendicular to a point<br>Locus of distance from two lines<br>Construct an angle bisector<br>Construct triangles from given information<br>Identify congruent figures<br>Explore congruent triangles<br>Identify congruent triangles | Integers, real and rational numbers<br>Understand and use surds (H)<br>Four operations with integers, fractions and decimals<br>Solve problems with integers<br>Solve problems with decimals<br>Solve problems with fractions<br><br>Convert between fractions, decimals and percentages (R)<br>Solve 'reverse' percentage problems<br>Recognise and solve percentage problems (non-calculator)<br>Recognise and solve percentage problems (calculator)<br>Solve problems with repeated percentage change<br>Calculate percentage increase and decrease<br><br>Solve problems with bills and bank statements<br>Calculate simple interest<br>Calculate compound interest<br>Solve problems with VAT<br>Calculate wages and taxes<br>Solve problems with exchange rates<br>Solve unit pricing problems | Angles in parallel lines<br>Solve angle problems (using chains of reasoning)<br>Angle problems with algebra<br>Conjectures with angles<br>Conjectures with shapes<br>Link constructions and geometrical reasoning<br><br>Identify the order of rotational symmetry of a shape<br>Compare and contrast rotational symmetry with lines of symmetry<br>Rotate a shape about a point on a shape<br>Rotate a shape about a point not on a shape<br>Translate points and shapes by a given vector<br>Compare rotation and reflection of shapes<br>Find the result of a series of transformations<br><br>Work with squares and square roots<br>Identify the hypotenuse of a right-angled triangle<br>Determine whether a triangle is right-angled<br>Calculate the hypotenuse of a right-angled triangle<br>Calculate missing sides in right-angled triangles<br>Use Pythagoras' theorem on coordinate axis<br>Explore proofs of Pythagoras' theorem<br>Use Pythagoras' theorem in 3-D shapes | Recognise enlargement and similarity<br>Enlarge a shape by a positive integer scale factor<br>Enlarge a shape by a positive integer scale factor from a point<br>Enlarge a shape by a positive fractional scale factor<br>Enlarge a shape by a negative scale factor<br>Work out missing sides and angles in a pair of given similar shapes<br>Solve problems with similar triangles<br>Explore ratios in right-angled triangles<br><br>Solve problems with direct proportion<br>Direct proportion and conversion graphs<br>Solve problems with inverse proportion<br>Graphs of inverse relationships<br>Solve ratio problems given the whole or a part<br>Solve 'best buy' problems<br>Solve problems ratio and algebra<br><br>Solve speed, distance and time problems without a calculator<br>Solve speed, distance and time problems with a calculator<br>Use distance/ time graphs<br>Solve problems with density, mass and volume<br>Solve flow problems and their graphs<br>Rates of change and their units<br>Convert compound units | Single event probability<br>Relative frequency<br>Expected outcomes<br>Independent events<br>Use tree diagrams<br>Use tree diagrams to solve 'without replacement' problems<br>Use diagrams to work out probabilities<br><br>Draw and interpret quadratic graphs<br>Interpret graphs, including reciprocal and piece-wise<br>Investigate graphs of simultaneous equations<br>Represent inequalities |
| **Common Misconceptions** | Not all 45 degree lines have a gradient of 1.<br>Students need to look at the scale on both axis. The gradient isn't always the number immediately after the =<br><br>Changing an inequality sign to an equals sign when you shouldn't . Divide or multiply both sides of an inequality by a negative number.Misunderstanding of cross multiplying<br><br><br>1 is not a prime number. Conjectures are not always true or false | If you have 3 lengths of a triangle you have to use them all to find the area . Misunderstanding of perpendicuklar height.Confusing formulas of area of a triangle and a parallelogram. Difference between "square centimetres" and "centimetres squared". "cubic centimetres" and "centimetres cubed"<br><br>Difference between equidistant of two points and two lines.<br><br>Reflections and rotations of a shape are all congruent. | Recurring decimals are irrational<br><br>2% is the same 0.2 A percentage can't be greater than 100.<br><br>Mixing up compound interest and simple interest | All diagonals meet at right angles<br><br>All rotations have a centre of the origin.Not fully describing a transformation<br><br>Not understanding the geometrical basis of Pythagoras'Theorem.<br>Not understanding the difference between finding the hypotenuse and another side<br><br>Can be used on all triangles | All enlargements get bigger<br><br>2:3 is equal to 2/3<br><br>To use addition or subtraction | A probability that is greater than 1 . Knowing when to add or multiply probabilities<br><br>Drawing quadratic graphs with straight lines |

| Concept | Explanation of concept |
|---|---|
| 1. Number | Addition and subtraction. Multiplication and division.Four operations with decimals,fractions and surds.Place value and ordering.Equivalence of fractions, decimals and percentages.Ratios and fractions.Fractions and percentages of amounts. Using percentages.Directed number.Factors, multiples, primes, squares, square roots.Indices, standard form. Mathematics and money. Problem solving. |
| 2. Algebra | Algebraic notation, brackets, equations and inequalities.Expanding and Factorising.Simultaneous equations.Equality and equivalence.Forming and solving equations. Working with formulas.Testing conjectures, proof.Indices. Sequences. Straight line graphs. Changing the subject. Functions. |
| 3. Statistics and probability | Collecting,representing and interpreting data.The data handling cycle.Sets and venn diagrams.Probability |
| 4. Geometry | Lines and angles.Transformations, symmetry.Area and volume. Circles.2d and 3d shapes.Similarity and congruence. Constructions.Pythagoras' theorem, trigonometry. Vectors.Loci |
| 5. Ratio and proportion | Ratio, scale. Enlargement and similarity.Multiplicative change.Proportion.Rates. Gradients and rates of change.Ratios and fractions. Compound measures: speed, distance, time, density, pressure |
| | |
| | |
| | |
| | |

| September 2022- July 2023 | Half term 1 | Half term 2 | Half term 3 | Half term 4 | Half term 5 | Half term 6 |
|---|---|---|---|---|---|---|
| **Year 10 foundation** | | | | | | |
| **Learning** | GEOMETRY 1<br>ALGEBRA 1 | NUMBER 1<br>GEOMETRY 2 | STATISTICS 1<br>NUMBER 2 | NUMBER 3<br>RATIO AND PROPORTION 1<br>GEOMETRY 3<br>STATISTICS 2 | GEOMETRY 3<br>ALGEBRA 2 | GEOMETRY 4 |
| **Concepts** | ALGEBRA<br><br>GEOMETRY | NUMBER<br>GEOMETRY | NUMBER<br>STATISTICS | NUMBER<br>RATIO AND PROPORTION<br>STATISTICS<br>GEOMETRY | ALGEBRA<br>GEOMETRY | GEOMETRY |
| **What is needed to master the knowledge** | Revision of basic number<br>Understand and use angle properties:acute, obtuse, reflex,at a point, on a straight line, vertically opposite, exterior angles.<br>Understand and use properties of triangles and quadrilaterals.<br>Understand and use angles on parallel lines.<br>Understand and use similarity and congruency.<br>Interior and exterior angles of polygons.<br>Understand algebraic notation and convention.<br>Simplify and manipulate algebraic expressions.<br>Generate terms of a sequence.<br>Recognise and use :Fibonacci, arithmetic, geometric sequences.<br>Find the n'th term of a sequence. | Understand and use coordinates in all 4 quadrants. Find the midpoint and gradient of a line segment.<br>Understand and use "y=mx+c"<br>Metric units<br>Area of plane shapes.<br>Surface area of 3d shapes.<br>Understand and use compound units. | Interpret and construct tables, charts and diagrams, including:<br>frequency tables, bar charts, pie charts and pictograms for categorical data STEM AND LEAF<br>Vertical line charts for ungrouped discrete numerical data<br>Tables and line graphs for time series data<br>Know their appropriate use<br>Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data<br>Know and understand the terms primary data, secondary data, discrete data and continuous data<br>Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through :<br>appropriate measures of central tendency (median, mean, mode and modal class)<br>Spread (range, including consideration of outliers)<br>Define percentage as 'number of parts per hundred'<br>Interpret percentages and percentage changes as a fraction or a decimal and interpret these multiplicatively<br>Express one quantity as a percentage of another<br>Compare two quantities using percentages<br>Work with percentages greater than 100% | Indices and roots.<br>Understand and use place value.<br>Understand and use standard form.<br>Ratio-simplify, divide and equivalence<br>Apply ratio to real life situations.<br>Know parts of a circle.<br>Find the area and circumference of a circle, semi circle and quadrant. | Understand and use the probability scale.<br>Understand and use relative frequency.<br>Construct, interpret and use Venn diagrams and possibility spaces.<br>Use and convert between metric units.<br>Understand and use scale factors.<br>Understand and use 3 figure bearings.<br>Construct and interpret plans and elevations of 3D shapes.<br>Substitute into algebraic expressions and formulae.<br>Solve linear equations.<br>Form and solve linear equations and inequalities.<br>Rearrange formulae. | Sketch lines parallel to the axes. y=x, y=-x.<br>Identify, describe and construct congruent and similar shapes, on coordinate axes, by considering rotation, reflection, translation and enlargement (including fractional scale factors)<br>Describe translations as 2D vectors<br>Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle)<br>Use these to construct given figures and solve loci problems<br>Pythagoras' theorem. |
| **Common Misconceptions** | Understanding that "angles at a point" only refers to adjacent angles.On parallel lines understanding difference between interior alternate angles and exterior alternate angles.<br>that similarity preserves angles.<br>Understanding when angles are equal or supplementary.<br>Difference between 2x and x squared.<br>n'th term of 5,8,11,13is n+3 | Not rearranging into the form y=mx+c before finding gradient and intercept.<br>That gradient is change in y divided by change in x.<br>Confusion between surface area and volume, especially with regards to the units.<br>Mixing up area of a triangle with area of parallelogram.<br>1 hour 20 minutes is 1.2 hours. | Not understanding inequality signs used in grouped frequency tables.<br>Not understanding difference between discrete and continuous data.<br>Not rearranging data into order before finding the median.<br>Not understanding the term "modal class"<br>A percentage can't be > 100.<br>A multiplier of 1.6 is an increase of 6%.<br>Not distinguishing between changing 24 out of 60 as a % and 24% of 60. | 1.03 is 1 and 3 tenths.<br>10^0 is zero.<br>1.3 x 10^-3 is -1300<br>2:3 is 2/3<br>Not understanding difference between a chord and a diameter.<br>Not adding the radii when finding perimeter of a quadrant. | A probability can be written as "2 to 1"<br>A probability can be grteater than 1<br>Thinking that changing from cm to m you multiply by 100.<br>Confusion between " 6 square centimetres" and "6 centimetres squared".<br>100 cm^2 is 1m^2.<br>Not measuring clockwise when finding bearings.<br>Solution to 2+3x=11 is x =4.<br>x/a and a/x are equivalent. | Not knowing equations of lines parallel to the axes.<br>Vectors confusing horizontal and vertical movement.<br>Not understanding relationshop between the constructions and loci. |

| Concept | Explanation of concept |
|---|---|
| **1. Number** | Addition and subtraction. Multiplication and division.Four operations with decimals,fractions and surds.Place value and ordering.Equivalence of fractions, decimals and percentages.Ratios and fractions.Fractions and percentages of amounts. Using percentages.Directed number.Factors, multiples, primes, squares, square roots.Indices, standard form. Mathematics and money. Problem solving. |
| **2. Algebra** | Algebraic notation, brackets, equations and inequalities.Expanding and Factorising.Simultaneous equations.Equality and equivalence.Forming and solving equations. Working with formulas.Testing conjectures, proof.Indices. Sequences. Straight line graphs. Changing the subject. Functions. |
| **3. Statistics and probability** | Collecting,representing and interpreting data.The data handling cycle.Sets and venn diagrams.Probability |
| **4. Geometry** | Lines and angles.Transformations, symmetry.Area and volume. Circles.2d and 3d shapes.Similarity and congruence. Constructions.Pythagoras' theorem, trigonometry. Vectors.Loci |
| **5. Ratio and proportion** | Ratio, scale. Enlargement and similarity.Multiplicative change.Proportion.Rates. Gradients and rates of change.Ratios and fractions. Compound measures: speed, distance, time, density, pressure |
| | |
| | |
| | |
| | |

| September 2022- July 2023 | Half term 1 | Half term 2 | Half term 3 | Half term 4 | Half term 5 | Half term 6 |
|---|---|---|---|---|---|---|
| **Year 10 Higher** | | | | | | |
| **Learning** | GEOMETRY 1<br>ALGEBRA 1 | NUMBER 1<br>GEOMETRY 2 | STATISTICS 1<br>NUMBER 2 | NUMBER 3<br>RATIO AND PROPORTION 1<br>GEOMETRY 3<br>STATISTICS 2 | GEOMETRY 3<br>ALGEBRA 2 | GEOMETRY 4 |
| **Concepts** | ALGEBRA<br><br>GEOMETRY | NUMBER<br>GEOMETRY | NUMBER<br>STATISTICS | NUMBER<br>RATIO AND PROPORTION<br>STATISTICS<br>GEOMETRY | ALGEBRA<br>GEOMETRY | GEOMETRY |
| **What is needed to master the knowledge** | BASIC NUMBER<br>Understand and use angle properties:acute, obtuse, reflex,at a point, on a straight line, vertically opposite, exterior angles.<br>Understand and use properties of triangles and quadrilaterals.<br>Understand and use angles on parallel lines.<br>Use scale factors, scale diagrams, maps and bearings.<br>Understand and use similarity and congruency.<br>Interior and exterior angles of polygons.<br>Understand algebraic notation and convention. | Simplify and manipulate algebraic expressions.<br>Generate terms of a sequence.<br>Recognise and use :Fibonacci, arithmetic, geometric sequences.<br>Find the n'th term of a sequence.<br>Find and use the n'th term of a quadratic sequence<br>Understand and use coordinates in all 4 quadrants. Find the midpoint and gradient of a line segment.<br>Understand and use "y=mx+c".<br>Understand and use equation of parallel and perpendicular lines<br><br>Apply and interpret limits of accuracy including lower and upper bounds.<br><br>Change between metric units.<br>Area of plane shapes.<br>Surface area of 3d shapes.<br>Understand and use compound units. | Interpret and construct tables, charts and diagrams, including:<br>frequency tables, bar charts, pie charts and pictograms for categorical data<br>vertical line charts for ungrouped discrete numerical data<br>tables and line graphs for time series data<br>Know their appropriate use Draw pie charts<br>Interpret pie charts(R) .Solve algebraic problems involving pie charts.<br>Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data<br>Know and understand the terms primary data, secondary data, discrete data and continuous data<br>Construct and use cumulative frequency diagrams<br>Construct and use Histograms.<br>Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through :<br>appropriate measures of central tendency (median, mean, mode and modal class)<br>spread (range, including consideration of outliers)<br>Interpret percentages and percentage changes as a fraction or a decimal and interpret these multiplicatively<br>Express one quantity as a percentage of another | Indices<br>Understand and use standard form.<br>Equivalence of fractions and ratios.<br>Ratio-simplify and divide.<br>Apply ratio to real life situations.<br>Know parts of a circle.<br>Find the area and circumference of a circle, semi circle and quadrant.<br>Find area and perimeter of a sector.<br>Find the surface area of cones, spheres and composite solids. | Understand and use the probability scale.<br>Understand and use relative frequency.<br>Manipulate surds.<br>Substitute into algebraic expressions and formulae.<br>Change the subject of a formula.<br>Solve linear equations.<br>Form and solve linear equations and inequalities.<br>Factorise trinomials.<br>Write trinomials in completing the square form.<br>Solve quadratic equations by factorising and use of the formula. | Recognise and sketch lines parallel to the axes and y=x, y=-x.<br>Identify, describe and construct congruent and similar shapes, on coordinate axes, by considering rotation, reflection, translation and enlargement (including fractional scale factors)<br>Describe translations as 2D vectors<br>Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle)<br>Use these to construct given figures and solve loci problems<br>Accurately construct triangles.<br>Construct and interpret plans and elevations of 3d shapes. |
| **Common Misconceptions** | Understanding that "angles at a point" only refers to adjacent angles.On parallel lines understanding difference between interior alternate angles and exterior alternate angles.<br>That similarity preserves angles.<br>Not measuring clockwise when finding bearings.<br><br>Understanding when angles are equal or supplementary.<br>Difference between 2x and x squared.<br>n'th term of 5,8,11,13is n+3 | Not rearranging into the form y=mx+c before finding gradiennt and intercept.<br>That gradient is change in y divided by change in x.<br>The gradient of a perpendicular is the reciprocal of the line.<br>Confusion between factor and multiple.<br>0.13 is "point thirteen"<br>Not realising 3/8 means 3 divided by 8.<br>Confusion between surface area and volume, especially with regards to the units.<br>Mixing up area of a triangle with area of parallelogram.<br>1 hour 20 minutes is 1.2 hours. | Confusion between cumulative frequency tables and grouped frequency tables.<br>Taking the midpoint when drawing cumulative frequency diagrams.<br>Forgetting that histograms use "frequency density" rather than "frequency"<br>Thinking that an increase of 3% is a multiplier of 1.3.<br>Not understanding the difference between simple and compound interest. | Thinking that an index of -2 means square root.<br>1.03 is 1 and 3 tenths.<br>10^0 is zero.<br>1.3 x 10^-3 is -1300<br>2:3 is 2/3<br>Not understanding difference between a chord and a diameter.<br>Not adding the radii when finding perimeter of a quadrant. | A probability can be written as "2 to 1"<br>a probability can be grteater than 1<br>Confusion between intersect and union.<br>Not understanding that sqrt3xsqrt3 is 3.<br>when simplifying surds not realising that you find the largest square number.<br>Solution to 2+3x=11 is x =4.<br>x/a and a/x are equivalent.<br>Not writing in the form ax^2+bx+c before applying the formula. | Not knowing equations of lines parallel to the axes.<br>Vectors confusing horizontal and vertical movement.<br>Not understanding relationship between the constructions and loci. |

| Concept | Explanation of concept |
|---|---|
| **1. Number** | Addition and subtraction. Multiplication and division.Four operations with decimals,fractions and surds.Place value and ordering.Equivalence of fractions, decimals and percentages.Ratios and fractions.Fractions and percentages of amounts. Using percentages.Directed number.Factors, multiples, primes, squares, square roots.Indices, standard form. Mathematics and money. Problem solving. |
| **2. Algebra** | Algebraic notation, brackets, equations and inequalities.Expanding and Factorising.Simultaneous equations.Equality and equivalence.Forming and solving equations. Working with formulas.Testing conjectures, proof.Indices. Sequences. Straight line graphs. Changing the subject. Functions. |
| **3. Statistics and probability** | Collecting,representing and interpreting data.The data handling cycle.Sets and venn diagrams.Probability |
| **4. Geometry** | Lines and angles.Transformations, symmetry.Area and volume. Circles.2d and 3d shapes.Similarity and congruence. Constructions.Pythagoras' theorem, trigonometry. Vectors.Loci |
| **5. Ratio and proportion** | Ratio, scale. Enlargement and similarity.Multiplicative change.Proportion.Rates. Gradients and rates of change.Ratios and fractions. Compound measures: speed, distance, time, density, pressure |
| | |
| | |
| | |
| | |

| September 2022- July 2023 | Half term 1 | Half term 2 | Half term 3 | Half term 4 | Half term 5 |
|---|---|---|---|---|---|
| **Year 11 foundation** | | | | | |
| **Learning** | Number 1<br>algebra 1 | POLYGONS, MEASURES. | STANDARD FORM<br>PERCENTAGES<br>TRANSFORMATIONS<br>CONSTRUCTIONS<br>STRAIGHT LINE GRAPHS | GRAPHS<br>EQUATIONS<br>FORMULAE<br>PYTHAGORAS' THEOREM<br>RATIO<br>SCALES AND CONSTRUCTIONS | BEARINGS<br>STATISTICAL MEASURES<br>PROBABILITY<br>PROPORTION |
| **Concepts** | NUMBER<br>ALGEBRA | GEOMETRY | NUMBER<br>ALGEBRA<br>GEOMETRY | ALGEBRA<br>GEOMETRY<br>RATIO AND PROPORTION | STATISTICS AND PROBABILITY<br>GEOMETRY<br>RATIO AND PROPORTION |
| **What is needed to master the knowledge** | Perform 4 operations with integers, fractions and decimals.<br>Round to nearest 10, 100 and 1000 and nearest integer.  Round to decimal places and significant figures. Produce estimations to calculations.  Perform calculations with money.<br>Understand and use indices. Understand and use prime, factor, multiple, cube and square.<br>Find HCF and LCM. | Understand agebraic notation. Understand expression, formula, identity, inequality and term. Substitute into expressions.<br>Collect like terms.<br>Expand and simplify expressions. Factorise into a single bracket.<br>Understand and use vocabulary of shapes.<br>Change between metric units of length.<br>Find area and perimeter of 2d shapes.<br>Find volume and surface area of 3d shapes.<br>Understand and use vocabulary associated with circles.<br>Find area and circumference of a circle.<br>Find area and perimeter of quadrant and semi circle.<br>Know and use the formula for the volume of a cylinder. | Mock revision/mock exams<br>Know and use the properties of polygons (inc quadrilaterals and triangles).<br>Understand and use sum of the exterior and interior angles of polygons.<br>Recognise and describe line and rotational symmetry.  Understand vectors and use them to describe translations. Perform and describe enlargements. Understand and use similarity and congruence<br><br>Work with coordinates in all 4 quadrants.<br>Recognise and sketch lines parallel to the axes and y=x.<br>Understand and use "y=mx+c". | Percentages calculator and non calculator<br>Plot, understand and use quadratic graphs.<br>Solve one and 2 step equations.<br>Solve equations with unknown on both sides.<br>Form and solve equations.<br>Understand and use standard mathematical formulae and formulae from other subjects.<br>Find squares and square roots.<br>Divide in a given ratio.<br>Simplify a ratio.<br>convert between ratios, percentages and fractions.<br>Divide in a given ratio given a quantity.<br>Find the 2 quantities given the difference.<br>Understand and use map scales.<br>Construct scale drawings. | Interpret and construct frequency tables, tally charts, bar charts, pictograms, pie charts and line graphs.<br>Understand and use the terms: primary data, secondary data, discrete and continuous data.<br>Understand and use probabilities.<br>Construct and use frequency and probability trees.<br>Calculate and use measures of central tendency and spread.<br>Understand and use relative frequency.<br>Solve direct and inverse proportion problems.<br>Perform standard constructions using ruler and compasses.<br>Sequences. |
| **Common Misconceptions** | 0.2 x 0.3 = 0.6<br>1/4 + 1/3 = 2/7<br>2/3 x 1/5 = 10/3<br>1 1/2 x 1 1/3 =1 1/6<br>Not understanding that a negative means a debit.<br>Confusion between HCF and LCM. | A squared is equivalent to 2a.<br>Absquared is equivalent to (ab) squared.<br>5(a+2) is equivalent to 5a+2<br>n'th term of 3,5,7 is n+2<br>Confusion between units of area and perimeter.<br>6 cm^2 is "6 cm squared".<br>Confusion between surface area and volume.<br>When finding perimeter of a quadrant forget to add the radii.<br>Not understanding difference between interior and exterior angles. | Lines parallel to the y axis have the form y=c.<br>Lines parallel to the x axis have the form x=c.<br>That an enlargement could result in reduction in size. | Confusion between x^2 and 2x.Not knowing the difference between "24% of 60" and "24 out of 60 as a percentage"<br>Thinking x^2gives a straight line graph.<br>Using rote methods, not understanding that 2x+3=6 is the same as 6=3+2x.<br>Not realising that "changing the subject" is the same process as "solving".<br><br>Not being able to change between metric units of lrngth | Not understanding that "compare two distributions" means compare their spread and a measure of central tendency.<br>Not understanding whether 2 quantities are in direct or inverse proportion. |

| Concept | Explanation of concept |
|---|---|
| **1. Number** | Addition and subtraction. Multiplication and division.Four operations with decimals,fractions and surds.Place value and ordering.Equivalence of fractions, decimals and percentages.Ratios and fractions.Fractions and percentages of amounts. Using percentages.Directed number.Factors, multiples, primes, squares, square roots.Indices, standard form. Mathematics and money. Problem solving. |
| **2. Algebra** | Algebraic notation, brackets, equations and inequalities.Expanding and Factorising.Simultaneous equations.Equality and equivalence.Forming and solving equations. Working with formulas.Testing conjectures, proof.Indices. Sequences. Straight line graphs. Changing the subject. Functions. |
| **3. Statistics and probability** | Collecting,representing and interpreting data.The data handling cycle.Sets and venn diagrams.Probability |
| **4. Geometry** | Lines and angles.Transformations, symmetry.Area and volume. Circles.2d and 3d shapes.Similarity and congruence. Constructions.Pythagoras' theorem, trigonometry. Vectors.Loci |
| **5. Ratio and proportion** | Ratio, scale. Enlargement and similarity.Multiplicative change.Proportion.Rates. Gradients and rates of change.Ratios and fractions. Compound measures: speed, distance, time, density, pressure |
|  |  |
|  |  |
|  |  |
|  |  |

| September 2022- July 2023 | Half term 1 | Half term 2 | Half term 3 | Half term 4 | Half term 5 |
|---|---|---|---|---|---|
| **Year 11 higher 1** | | | | | |
| Learning | algebra 1<br>fractions, decimals and percentages<br>shape 1<br>Number 1 | GRAPHS<br>RATIO AND PROPORTION<br>SHAPE 2 | DATA<br>ALGEBRA 2<br>PYTHAGORAS THEOREM<br>PROBABILITY | NUMBER 2<br>TRANSFORMATIONS<br>CONSTRUCTIONS<br>ALGEBRA 3 | VECTORS<br>SIMILARITY |
| Concepts | STATISTICS AND PROBABILITY<br>GEOMETRY<br>RATIO AND PROPORTION | NUMBER<br>ALGEBRA<br>GEOMETRY<br>RATIO AND PROPORTION | NUMBER<br>ALGEBRA<br>STATISTICS AND PROBABILITY<br>GEOMETRY | NUMBER<br>ALGEBRA<br>STATISTICS AND PROBABILITY<br>GEOMETRY | NUMBER<br>ALGEBRA<br>STATISTICS AND PROBABILITY<br>GEOMETRY |
| **What is needed to master the knowledge** | Angles in parallel lines and shapes<br>Exterior and interior angles of polygons<br>Proving geometric facts including properties of quadrilaterals<br>Solve problems with angles in polygons<br>Bearings and scale diagrams<br>Form and solve one-step and two-step equations<br>Solve linear equations involving fractions<br>Basic rules of indices<br>Understand and use the power zero, negative and fractional indices<br>Exact answers. Rational and irrational numbers<br>Understand and use surds. Rationalise the denominator. Calculate with surds.<br>Rounding to decimal places and significant figures<br>Converting into standard form for small and large numbers<br>Calculate with numbers in standard form | Expand and factorise single brackets<br>Expand and simplify double brackets<br>Factorise trinomials where a=1<br>Solve quadratics by factorising<br>Complete the square<br><br>Use the sine, cosine and tangent to find missing sides and angles<br><br>Sketch trigonometric functions.<br><br>Exact values<br><br>Pythagoras' Theorem (Revision)<br><br>Select the appropriate method to solve right-angled triangle problems | Change the subject of a formula including where the subject appears more than once<br>Understand and use sine and cosine rules<br>Use function notation<br>Work with composite functions<br>Work with inverse functions<br>Plot and read from cubic, exponential graphs<br>Recognise graph shapes<br>Solve a pair of linear simultaneous equations algebraically. | Solve a pair of simultaneous equations (one linear, one quadratic) using graphs<br>Direct and inverse proportion<br>Understand and represent vectors. Use and read vector notation<br>Draw and understand vectors multiplied by a scalar. Recognise parallel vectors<br>Draw and understand addition and subtraction of vectors<br>Explore vector journeys in shapes<br>Explore quadrilaterals using vectors<br>Use vectors to construct geometric arguments and proofs<br>Perform and describe translations.<br>Perform and describe line symmetry and reflection.<br>Perform and describe rotations and rotational symmetry.<br>Identify invariant points and lines<br>Sketch and identify translations of the graph of a given function<br>Sketch and identify reflections of the graph of a given function<br>Understand and use circle theorems. | Circle theorems<br>Find approximate solutions to equations using graphs<br>Estimate the area under a curve<br>Estimate gradient by drawing a tangent.<br>Congruency |
| **Common Misconceptions** | When measuring angles using a 180° degree protractor students often confuse the upper and lower scale.<br><br>Understanding basic angle properties such as acute and reflex angles helps with this.<br><br>Students often forget the definition of properties associated to angles in parallel lines.<br><br>Exterior angles in a polygon have to travel in the same direction for the sum to be 360°.<br><br>Difference between solving equations and inequalities.<br>Difference between x^2/3 and x^3/2. Confusing x^-2 with sqrt x. | Not understanding that (x+Öa)(x-Öa) gives a rational number but (x+Öa)(x+Öa) does not<br>X^0 is 1<br>x^-2 means square root.<br>Incorrectly labelling the sides.<br>Multiplying when finding the hypotenuse. Not understanding whether to use SOHCAHTOA, Pythagoras, Sine or cosine rule. | Students often have difficulty insqyaring a+b.<br><br>subtracting the 2bc from the b^2 +c^2 before multiplying by cosA<br><br>Not working backwards when using inverse functions<br><br>When using function machines that include multiple operations to solve equations, a common error is to forget to work backwards. This means that the inverse operations are used but they are in the wrong order.<br><br>Not using the correct order of operations when drawing a function machine<br><br>A common error is to not follow the correct order of operations when creating a function machine for an equation.<br><br>Function notation is mistaken for a product<br>It is common for f(x) to be thought of as "f times x" rather than "f of x". This confusion can lead to incorrect evaluations of values.<br><br>E.g. | Column vectors notation<br><br>2D column vectors only have 2 numbers within the brackets. Column vectors have the top number and the bottom number in the brackets.<br><br>There is no need for any other punctuation marks such as commas or semicolons. There is no need for a line to separate the numbers.<br><br>Vector addition is commutative. This means that the order in which we add vectors is not important.<br><br>The order in which you subtract vectors is very important. It is NOT like vector addition where the order is unimportant. Vector subtraction is NOT commutative.<br><br>A component of a vector can be zero<br>Vector components can be zero.<br><br>If both components of a vector are zero, this vector is known as the zero vector. | Confusing "angle at the centre" with "cyclic quadrilateral".<br><br>Confusing "angle in the alternate segment" with "angles on parallel lines".<br><br>Students often struggle with precisely defining the various angle appropriate angle properties.<br><br>Incomplete angle properties are a common source for losing marks in examinations.<br><br>Angle and line notation often confuses students to an extent they may calculate an angle that was not asked for.<br><br>Students need to relate their written work with the relevant angle rather than writing detached paragraphs.<br><br>Not understanding whether to use SOHCAHTOA, Pythagoras, Sine or cosine rule. |

| Concept | Explanation of concept |
|---|---|
| **1. Number** | Addition and subtraction. Multiplication and division.Four operations with decimals,fractions and surds.Place value and ordering.Equivalence of fractions, decimals and percentages.Ratios and fractions.Fractions and percentages of amounts. Using percentages.Directed number.Factors, multiples, primes, squares, square roots.Indices, standard form. Mathematics and money. Problem solving. |
| **2. Algebra** | Algebraic notation, brackets, equations and inequalities.Expanding and Factorising.Simultaneous equations.Equality and equivalence.Forming and solving equations. Working with formulas.Testing conjectures, proof.Indices. Sequences. Straight line graphs. Changing the subject. Functions. |
| **3. Statistics and probability** | Collecting,representing and interpreting data.The data handling cycle.Sets and venn diagrams.Probability |
| **4. Geometry** | Lines and angles.Transformations, symmetry.Area and volume. Circles.2d and 3d shapes.Similarity and congruence. Constructions.Pythagoras' theorem, trigonometry. Vectors.Loci |
| **5. Ratio and proportion** | Ratio, scale. Enlargement and similarity.Multiplicative change.Proportion.Rates. Gradients and rates of change.Ratios and fractions. Compound measures: speed, distance, time, density, pressure |
| | |
| | |
| | |
| | |

| September 2022- July 2023 | Half term 1 | Half term 2 | Half term 3 | Half term 4 | Half term 5 |
|---|---|---|---|---|---|
| **Year 11 higher** | | | | | |
| **Learning** | algebra 1<br>fractions, decimals and percentages<br>shape 1<br>Number 1 | SEQUENCES<br>SHAPE 2<br>ALGEBRA 2 | NUMBER 2<br>ALGEBRA 3 | RATIO AND PROPORTION 1<br>SHAPE 3 | STATISTICS 1<br>RATE OF CHANGE |
| **Concepts** | NUMBER<br>ALGEBRA<br>GEOMETRY | ALGEBRA<br>GEOMETRY | NUMBER<br>ALGEBRA | GEOMETRY<br>RATIO AND PROPORTION | STATISTICS AND PROBABILITY<br>ALGEBRA |
| **What is needed to master the knowledge** | Angles in parallel lines and shapes<br>Exterior and interior angles of polygons<br>Proving geometric facts including properties of quadrilaterals<br>Solve problems with angles in polygons<br>Bearings and scale diagrams.<br>Algebraic notation.<br>Solve equations<br>Form and solve equations<br>Basic rules of indices<br>Understand and use the power zero, fractional and negative indices<br>Rational and irrational numbers<br>Understand and use surds<br>Calculate with surds<br>Rounding to decimal places and significant figures<br>Powers of ten and standard form<br>Converting into standard form for small and large numbers | Calculate with numbers in standard form<br>HCF and LCM inc algebraically<br>Expand and factorise single brackets<br>Expand and simplify double brackets<br>Factorise trinomials where a=1<br>solve x^2+bx+c=0<br>Sequences<br>Finding the n'th term of a linear sequence. Solving problems involving sequences. Using the n'th term of a quadratic sequence.<br>Pythagoras' Theorem (Revision)<br>Use the sine, cosine and tangent to find missing sides and angles<br>Select the appropriate method to solve right-angled triangle problems<br>Constuct angles and triangles using ruler, compasses and a protractor<br>Locus of distance from a point<br>Locus of distance from a straight line<br>Locus equidistant from two points<br>Construct a perpendicular bisector<br>Construct a perpendicular from a point<br>Construct an angle bisector Solve loci problems<br>Change the subject of a simple formula | Rounding to decimal places and significant figures<br>Estimating answers to calculations (R)<br>Understand and use limits of accuracy<br>Upper and lower bounds<br>Draw straight line graphs. Find the gradient and midpoint of a line.<br>Understand and use y=mx+c<br>Plot and read from cubic, exponential graphs<br>Recognise graph shapes | Calculate with ratios<br>Simplify ratios<br>Ratio problems<br>Direct and inverse proportion worded problems<br>Calculate with pressure and density<br>Angle rules including on parallel lines<br>Understand and represent vectors. Use and read vector notation<br>Draw and understand vectors multiplied by a scalar.  Recognise parallel vectors<br>Draw and understand addition and subtraction of vectors<br>Understand similarity and congruence.<br>Perform and describe line and rotational symmetry.<br>Perform translations, rotations, reflections.<br>Enlarge a shape<br>Describe transformations<br>Calculate the circumference and area of a circle.<br>Calculate the area and perimeter of quadrant and semi circle | Find averages  and range. Construct and use cumulative frequency graphs,  box plots and histograms.<br>Compare distibutions. Draw and use scatter graphs.<br>Estimate the gradient by drawing a tangent.<br>Basic probability.<br>Frequency and probability trees.<br>Construct and use Venn diagrams.<br><br>Estimate gradient by drawing a tangent. |
| **Common Misconceptions** | Incorrectly rearranging the formula<br>Using incompatible units in a calculation<br>The correct way is to notice that the speed uses hours but the time given is in minutes. Therefore you must change 30 minutes into 0.5 hours and substitute these compatible values into the formula and do the following calculation.<br>When measuring angles using a 180° degree protractor students often confuse the upper and lower scale.<br>Understanding basic angle properties such as acute and reflex angles helps with this.<br>Students often forget the definition of properties associated to angles in parallel lines.<br>Exterior angles in a polygon have to travel in the same direction for the sum to be 360°.<br>Difference between solving equations and inequalities.<br>Difference between x^2/3 and x^3/2. | A common error occurs when drawing the locus of points, a fixed distance from the perimeter of a polygon. It is important to remember that the vertex of a polygon must be treated in the same way as a fixed point. Therefore, an arc must be used for the locus at the vertex.<br><br>E.g.<br>Joining corners of rectangles instead of bisecting the angle<br>A common error occurs when asked to find the locus of points equidistant from two perpendicular sides of a rectangle. The error is to just join the opposite corners of the rectangle instead of performing an angle bisector.<br><br>Not understanding whether to use SOHCAHTOA, Pythagoras, Sine or cosine rule. | It is very common for students to put an incorrect upper bound E.g.<br>If a length has been rounded to 56 cm to the nearest cm, an error maybe to write the upper bound as 56.4 cm.<br>The upper bound must be bigger than 56.4 cm as 56.49 also rounds down to 56, so does 56.499999999....<br>The upper bound in this case is 56.5 cm.<br>Thinking that 23.6 x 10^6 is in standard form.<br>That y=x^2 is a straight line<br><br>Students often have difficulty substituting in negative values to complex equations. Encourage the use of mental arithmetic. | Thinking 3:5 is the same as 3/5.<br>Not using bar models.<br>Mixing up direct and inverse proportion<br>Money is used in many direct proportion word problems. If an answer is 5.3 you may be tempted to write it as £5.3, but the correct way of writing it would be £5.30<br>Get mixed up with which angles are equal and which add up to 180 or 360<br>Column vectors notation<br>2D column vectors only have 2 numbers within the brackets. Column vectors have the top number and the bottom number in the brackets. There is no need for any other punctuation marks such as commas or semicolons.  There is no need for a line to separate the numbers.<br>Check the arrow on vector diagrams to see the direction of the vector.<br>Check for negative signs in column vectors.<br>Be careful calculating with negative numbers<br>It is easy to make errors with negative numbers when adding, subtracting, multiplying or squaring.  Brackets around the negative number can make calculations more accurate.<br>Incorrect choice from a=πr^2 c=2πr c=πd.<br>Failure to add the radii when finding the perimeter of quadrants or semi circles. | Confusing estimating the mean with cumulative frequency.<br>Plot midpoint rather than the end point for a cumulative frequency diagram.<br>Not realising that "compare distributions" means compare a measure of central tendency and a measure of spread.<br>Not finding the gradient correctly. |

| Concept | Explanation of concept |
|---|---|
| 1. Number | Addition and subtraction. Multiplication and division.Four operations with decimals,fractions and surds.Place value and ordering.Equivalence of fractions, decimals and percentages.Ratios and fractions.Fractions and percentages of amounts. Using percentages.Directed number.Factors, multiples, primes, squares, square roots.Indices, standard form. Mathematics and money. Problem solving. |
| 2. Algebra | Algebraic notation, brackets, equations and inequalities.Expanding and Factorising.Simultaneous equations.Equality and equivalence.Forming and solving equations. Working with formulas.Testing conjectures, proof.Indices. Sequences. Straight line graphs. Changing the subject. Functions. |
| 3. Statistics and probability | Collecting,representing and interpreting data.The data handling cycle.Sets and venn diagrams.Probability |
| 4. Geometry | Lines and angles.Transformations, symmetry.Area and volume. Circles.2d and 3d shapes.Similarity and congruence. Constructions.Pythagoras' theorem, trigonometry. Vectors.Loci |
| 5. Ratio and proportion | Ratio, scale. Enlargement and similarity.Multiplicative change.Proportion.Rates. Gradients and rates of change.Ratios and fractions. Compound measures: speed, distance, time, density, pressure |
| | |
| | |
| | |
| | |