



### Why Teach Maths

The teaching of Mathematics aims to develop students into confident mathematicians who can show resilience in their mathematical journey to become fluent with their conceptual understanding. The maths scheme of work is sequenced to ensure that students can master the basic conceptual skills before progressing, providing opportunities to make connections between topics.

Using this acquired depth of knowledge, students will be able to increase their awareness of mathematical techniques and their applications and develop key employability skills such as logical reasoning and problem-solving.

### Substantive Big Ideas

| Substantive Area and Year (s) Taught | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|--------------------------------------|---|---|---|----|----|----|----|
| <b>Number</b>                        |   |   |   |    |    |    |    |
| <b>Ratio and Proportion</b>          |   |   |   |    |    |    |    |
| <b>Geometry</b>                      |   |   |   |    |    |    |    |
| <b>Algebra</b>                       |   |   |   |    |    |    |    |
| <b>Statistics</b>                    |   |   |   |    |    |    |    |
| <b>Probability</b>                   |   |   |   |    |    |    |    |

Build mathematical fluency

Reason mathematically

**BIG DISCIPLINARY IDEAS OF OUR MATHS CURRICULUM**

Make connections within and across topics

Problem solve in a variety of contexts

### Learning for Life and Careers

#### Employability skills

Resilience, inquisitiveness, problem solving, making connections and identify patterns, explain, justify, reason logically, numeracy skills, communicate confidently.

#### Linking the curriculum to careers

Year group specific careers lessons delivered throughout the year.

#### Encounters with employers

Opportunity to speak to employers at careers fairs and work experience in Y10 and Y12.

#### Examples of qualification pathways

Students studying Maths at a higher level have access to some of the highest paid careers; if studying an A-Level in Maths, (the most popular A-Level in England), students can earn on average 11% more.

A-Level Maths is one of the most widely accepted and respected subject choice by universities and will keep your options open. Maths and Further Mathematics are 'facilitating subjects' which means they are amongst the most asked for by universities.

Degree choices where A-level Mathematics is an essential requirement of nearly all universities: Actuarial Science, Aeronautical Engineering, Chemical Engineering, Civil Engineering, Economics, Electrical/Electronic Engineering, Engineering (General), Mathematics, Mechanical Engineering, Physics, Statistics,

Degree choices where A-level Mathematics is listed as useful by most universities: Accountancy, Architecture, Biochemistry, Biology, Biomedical Sciences (including Medical Science), Business Studies, Chemistry, Computer Science, Dentistry, Dietetics, Geography – Some Geography BSc (science) degrees prefer one from Biology, Chemistry, Mathematics or Physics, Law – facilitating subjects at A-level are useful when applying for Law, Management Studies, Nursing and Midwifery,



# Prince William School

## Maths Curriculum Map – Topics by Term – KS3 and 4




|        | Year 7 |                              |    | Year 8                       |      |                                     | Year 9  |                                     |        | Year 10              |            |                                     |          | Year 11                             |            |                                     |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
|--------|--------|------------------------------|----|------------------------------|------|-------------------------------------|---------|-------------------------------------|--------|----------------------|------------|-------------------------------------|----------|-------------------------------------|------------|-------------------------------------|---|--------------------------------------|---|----------------------------|-------------------------------|-------------------------------|---|-------------------------------|---|-------------------------------|------------|-------------------------------|--|--|
|        |        |                              |    | Support                      | Core | Higher                              | Support | Core                                | Higher | Additional           | Foundation | Crossover                           | Higher 1 | Higher 2                            | Additional |                                     |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
|        |        |                              |    |                              |      |                                     |         |                                     |        |                      |            |                                     |          |                                     |            |                                     |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
| Autumn | N      | Investigating Number Systems | N  | Investigating Number Systems | N    | Calculation 1                       | N       | Calculation 1                       | N      | Calculation 1        | N          | Number Calculation                  | N        | Calculation                         | N          | Number Calculation                  | A | Algebraic Manipulation               | S | Statistics                 | S                             | Statistics                    | S | Statistics                    | S | Statistics                    | A          | Binomial distribution         |  |  |
|        | N      | Pattern Sniffing             | N  | Pattern Sniffing             | N    | Calculation 1                       | N       | Calculation 1                       | N      | Calculation 1        | N          | Calculation                         | N        | Calculation                         | N          | Number Calculation                  | A | Polynomials, functions and equations | P | Probability                | P                             | Probability                   | P | Probability                   | P | Probability                   | P          | Probability                   |  |  |
|        | N      | Pattern Sniffing             | N  | Solving Calculation Problems | N    | Calculation 1                       | N       | Calculation 1                       | N      | Calculation 1        | N          | Calculation                         | N        | Calculation                         | N          | Number Calculation                  | A | Polynomials, functions and equations | N | Number Calculations        | G                             | Shape                         | A | Solving                       | A | Solving                       | A          | Solving                       |  |  |
|        | N      | Solving Calculation Problems | N  | Generalising arithmetic      | G    | Shape                               | G       | Shape                               | G      | Shape                | G          | Visualising                         | G        | Visualising                         | G          | Shape 1                             | A | Equations and inequalities           |   | Revision                   |                               | Revision                      |   | Revision                      |   | Revision                      |            | Revision                      |  |  |
|        | A      | Generalising arithmetic      | G  | Exploring Shape              | N    | Calculation 2                       | N       | Calculation 2                       | N      | Calculation 2        | N          | Calculation                         | A        | Simplifying                         | A          | Simplifying                         | G | Shape 1                              | A | Equations and inequalities | RP                            | Ratio & Proportion            |   | Revision                      |   | Revision                      |            | Revision                      |  |  |
|        | G      | Exploring Shape              | N  | Reasoning with Measures      | A    | Simplifying                         | N       | Calculation 2                       | A      | Simplifying          | A          | Simplifying                         | N        | Fractions, Decimals and Percentages | RP         | Scaling                             | A | Simplifying                          | G | Graphs                     | G                             | Geometry - Graphs             |   | Revision                      |   | Revision                      |            | Revision                      |  |  |
|        |        |                              |    |                              |      |                                     |         |                                     |        |                      |            |                                     |          |                                     |            |                                     |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
|        |        |                              |    |                              |      |                                     |         |                                     |        |                      |            |                                     |          |                                     |            |                                     |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
| Spring | G      | Exploring Shape              | N  | Discovering Equivalence      | N    | Fractions, Decimals and Percentages | A       | Simplifying                         | A      | Simplifying          | N          | Fractions, Decimals and Percentages | RP       | Scaling                             | N          | Fractions, Decimals and Percentages | A | Sequences and recurrence relations   | G | Geometry Visualising       | RP                            | Ratio & Proportion            | G | Geometry                      |   | Revision                      |            | Revision                      |  |  |
|        | N      | Reasoning with Measures      | N  | Reasoning with Fractions     | N    | Fractions, Decimals and Percentages | A       | Simplifying                         | A      | Simplifying          | N          | Fractions, Decimals and Percentages | RP       | Scaling                             | N          | Fractions, Decimals and Percentages | A | Sequences and recurrence relations   | G | Geometry Visualising       | G                             | Geometry Measures             | G | Geometry                      |   | Revision                      |            | Revision                      |  |  |
|        | N      | Discovering Equivalence      | N  | Reasoning with Fractions     | N    | Sequences                           | N       | Fractions, Decimals and Percentages | A      | Patterns and solving | A          | Patterns and solving                | G        | Measuring                           | A          | Pattern Sniffing                    | A | Pattern Sniffing                     | G | Points, lines and circles  |                               | Mock 2 Revision               |   | Mock 2 Revision               |   | Mock 2 Revision               |            | Mock 2 Revision               |  |  |
|        | N      | Reasoning with Fractions     | N  | Solving Number Problems      | A    | solving                             | A       | solving                             | G      | Measuring            | G          | Measuring                           | A        | Solving                             | A          | Solving 1                           | A | Solving 1                            | G | Linear Inequalities        |                               | Revision Practice Exam Papers |   | Revision Practice Exam Papers |   | Revision Practice Exam Papers |            | Revision Practice Exam Papers |  |  |
|        | N      | Solving Number Problems      | S  | Investigating Statistics     | G    | Measuring                           | G       | Measuring                           | RP     | Scaling 1            | G          | Measuring                           | G        | Measuring                           | G          | Measuring                           | G | Measuring                            | G | Linear Inequalities        |                               | Revision Practice Exam Papers |   | Revision Practice Exam Papers |   | Revision Practice Exam Papers |            | Revision Practice Exam Papers |  |  |
|        |        |                              |    |                              |      |                                     |         |                                     |        |                      |            |                                     |          |                                     |            |                                     |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
|        |        |                              |    |                              |      |                                     |         |                                     |        |                      |            |                                     |          |                                     |            |                                     |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
|        |        |                              |    |                              |      |                                     |         |                                     |        |                      |            |                                     |          |                                     |            |                                     |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
| Summer | N      | Solving Number Problems      | G  | Visualising Shape            | G    | Measuring                           | RP      | Scaling                             | RP     | Scaling              | RP         | Scaling 1                           | G        | Measuring                           | G          | Measuring                           | G | Measuring                            | G | Trigonometry               | Revision Practice Exam Papers |                               |   |                               |   | A                             | Kinematics |                               |  |  |
|        | S      | Investigating Statistics     | N  | Exploring Change             | A    | Graphing                            | A       | Graphing                            | A      | Graphing             | A          | Graphing                            | A        | Proving                             | A          | Graphing                            | A | Graphing                             |   | End of year exams          |                               |                               |   |                               |   |                               |            |                               |  |  |
|        | G      | Visualising Shape            | N  | Exploring Change             | A    | Graphing                            | A       | Graphing                            | A      | Graphing             | A          | Graphing                            | A        | Graphing                            | A          | Graphing                            | A | Graphing                             | A | Graphing                   |                               | GCSE Examinations             |   |                               |   |                               | Exams      | Exams                         |  |  |
|        | N      | Exploring Change             | RP | Proportional Reasoning       | G    | Visualising                         | S       | Probability                         | S      | Probability          | A          | Graphing                            | A        | Graphing                            | G          | Visualising                         | S | Permutations and combinations        |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
|        | RP     | Proportional Reasoning       | RP | Proportional Reasoning       | G    | Visualising                         | S       | Probability                         | S      | Probability          | A          | Graphing                            | A        | Graphing                            | G          | Visualising                         | S | Permutations and combinations        |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
|        | G      | Describing Position          | G  | Describing Position          | S    | Probability                         | S       | Data                                | S      | Data                 | G          | Shape 2                             | A        | Solving 2                           | RP         | Proportion                          |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |
|        | N      | Measuring & estimating       | N  | Measuring & estimating       | S    | Data                                | S       | Data                                | S      | Data                 | G          | Shape 2                             | A        | Solving 2                           | RP         | Proportion                          |   |                                      |   |                            |                               |                               |   |                               |   |                               |            |                               |  |  |



# Prince William School

## Maths Curriculum Map – Substantive Progression KS3 (Number)




|   | Year 7   | Year 8   | Year 9 <b>support / core / higher</b>  |
|---|--|--|--|
| <br><b>NUMBER</b> | <ul style="list-style-type: none"> <li>understand and use place value</li> <li>round numbers and measures to an appropriate degree of accuracy</li> <li>order positive and negative integers, decimals and fractions</li> <li>generate terms of a sequence from a term-to-term rule</li> <li>recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions</li> <li>use positive integer powers and associated real roots, recognise powers of 2, 3, 4, 5</li> <li>apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers</li> <li>use conventional notation for priority of operations, including brackets</li> <li>use the symbols =, ≠, &lt;, &gt;, ≤, ≥</li> <li>estimate answers; check calculations using approximation and estimation</li> <li>substitute numerical values into formulae and expressions</li> <li>understand and use standard mathematical formulae</li> <li>recognise and use relationships between operations, including inverse operations</li> <li>express one quantity as a fraction of another</li> <li>define percentage as 'number of parts per hundred'</li> <li>interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively</li> <li>compare two quantities using percentages</li> <li>solve problems involving percentage change, including percentage increase/decrease</li> <li>interpret fractions and percentages as operators</li> <li>use standard units of mass, length, time, money, and other measures (including standard compound measures) using decimal quantities where appropriate</li> <li>use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)</li> <li>change freely between related standard units (e.g., time, length, area, volume/capacity, mass) in numerical contexts</li> <li>convert between different units of measure [for example, kilometre to metre, hour to minute]</li> </ul> | <ul style="list-style-type: none"> <li>generate terms of a sequence from either a term-to-term or a position-to-term rule</li> <li>deduce expressions to calculate the nth term of linear sequences</li> <li>use the concepts and vocabulary of prime numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem</li> <li>calculate with positive integer indices</li> <li>use conventional notation for priority of operations</li> <li>substitute numerical values into scientific formulae</li> <li>work with percentages greater than 100%</li> <li>solve problems involving percentage change, including original value problems, and simple interest including in financial mathematic</li> <li>work interchangeably with terminating decimals and their corresponding fractions</li> <li>calculate exactly with fractions</li> <li>use compound units such as speed, rates of pay, unit pricing</li> <li>change freely between compound units</li> <li>in numerical contexts</li> </ul> | <ul style="list-style-type: none"> <li>order positive and negative integers, decimals, and fractions, use the symbols =, ≠, &lt;, &gt;, ≤, ≥</li> <li>apply the four operations to integers, decimals, and simple fractions and mixed numbers – both positive and negative</li> <li>use positive integer powers and associated real roots, recognise powers of 2, 3, 4, 5</li> <li>calculate with roots, and positive whole number indices</li> <li>use the concepts and vocabulary of prime numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem</li> <li>round numbers and measures to an appropriate degree of accuracy</li> <li>use conventional notation for priority of operations</li> <li>as above</li> <li>use inequality notation to specify simple error intervals due to truncation or rounding</li> <li>apply and interpret limits of accuracy</li> <li>calculate with and interpret standard form</li> <li>calculate exactly with multiples of <math>\pi</math></li> <li>work interchangeably with terminating decimals and their corresponding fractions</li> </ul> |



# Prince William School

## Maths Curriculum Map – Substantive Progression KS3 (Ratio & Proportion)




|                    | Year 7  | Year 8   | Year 9 <b>support / core / higher</b>   |
|--------------------|---|--|---|
| RATIO & PROPORTION |  <ul style="list-style-type: none"> <li>• use ratio notation, including reduction to simplest form</li> <li>• divide a given quantity into two parts in each part: part or part: whole ratio</li> </ul> | <ul style="list-style-type: none"> <li>• express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)</li> <li>• express a multiplicative relationship between two quantities as a ratio or a fraction</li> <li>• understand and use proportion as equality of ratios</li> <li>• relate ratios to fractions and to linear functions</li> <li>• compare lengths, areas and volumes using ratio notation</li> <li>• use scale factors, scale diagrams and maps</li> <li>• identify and work with fractions in ratio problems</li> </ul> | <ul style="list-style-type: none"> <li>• express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1</li> <li>• define percentage as ‘number of parts per hundred’; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; solve problems involving percentage change, including percentage increase/decrease</li> <li>• work interchangeably with simple examples of terminating decimals and their corresponding fractions</li> <li>• use ratio notation, including reduction to simplest form</li> <li>• divide a given quantity into two parts in a given part: part or part: whole ratio; apply ratio to real contexts and problems understand and use proportion as equality of ratios</li> <li>• use ratio notation, including reduction to simplest form</li> <li>• divide a given quantity into two parts in a given part or whole ratio;</li> <li>• use proportion as equality of ratios</li> </ul> <p>as above plus</p> <ul style="list-style-type: none"> <li>• express a multiplicative relationship between two quantities as a ratio or a fraction</li> <li>• relate ratios to fractions and to linear functions</li> <li>• use scale factors, scale diagrams and maps</li> <li>• compare lengths, areas and volumes using ratio notation; make links to similarity and scale factors</li> <li>• identify and work with fractions in ratio problems</li> <li>• solve problems involving direct and inverse proportion, including graphical and algebraic representations</li> <li>• change freely between related standard units in numerical contexts</li> <li>• solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics             <ul style="list-style-type: none"> <li>• solve problems involving direct and inverse proportion, including graphical and algebraic representations</li> <li>• apply the concepts of congruence and similarity, including the relationships between lengths in similar figures</li> <li>• use compound units such as density and pressure;</li> <li>• change freely between compound units (e.g., density, pressure) in numerical and algebraic contexts</li> </ul> </li> </ul> |



# Prince William School

## Maths Curriculum Map – Substantive Progression KS3 (Geometry)




|   | Year 7  | Year 8   | Year 9 <b>support / core / higher</b>  |
|---|---|--|--|
| <br><b>GEOMETRY</b> | <ul style="list-style-type: none"> <li>identify properties of the faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones, and spheres</li> <li>use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries</li> <li>use the standard conventions for labelling and referring to the sides and angles of triangles</li> <li>apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles</li> <li>derive and apply the properties and definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language</li> <li>calculate perimeters of 2D shapes</li> <li>calculate the area of parallelograms, triangles and trapezia</li> <li>know and apply formulae to calculate volume of cuboids</li> <li>draw diagrams from written description</li> <li>measure line segments and angles in geometric figures</li> <li>use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons, and polygons with reflection and/or rotation symmetries</li> <li>identify and apply circle definitions and properties, including centre, radius, chord, diameter, circumference</li> <li>work with coordinates in all four quadrants</li> <li>solve geometrical problems with coordinate axes</li> <li>understand and use lines parallel to the axes, <math>y=x</math> and <math>y=-x</math></li> <li>identify, describe and construct congruent shapes, including on coordinate axes, by considering rotation, reflection and translation</li> <li>describe translations as 2D vectors</li> </ul> | <ul style="list-style-type: none"> <li>measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings</li> <li>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)</li> <li>use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line</li> <li>understand and use alternate and corresponding angles <b>on</b> parallel lines</li> <li>derive and use the sum of angles in a triangle (e.g., to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)</li> <li>calculate perimeters of circles and composite shapes</li> <li>know and apply formulae to calculate volume of right prisms (including cylinders)</li> <li>plot graphs of equations that correspond to straight-line graphs in the coordinate plane</li> <li>identify and interpret gradients and intercepts of linear functions graphically and algebraically</li> <li>recognise, sketch and interpret graphs of linear functions and quadratic functions</li> <li>find approximate solutions to linear equations using a graph</li> <li>identify, describe, and construct similar shapes, including on coordinate axes, by considering enlargement</li> </ul> | <p>revision of earlier learning, as necessary, plus</p> <ul style="list-style-type: none"> <li>derive and apply the properties and definitions of special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language</li> <li>know and apply formulae to calculate area of triangles, parallelograms, trapezia; volume of cuboids</li> <li>apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles</li> <li>measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings</li> <li>identify, describe and construct congruent shapes, including on coordinate axes, by considering rotation, reflection and translation and enlargement; describe translations as 2D vectors</li> </ul> <p>As above plus</p> <ul style="list-style-type: none"> <li>apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles; understand and use alternate and corresponding angles on parallel lines; derive and use the sum of angles in a triangle (e.g., to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)</li> <li>know and apply formulae to calculate area of triangles, parallelograms, trapezia; volume of cuboids and other right prisms (including cylinders)</li> <li>know the formulae = <math>2\pi r = \pi d</math>, area of a circle = <math>\pi r^2</math>; calculate perimeters of 2D shapes including circles, areas of circles and composite shapes</li> <li>identify and apply circle definitions and properties, including centre, radius, diameter, chord, circumference, tangent, arc, sector and segment</li> <li>construct and interpret plans and elevations of 3D shapes</li> <li>Know the formulae for: Pythagoras' theorem and apply it to find lengths in right- angled triangles in two dimensional figures</li> <li>Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' Theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs</li> <li>Calculate arc lengths, angles and areas of sectors of circles</li> <li>use the basic congruence criteria for triangles</li> </ul> |



# Prince William School

## Maths Curriculum Map – Substantive Progression KS3 (Algebra)




|   | Year 7   | Year 8   | Year 9 <b>support / core / higher</b>   |
|---|--|--|---|
| <br><br>ALGEBRA | <ul style="list-style-type: none"> <li>• solve linear equations in one unknown algebraically</li> <li>• simplify and manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket</li> <li>• understand and use the concepts and vocabulary of expressions, equations, formulae and terms</li> <li>• use and interpret algebraic notation</li> </ul> | <ul style="list-style-type: none"> <li>• solve linear equations with the unknown on both sides of the equation</li> <li>• rearrange formulae to change the subject</li> <li>• simplify and manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums, products and powers, including the laws of indices</li> <li>• understand and use the concepts and vocabulary of inequalities and factors</li> <li>• use and interpret algebraic notation; coefficients written as fractions rather than as decimals</li> <li>• plot and interpret graphs and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</li> </ul> | <ul style="list-style-type: none"> <li>• use and interpret algebraic notation, including brackets</li> <li>• understand and use the concepts and vocabulary of expressions, terms and factors</li> <li>• generate terms of a sequence from either a term-to-term or a position-to-term rule</li> <li>• recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions</li> <li>• deduce expressions to calculate the nth term of linear sequences</li> <li>• solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation)</li> <li>• work with coordinates in all four quadrants</li> <li>• solve geometrical problems on coordinate axes</li> <li>• plot graphs of equations that correspond to straight-line graphs in the coordinate plane</li> </ul> <p>as above plus</p> <ul style="list-style-type: none"> <li>• substitute numerical values into formulae and expressions, including scientific formulae</li> <li>• translate simple situations or procedures into algebraic expressions or formulae; derive an equation, solve the equation and interpret the solution</li> <li>• understand and use standard mathematical formulae, rearrange formulae to change the subject</li> <li>• identify and interpret gradients and intercepts of linear functions graphically and algebraically</li> <li>• recognise, sketch and interpret graphs of linear functions</li> </ul> <p>as above plus</p> <ul style="list-style-type: none"> <li>• recognise and use Fibonacci type sequences, quadratic sequences and simple geometric progressions (<math>r^n</math> where <math>n</math> is an integer, and <math>r</math> is a rational number <math>&gt; 0</math>)             <ul style="list-style-type: none"> <li>• simplify and manipulate algebraic expressions by expanding products of two binomials and factorising quadratic expressions of the form <math>x^2 + bx + c</math>, including the difference of two squares</li> <li>• know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments</li> <li>• understand and use the concepts and vocabulary of identities</li> <li>• translate simple situations or procedures into algebraic expressions or formulae, derive an equation, solve the equation and interpret the solution</li> <li>• represent the solution set to an inequality on a number line and using set notation</li> <li>• find approximate solutions to linear equations using a graph</li> <li>• solve two linear simultaneous equations in two variables algebraically</li> <li>• derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution</li> <li>• find approximate solutions to simultaneous equations using a graph</li> <li>• solve linear inequalities in two variables; represent the solution using set notation and, on a graph,</li> <li>• use the form <math>y = mx + c</math> to identify parallel lines</li> <li>• find the equation of the line through two given points, or through one point with a given gradient</li> <li>• identify and interpret roots, intercepts, turning points of quadratic functions graphically</li> <li>• deduce roots of quadratic functions algebraically</li> <li>• recognise, sketch and interpret graphs of simple cubic functions and the reciprocal function <math>y = 1/x</math> with <math>x \neq 0</math></li> <li>• plot and interpret graphs (and those of non-standard functions) in real contexts to find approximate solutions to problems such as simple kinematic problems</li> </ul> </li> </ul> |



# Prince William School

## Maths Curriculum Map – Substantive Progression KS3 Statistics)




|  | Year 7   | Year 8  | Year 9 <b>support</b> / core / <b>higher</b>  |
|--|--|---|---|
| <br>STATISTICS | <ul style="list-style-type: none"> <li>interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data and know their appropriate use</li> <li>interpret, analyse and compare median, mean, mode and modal class and spread (range)</li> </ul> | <ul style="list-style-type: none"> <li>use and interpret scatter graphs of bivariate data</li> <li>recognise correlation</li> <li>interpret, analyse and compare discrete, continuous and grouped data</li> <li>Consideration of outliers</li> <li>apply statistics to describe a population</li> </ul> | <ul style="list-style-type: none"> <li>interpret and construct more complex tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data and know their appropriate use</li> <li>interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range)</li> <li>as above, plus</li> <li>use and interpret scatter graphs of bivariate data; recognise correlation and know correlation does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing</li> <li>as above</li> </ul> |



# Prince William School


## Maths Curriculum Map – Substantive Progression KS3 (Probability)



|   | Year 7  | Year 8   | Year 9 <b>support / core / higher</b>  |
|---|---|--|--|
| <br><br>PROBABILITY | <ul style="list-style-type: none"> <li>record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees</li> <li>apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments</li> <li>relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale</li> <li>construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> </ul> | <ul style="list-style-type: none"> <li>apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one</li> <li>enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams</li> <li>construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> </ul> | <ul style="list-style-type: none"> <li>apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments</li> <li>relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale</li> <li>construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li>enumerate sets and combinations of sets systematically, using tables and grids</li> <li>construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li>as above plus</li> <li>enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams</li> <li>construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li>as above plus</li> <li>apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one</li> <li>calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</li> <li>understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size</li> </ul> |






|   | Year 10 <b>Support / Core / Higher</b>  | Year 11 <b>Support / Core / Higher</b>  | Additional Maths Y10 | Additional Maths Y11 |
|---|---|---|----------------------|----------------------|
| <br><b>Number</b> | <ul style="list-style-type: none"> <li>• apply the four operations, including formal written methods, to integers, decimals - both positive and negative</li> <li>• use conventional notation for priority of operations, including brackets, powers, roots and reciprocals</li> <li>• use positive integer powers and associated real roots; recognise powers of 2, 3, 4 and 5</li> <li>• calculate with roots and positive whole number indices</li> <li>• use the concepts and vocabulary of <b>prime</b> numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem</li> <li>• order integers, decimals and fractions</li> <li>• apply the four operations, including formal written methods, to simple fractions (proper and improper), and mixed numbers</li> <li>• define percentage as ‘number of parts per hundred’; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; solve problems involving percentage change, including percentage increase/decrease</li> <li>• use inequality notation to specify simple error intervals due to truncation or rounding</li> <li>• apply and interpret limits of accuracy</li> <li>• calculate with roots, and with integer indices</li> <li>• calculate with and interpret standard form</li> <li>• calculate exactly with multiples of <math>\pi</math></li> <li>• work interchangeably with terminating decimals and their corresponding fractions</li> <li>• solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics</li> <li>• <b>apply and interpret limits of accuracy,</b></li> <li>• <b>estimate powers and roots of any given positive number</b></li> <li>• <b>calculate with roots, and with fractional indices</b></li> <li>• <b>calculate exactly with surds</b></li> <li>• <b>simplify surd expressions involving squares and rationalise denominators</b></li> <li>•</li> </ul> | <ul style="list-style-type: none"> <li>• use inequality notation to specify simple error intervals due to truncation or rounding</li> <li>• apply and interpret limits of accuracy</li> <li>• calculate with and interpret standard form</li> <li>• calculate exactly with multiples of <math>\pi</math></li> </ul> |                      |                      |






|  | Year 10 <b>Support</b> / Core / <b>Higher</b>   | Year 11 <b>Support</b> / Core / <b>Higher</b>  | Additional Maths Y10 | Additional Maths Y11 |
|--|---|--|----------------------|----------------------|
| <br>Ratio and Proportion | <ul style="list-style-type: none"> <li>• express a multiplicative relationship between two quantities as a ratio or a fraction</li> <li>• understand and use proportion as equality of ratios</li> <li>• relate ratios to fractions and to linear functions</li> <li>• use scale factors, scale diagrams and maps</li> <li>• compare lengths, areas and volumes using ratio notation; make links to similarity &amp; scale factor</li> <li>• identify and work with fractions in ratio problems</li> <li>• solve problems involving direct and inverse proportion</li> <li>• change freely between related standard units in numerical contexts</li> <li>• divide a given quantity into two parts in a given part: part or part: whole ratio; express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems</li> <li>• solve problems involving direct and inverse proportion, including graphical and algebraic representations</li> <li>• apply the concepts of congruence and similarity, including the relationships between lengths in similar figures</li> <li>• use compound units such as density and pressure;</li> <li>• change freely between compound units (e.g., density, pressure) in numerical and algebraic contexts</li> <li>• change recurring decimals into their corresponding fractions and vice versa</li> <li>• set up, solve and interpret the answers in growth and decay problems, including compound interest</li> <li>•</li> </ul> | <ul style="list-style-type: none"> <li>• set up, solve and interpret the answers in growth and decay problems, including compound interest</li> <li>• understand that X is inversely proportional to Y is equivalent to X is proportional to 1/Y; construct and interpret equations that describe direct and inverse proportion</li> <li>• recognise and interpret graphs that illustrate direct and inverse proportion</li> </ul> |                      |                      |



# Prince William School

## Maths Curriculum Map – Substantive Progression KS4 (Geometry)



|  | Year 10 <b>Support</b> / Core / <b>Higher</b>  | Year 11 <b>Support</b> / Core / <b>Higher</b>   | Additional Maths Y10   | Additional Maths Y11  |
|--|--|---|--|---|
|  | <ul style="list-style-type: none"><li>identify properties of the faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres</li></ul> | <ul style="list-style-type: none"><li>identify and apply circle definitions and properties, including centre, radius,</li></ul> | <ul style="list-style-type: none"><li>calculate the distance between two points</li><li>Find the mid-point of a line segment</li></ul> | <ul style="list-style-type: none"><li>confirm the presence of a root by considering the sign of a function at the ends of an interval</li></ul> |


- use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries; use the standard conventions for labelling and referring to the sides and angles of triangles
- derive and apply the properties and definitions of special types of quadrilaterals using appropriate language
- apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles; understand and use alternate and corresponding angles on parallel lines; derive and use the sum of angles in a triangle
- know the formulae for: Pythagoras' theorem and apply it to find lengths in right-angled triangles in two dimensional figures
- identify and apply circle definitions and properties, including centre, radius, diameter, chord, circumference, tangent, arc, sector and segment
- use the standard ruler and compass constructions; know that the perpendicular distance from a point to a line is the shortest distance to the line
- construct and interpret plans and elevations of 3D shapes
- apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides,
- calculate arc lengths, angles and areas of sectors of circles
- use the basic congruence criteria for triangles
- apply Pythagoras' theorem to find lengths in three dimensional figures
- know the trigonometric ratios, and apply them to find angles and lengths in right-angled triangles in two dimensional figures
- know the exact values of  $\sin\theta$ ,  $\cos\theta$  and  $\tan\theta$  for  $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$  and  $90^\circ$ ;
- apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results
- calculate surface area and volume of spheres, pyramids, cones and composite solids
- apply the concepts of congruence and similarity, including the relationships between length, areas and volumes in similar figures
- identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection and translation and enlargement; describe translations as 2D vectors
- describe the changes and invariance achieved by combinations of rotations, reflections and translations
- apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors
- use vectors to construct geometric arguments and proofs


- diameter, chord, circumference, tangent, arc, sector and segment
- use the standard ruler and compass constructions and use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line
  - construct and interpret plans and elevations of 3D shapes
  - Identify, describe and construct congruent shapes, including on coordinate axes, by considering rotation, reflection and translation and enlargement; describe translations as 2D vectors
  - calculate surface area and volume of spheres, pyramids, cones and composite solids
  - apply the concepts of congruence and similarity
  - know the formulae for: Pythagoras' theorem, and apply it to find lengths in right-angled triangles and, where possible, general triangles and in three dimensional figures;
  - know the trigonometric ratios, to find angles and lengths in right-angled triangles and, where possible, general triangles in two dimensional figures
  - know the exact values of  $\sin\theta$ ,  $\cos\theta$  and  $\tan\theta$  for  $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$  and  $90^\circ$ ;
  - know the trigonometric ratios, and apply them to find angles and lengths in right-angled triangles and, where possible, general triangles in three dimensional figures
  - know and apply the sine rule to find unknown lengths and angles
  - know and apply  $\text{Area} = \frac{1}{2}ab \sin C$  to calculate the area, sides or angles of any triangle.
  - sketch translations and reflections of a given function
  - recognise, sketch and interpret graphs of exponential functions  $y = k^x$  for positive values of  $k$ , and the trigonometric functions (with arguments in degrees)  $y = \sin x$ ,  $y = \cos x$  and  $y = \tan x$  for angles of any size

- know and use the equation of a circle
- trigonometric functions for angles of any size
- recall and use the three trigonometrical functions for angles of any magnitude and their graphs
- know the sine and cosine rules and be able to apply them, including the ambiguous case for sine
- know and use the identity
 
$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$
- know and use the identity
 
$$\sin^2\theta + \cos^2\theta = 1$$
- solve simple trigonometric equations in given interval
- apply Pythagoras theorem and trigonometry to two- and three-dimensional problems
- the rule for integrating  $x^n$  where  $n$  is a positive integer
- use the integral notation
- Find definite integrals
- Find areas between curve and x-axis

- recognise a situation when a change of sign may not indicate a root
  - improve the accuracy of a root using:
    - interval bisection
    - decimal search
  - an iterative function
  - estimate the gradient of a tangent to a curve at a point using
    - a central difference
    - a forward difference
    - a backward difference
  - improve the estimate of a gradient
  - recognise when an attempt to improve an estimate of a gradient might not work
  - estimate the area under a curve and the x-axis using
    - the trapezium rule
    - rectangular strips
  - recognise when an estimate of an area would be an overestimate or an underestimate
  - differentiation
  - iterative sequences
  - the gradient of a curve
  - stationary points
  - the second derivative
- improve an estimate of an area
- find the area between a curve, two ordinates and the x-axis
  - find the area between two curves
  - integrate where  $n$  is a positive integer or 0, and the sum of such functions
  - understand integration as the reverse process of differentiation
  - know what is meant by a definite and an indefinite integral



|   | Year 10 Support / Core / Higher   | Year 11 Support / Core / Higher   | Additional Maths Y10   | Additional Maths Y11   |
|---|---|---|--|--|
| <br>Algebra | <ul style="list-style-type: none"> <li>• use and interpret algebraic notation,</li> <li>• understand and use the concepts and vocabulary of expressions, equations, formulae, inequalities, terms and factors</li> <li>• simplify and manipulate algebraic expressions</li> <li>• substitute numerical values into formulae and expressions, including scientific formulae</li> <li>• translate simple situations or procedures into algebraic expressions or formulae; derive an equation, solve the equation and interpret the solution</li> <li>• understand and use standard mathematical formulae, rearrange formulae to change the subject</li> <li>• solve linear inequalities in one variable</li> <li>• represent the solution set to an inequality on a number line</li> <li>• work with coordinates in all four quadrants</li> <li>• solve geometrical problems on coordinate axes</li> <li>• plot graphs of equations that correspond to straight-line graphs in the coordinate plane</li> <li>• find approximate solutions to linear equations using a graph</li> <li>• identify and interpret gradients and intercepts of linear functions graphically and algebraically</li> <li>• recognise, sketch and interpret graphs of linear functions</li> <li>• plot and interpret graphs in real contexts to find approximate solutions to problems such as simple kinematic problems</li> <li>• as above plus</li> <li>• know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments</li> <li>• understand and use the concepts and vocabulary of identities</li> <li>• translate simple situations or procedures into algebraic expressions or formulae</li> <li>• recognise and use Fibonacci type sequences, quadratic sequences and simple geometric progressions (<math>r^n</math> where <math>n</math> is an integer, and <math>r</math> is a rational number <math>&gt; 0</math>)</li> <li>• translate simple situations or procedures into algebraic expressions or formulae; derive an equation, solve the equation and interpret the solution</li> <li>• understand and use standard mathematical formulae, rearrange formulae to change the subject</li> <li>• solve linear inequalities in one variable</li> <li>• represent the solution set to an inequality on a number line</li> <li>• use the form <math>y = mx + c</math> to identify parallel lines</li> <li>• find the equation of the line through two given points, or through one point with a given gradient</li> <li>• identify and interpret roots, intercepts, turning points of quadratic functions graphically</li> <li>• deduce roots of quadratic functions algebraically</li> <li>• recognise, sketch and interpret graphs of simple cubic functions and reciprocal functions</li> <li>• plot and interpret graphs in real contexts to find approximate solutions to problems such as simple kinematic problems</li> <li>• find approximate solutions to linear equations using a graph</li> <li>• solve two linear simultaneous equations in two variables algebraically</li> <li>• derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution</li> <li>• find approximate solutions to simultaneous equations using a graph</li> <li>• solve quadratic equations algebraically by factorising</li> <li>• as above plus</li> <li>• simplify and manipulate algebraic expressions by collecting like terms, multiplying a single term over a bracket, taking out common factors, expanding products of two or more binomials, factorising quadratics of the form <math>x^2 + bx + c</math> including the difference of two squares, simplifying expressions involving sums, products and laws of indices</li> <li>• deduce expressions to calculate the <math>n</math>th term of quadratic sequences</li> <li>• recognise and use simple geometric progressions</li> <li>• solve quadratic equations, find approximate solutions using a graph</li> <li>• solve two simultaneous equations in two variables where one is quadratic algebraically</li> <li>• use the form <math>y = mx + c</math> to identify perpendicular lines</li> <li>• recognise and use the equation of a circle with centre at the origin</li> <li>• find the equation of a tangent to a circle at a given point</li> <li>• interpret the gradient at a point on a curve as the instantaneous rate of change</li> <li>• calculate or estimate gradients of graphs and areas under graphs and interpret results</li> </ul> | <ul style="list-style-type: none"> <li>• solve quadratic equations by completing the square</li> <li>• solve quadratic equations by using the quadratic formula</li> <li>• find approximate solutions to equations numerically using iteration</li> <li>• interpret the reverse process as the inverse function</li> <li>• interpret the succession of two functions as a 'composite function'</li> </ul> | <ul style="list-style-type: none"> <li>• algebraic manipulation</li> <li>• linear inequalities in two variables</li> <li>• polynomials, functions and equations</li> <li>• graphs</li> <li>• applications of equations and inequalities in one variable</li> <li>• sequences and recurrence relationships</li> </ul> | <ul style="list-style-type: none"> <li>• properties of the exponential function</li> <li>• applications of numerical methods</li> <li>• logarithms</li> <li>• reduction to linear form</li> <li>• equations involving exponentials</li> <li>• motion in a straight line</li> <li>• acceleration due to gravity</li> <li>• apply differentiation and integration to kinematics problems that involve displacement, velocity and acceleration of a particle moving in a straight line with variable or constant acceleration</li> <li>• use <math>x-t</math> and <math>v-t</math> graphs</li> <li>• finding displacement from velocity and velocity from acceleration</li> </ul> |

|  | Year 10 Support / Core / Higher | Year 11 Support / Core / Higher   | Additional Maths Y10   | Additional Maths Y11  |
|--|---------------------------------|---|--|---|
| <br>Probability |                                 | <ul style="list-style-type: none"> <li>• construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li>• apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one</li> <li>• enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams</li> <li>• construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li>• calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</li> <li>• as above and understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size</li> <li>• calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams.</li> </ul> | <ul style="list-style-type: none"> <li>• probability diagrams</li> <li>• factorials and the product rule</li> <li>• permutations and combinations</li> </ul> | <ul style="list-style-type: none"> <li>• binomial expansion</li> <li>• binomial distribution</li> </ul> |



|            | Year 12   | Year 13  |
|------------|---|--|
| Core Maths | <p><b>MATHS FOR PERSONAL FINANCE</b></p> <ul style="list-style-type: none"> <li>• substituting numerical values into formulae, spreadsheets and financial expressions</li> <li>• using conventional notation for priority of operations, including brackets, powers, roots and reciprocals</li> <li>• applying and interpreting limits of accuracy, specifying simple error intervals due to truncation or rounding</li> <li>• finding approximate solutions to problems in financial contexts</li> <li>• interpreting percentages and percentage changes as a fraction or a decimal and interpreting these multiplicatively</li> <li>• expressing one quantity as a percentage of another</li> <li>• comparing two quantities using percentages</li> <li>• working with percentages over 100%</li> <li>• solving problems involving percentage change</li> <li>• simple and compound interest</li> <li>• Saving and investments using AER</li> <li>• student loans and mortgages using APR</li> <li>• graphical representation (plotting points to create graphs and interpreting results from graphs in financial contexts)</li> <li>• income tax, National Insurance, Value Added Tax (VAT)</li> <li>• the effect of inflation, Retail Price Index (RPI), Consumer Price Index (CPI)</li> <li>• setting up, solving and interpreting the solutions to financial problems, including those that involve compound interest using iterative methods</li> <li>• currency exchange rates including commission</li> <li>• budgeting</li> </ul> | <p><b>CRITICAL PATH ANALYSIS</b></p> <ul style="list-style-type: none"> <li>• Representing compound projects by activity networks</li> <li>• Activity on-node representation will be used</li> <li>• Using early time and late time algorithms to identify critical activities and find the critical path(s)</li> <li>• Using Gantt charts (cascade diagrams) to present project activities</li> <li>• Understanding that uncertain outcomes can be modelled as random events with estimated probabilities</li> <li>• Applying ideas of randomness, fairness and equally likely events to calculate expected outcomes</li> <li>• Understanding and applying Venn diagrams and simple tree diagrams</li> <li>• Calculating the probability of combined events</li> <li>• Calculating the expected value of quantities such as financial loss or gain</li> <li>• Understanding that many decisions have to be made when outcomes cannot be predicted with certainty</li> <li>• Understanding that the actions that can be taken to reduce or prevent specific risks may have their own costs</li> <li>• Using probabilities to calculate expected values of costs and benefits decisions</li> <li>• Understanding that calculating an expected value is an important part of such decision making</li> </ul> |
|            | <p><b>DATA</b></p> <ul style="list-style-type: none"> <li>• Inferring properties of populations or distributions from a sample, whilst knowing the limitations of sampling</li> <li>• Constructing and interpreting diagrams for grouped discrete data and continuous data, knowing their appropriate use and reaching conclusions based on these diagrams</li> <li>• Representing a situation mathematically, making assumptions and simplifications</li> <li>• Selecting and using appropriate mathematical techniques for problems and situations</li> <li>• Interpreting results in the context of a given problem</li> <li>• Evaluating methods and solutions including how they may have been affected assumptions made</li> </ul>  |  |
|            | <p><b>COMMUNICATING MATHEMATICAL APPROACHES AND SOLUTIONS</b></p> <ul style="list-style-type: none"> <li>• Summarising and report writing</li> <li>• Comparing results from a model with real data</li> <li>• Critical analysis of data quoted in media, political campaigns, marketing etc</li> </ul>  |  |
|            | <p><b>ESTIMATION</b></p> <ul style="list-style-type: none"> <li>• representing a situation mathematically, making assumptions and simplifications</li> <li>• selecting and using appropriate mathematical techniques for problems and situations</li> <li>• interpreting results in the context of a given problem</li> <li>• evaluating methods and solutions including how they may have been affected by assumptions made</li> <li>• making fast, rough estimates of quantities which are either difficult or impossible to measure directly</li> </ul>  |  |





|                     |                       | A Level Maths  |  | A Level Further Maths   |   |
|---------------------|-----------------------|--|--|---|---|
|                     |                       | Year 12  | Year 13  | Year 12   | Year 13   |
| Pure                | Proof                 | <ul style="list-style-type: none"> <li>Understand and use the structure of mathematical proof</li> <li>Use methods of proof, including proof by deduction, proof by exhaustion &amp; disproof by counterexample</li> </ul>   | <ul style="list-style-type: none"> <li>Use the method of proof by contradiction</li> </ul>   | <ul style="list-style-type: none"> <li>Construct proofs using mathematical induction; contexts include sums of series, divisibility, and powers of matrices.</li> </ul>   | <ul style="list-style-type: none"> <li></li> </ul>  |
|                     | Algebra and Functions | <ul style="list-style-type: none"> <li>Understand and use the laws of indices for all rational exponents</li> <li>Use and manipulate surds, including rationalising the denominator</li> <li>Work with quadratic functions and their graphs</li> <li>Solve simultaneous equations in two variables by elimination and by substitution</li> <li>Solve linear and quadratic inequalities in a single variable and interpret these graphically</li> <li>Express solutions through correct use of 'and' and 'or', or through set notation</li> <li>Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation, and simple algebraic division; use of the factor theorem</li> <li>Sketch curves defined by simple equations including polynomials</li> <li>Interpret algebraic solution of equations graphically; use intersection points of graphs to solve equations</li> <li>Understand the effect of simple transformations on the graph of <math>y = f(x)</math> including sketching associated graphs</li> </ul> | <ul style="list-style-type: none"> <li>Simplify rational expressions</li> <li>Understand and use the modulus of a function; including their graphs</li> <li>Understand and use composite functions, inverse functions and their graphs</li> <li>Understand the effect of combinations of transformations</li> <li>Decompose rational functions into partial fractions</li> <li></li> </ul> | <ul style="list-style-type: none"> <li>Understand and use the relationship between roots and coefficients of polynomial equations up to quartic equations.</li> <li>Form a polynomial equation whose roots are a linear transformation of the roots of a given polynomial equation</li> <li>Understand and use formulae for the sums of integers, squares and cubes and use these to sum other series.</li> <li>Understand and use the method of differences for summation of series including use of partial fractions.</li> <li>Recognise and use the Maclaurin series for <math>e^x</math>, <math>\ln(1+x)</math>, <math>\sin x</math>, <math>\cos x</math>, and <math>(1+x)^n</math>, and be aware of the range of values of <math>x</math> for which they are valid (proof not required).</li> <li>Inequalities involving polynomial equations</li> <li>Solving inequalities algebraically.</li> <li>Graphs of <math>y =  f(x) </math>, <math>y = 1/f(x)</math> for given <math>y = f(x)</math></li> <li>Graphs of rational functions of form <math>(ax+b)/(cx+d)</math>; asymptotes, points of intersection with coordinate axes or other straight lines; associated inequalities.</li> <li>Graphs of rational functions of form <math>(ax^2+bx+c)/(dx^2+ex+f)</math> including cases when some of these coefficients are zero; asymptotes parallel to coordinate axes</li> <li>Using quadratic theory (not calculus) to find the possible values of the function and coordinates of the stationary points of the graph for rational functions of form <math>(ax^2+bx+c)/(dx^2+ex+f)</math></li> <li>Sketching graphs of curves with equations</li> <li><math>x^2/a^2 + y^2/b^2 = 1</math>, <math>x^2/a^2 - y^2/b^2 = 1</math>, <math>xy = c^2</math></li> <li>including intercepts with axes and equations of asymptotes of hyperbolas.</li> <li>Single transformations of curves involving translations, stretches parallel to coordinate axes and reflections in the coordinate axes and the lines <math>y = \pm x</math></li> </ul> | <ul style="list-style-type: none"> <li>Find the Maclaurin series of a function including the general term</li> <li>Evaluation of limits using Maclaurin series or l'Hôpital's rule</li> <li>Modulus of functions and associated inequalities</li> </ul> |
|                     | Coordinate Geometry   | <ul style="list-style-type: none"> <li>Understand and use the equation of a straight line, including in modelling contexts</li> <li>Understand and use the coordinate geometry of the circle including using the equation of a circle in the form <math>(x-a)^2 + (y-b)^2 = r^2</math></li> <li>Completing the square to find the centre and radius of a circle</li> <li>Use of the following properties: the angle in a semicircle is a right angle, the perpendicular from the centre to a chord bisects the chord &amp; the radius of a circle at a given point on its circumference is perpendicular to the tangent to the circle at that point</li> </ul>   | <ul style="list-style-type: none"> <li>Understand and use parametric equations of curves, including in modelling in a variety of contexts</li> <li>Convert between Cartesian equations and parametric equations</li> </ul>   |   |   |
| Sequence and Series |                       | <ul style="list-style-type: none"> <li>Understand and use the binomial expansion of <math>(a+bx)^n</math> for any rational <math>n</math></li> <li>Understand and use recurrence relations</li> <li>Understand and use sigma notation for sums of series</li> <li>Understand and work with arithmetic sequences and series</li> <li>Understand and work with geometric sequences and series</li> </ul>   |  |   |   |



|      |                        | A Level Maths  |  | A Level Further Maths   |  |
|------|------------------------|--|--|---|--|
|      |                        | Year 12  | Year 13  | Year 12   | Year 13  |
| Pure | Differentiation        | <ul style="list-style-type: none"> <li>Understand and use the derivative of <math>f(x)</math> as the gradient of the tangent to the graph of <math>y=f(x)</math> at a general point <math>(x, y)</math></li> <li>Understand the gradient of the tangent as a limit</li> <li>Sketching the gradient function for a given curve</li> <li>Understand differentiation from first principles for small positive integer powers of <math>x</math></li> <li>Apply differentiation to find gradients, tangents and normal, maxima and minima and stationary points, points of inflection</li> <li>Identify where functions are increasing or decreasing</li> </ul> | <ul style="list-style-type: none"> <li>Understand and use the second derivative in determining the convex/concave sections of curves and points of inflection</li> <li>Differentiate polynomial functions using the chain rule, including problems involving connected rates of change and inverse functions</li> <li>Differentiate polynomial functions using the product and quotient rules</li> <li>Understand and use the second derivative in determining the convex/concave sections of curves and points of inflection</li> <li>Differentiate polynomial functions using the chain rule, including problems involving connected rates of change and inverse functions</li> <li>Differentiate polynomial functions using the product and quotient rules</li> <li>Differentiate the               <ul style="list-style-type: none"> <li>exponential function,</li> <li>the trigonometric functions, related sums, differences and constant multiples</li> </ul> </li> <li>Understand and use the derivative of <math>\ln x</math></li> <li>Differentiate using the chain rule, product rule and quotient rule</li> <li>Differentiate simple functions and relations defined implicitly</li> <li>Differentiate simple functions and relations defined parametrically</li> </ul> |   |  |
|      | Integration            | <ul style="list-style-type: none"> <li>Integrate <math>x^n</math> (excluding <math>n = -1</math>), and related sums, differences, and constant multiples</li> <li>Evaluate definite integrals</li> <li>Use a definite integral to find the area under a curve</li> </ul>   | <ul style="list-style-type: none"> <li>Integrate the exponential function, <math>1/x</math>, the trigonometric functions and related sums, differences and constant multiples</li> <li>Use a definite integral to find the area between two curves</li> <li>Understand and use integration as the limit of a sum</li> <li>Carry out simple cases of integration by substitution</li> <li>Carry out simple cases of integration by parts</li> <li>Integrate using partial fractions</li> <li>Construct simple differential equations in pure mathematics and in context</li> <li>Evaluate the analytical solution of simple first order differential equations with separable variables, including finding particular solutions</li> <li>Interpret the solution of a differential equation in the context of solving a problem</li> <li>Use differential equations in kinematics problems</li> </ul>  |   |  |
|      | Calculus               |  |  | <ul style="list-style-type: none"> <li>Evaluate improper integrals where either the integrand is undefined at a value in the range of integration or the range of integration extends to infinity</li> <li>Derive formulae for and calculate volumes of revolution.</li> <li>Understand and evaluate the mean value of a function.</li> </ul> | <ul style="list-style-type: none"> <li>Integrate using partial fractions</li> <li>Differentiate inverse trigonometric functions</li> <li>Integrate functions of the form <math>(a^2-x^2)^2</math>, <math>(a^2+x^2)^{-1}</math> and be able to choose trigonometric substitutions to integrate associated functions</li> <li>Arc length and area of surface of revolution for curves expressed in Cartesian or parametric coordinates</li> <li>Derivation and use of reduction formulae for integration.</li> <li>The limits <math>\lim(x^k e^{-x})</math>, and <math>x^k \ln x</math>, where <math>k &gt; 0</math> applied to improper integrals</li> </ul>  |
|      | Differential Equations |  |  | <ul style="list-style-type: none"> <li>Find and use an integrating factor to solve differential equations of form <math>dy/dx + P(x)y = Q(x)</math> and recognise when it is appropriate to do so.</li> </ul>   | <ul style="list-style-type: none"> <li>Find both general and particular solutions of differential equations.</li> <li>Use differential equations in modelling in kinematics and in other contexts.</li> <li>Solve differential equations of form <math>y'' + ay' + by = 0</math> where <math>a</math> and <math>b</math> are constants, by using the auxiliary equation.</li> <li>Solve differential equations of form <math>y'' + ay' + by = 0</math> where <math>a</math> and <math>b</math> are constants, by solving the homogeneous case and adding a particular integral to the complementary function (in cases where <math>f(x)</math> is a polynomial, exponential or trigonometric function)</li> <li>Understand and use the relationship between the cases when the discriminant of the auxiliary equation is positive, zero and negative and the form of solution of the differential equation.</li> <li>Solve the equation for simple harmonic and relate the solution to the motion.</li> <li>Model damped oscillations using 2nd order differential equations and interpret their solutions. Understand light, critical, and heavy damping and be able to determine when each will occur.</li> <li>Analyse and interpret models of situations with one independent variable and two dependent variables as a pair of coupled 1st order simultaneous equations and be able to solve them, for example predator-prey models.</li> <li>Use of Hooke's law with <math>T = kx</math> to formulate a differential equation for simple harmonic motion, where <math>k</math> is a constant.</li> <li>Use models for damped motion where damping force is proportional to the velocity</li> </ul> |



|      |                             | A Level Maths   |  | A Level Further Maths  |  |
|------|-----------------------------|---|--|--|--|
|      |                             | Year 12   | Year 13  | Year 12  | Year 13  |
| Pure | Vectors                     | <ul style="list-style-type: none"> <li>Calculate the magnitude and direction of a 2D vector and convert between component form and magnitude/direction form</li> <li>Add 2D vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars and understand their geometrical interpretations</li> <li>Understand and use position vectors; calculate the distance between two points represented by position vectors</li> <li>Understand and use the binomial expansion of <math>(a+bx)^n</math> for positive integer <math>n</math> and the notations <math>n!</math> and <math>nCr</math></li> </ul>   | <ul style="list-style-type: none"> <li>Calculate the magnitude and direction of a 3D vector and convert between component form and magnitude/direction form</li> <li>Add 3D vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars and understand their geometrical interpretation</li> </ul>  | <ul style="list-style-type: none"> <li>Understand and use the vector and Cartesian forms of an equation of a straight line in 3D.</li> <li>Understand and use the vector and Cartesian forms of the equation of a plane.</li> <li>Calculate the scalar product and use it to calculate the angle between two lines,</li> <li>Check whether vectors are perpendicular by using the scalar product.</li> <li>Find the intersection of two lines. Find the intersection of a line and a plane. Calculate the perpendicular distance between two lines, from a point to a line and from a point to a plane.</li> </ul> | <ul style="list-style-type: none"> <li>Calculate and understand the properties of the vector product. Understand and use the equation of a straight line in the form <math>(r - a) \times b = 0</math> Use vector products to find the area of a triangle</li> </ul>       |
|      | Numerical Methods           | <ul style="list-style-type: none"> <li></li> </ul>  | <ul style="list-style-type: none"> <li>Locate roots of <math>f(x)=0</math> by considering changes of sign of <math>f(x)</math> in an interval of <math>x</math></li> <li>Understand the limitations of change of sign methods</li> <li>Solve equations approximately using simple iterative methods and understand their limitations; be able to draw associated cobweb and staircase diagrams</li> <li>Solve equations using the Newton-Raphson method and understand its limitations</li> <li>Understand and use the trapezium rule to estimate the area under a curve</li> <li>Use numerical methods to solve problems in context</li> </ul>  |  | <ul style="list-style-type: none"> <li>Mid-ordinate rule and Simpson's rule for integration.</li> <li>Euler's step by step method for solving first order differential equations</li> <li>Improved Euler method for solving first order differential equations.</li> </ul> |
|      | Trigonometry                | <ul style="list-style-type: none"> <li>Understand and use the definitions of sine, cosine and tangent for all arguments</li> <li>Use the sine rule, cosine rule and the area of a triangle formula</li> <li>Understand and use the sine, cosine and tangent functions; their graphs, symmetries and periodicity</li> <li>Understand and use the identities <math>\tan\theta = \sin\theta/\cos\theta</math> and <math>(\sin\theta)^2 + (\cos\theta)^2 = 1</math></li> <li>Solve trigonometric equations in a given interval</li> </ul>   | <ul style="list-style-type: none"> <li>Understand and use radian measure, including use for arc length and area of a sector</li> <li>Understand and use the standard small angle approximations</li> <li>Solve simple trigonometric equations using radians</li> <li>Understand and use the definitions of the reciprocal trigonometric functions, including their graphs</li> <li>Understand and use the definitions of the inverse trigonometric functions, including their graphs</li> <li>Understand and use the identities <math>[\sec]^2 x \equiv 1 + [\tan]^2 x</math> and <math>[\operatorname{cosec}]^2 x \equiv 1 + [\cot]^2 x</math></li> <li>Understand and use the compound angle formulae and double angle formulae, including their geometric proofs</li> <li>Understand and use expressions given in harmonic form</li> <li>Construct proofs involving trigonometric functions and identities</li> <li>Use trigonometric functions to solve problems in context</li> </ul> |  |  |
|      | Exponentials and Logarithms | <ul style="list-style-type: none"> <li>Know and use the function <math>ax</math> and its graph, where <math>a</math> is positive</li> <li>Know and use the function <math>e^x</math> and its graph</li> <li>Know that the gradient of <math>e^{kx}</math> is equal to <math>ke^{kx}</math> and hence understand why the exponential model is suitable in many applications</li> <li>Know and use the definition of <math>[\log]_a x</math> as the inverse of <math>ax</math>, where <math>a</math> is positive and <math>x \geq 0</math>.</li> <li>Know and use the function <math>\ln x</math> and its graph</li> <li>Know and use <math>\ln x</math> as the inverse function of <math>e^x</math></li> <li>Understand and use the laws of logarithms:</li> <li>Solve equations of the form <math>ax=b</math></li> <li>Use logarithmic graphs to estimate parameters in relationships of the form <math>y=ax^n</math> and <math>y = kbx</math>, given data for <math>x</math> and <math>y</math></li> <li>Understand and use exponential growth and decay; use in modelling and consider limitations and refinements of models</li> </ul> |  |  |  |



|      |                      | A Level Maths |         | A Level Further Maths   |   |
|------|----------------------|---------------|---------|---|---|
|      |                      | Year 12       | Year 13 | Year 12   | Year 13   |
| Pure | Polar Coordinates    |               |         | <ul style="list-style-type: none"> <li>Understand and use polar coordinates and be able to convert between polar and Cartesian coordinates.</li> <li>Sketch curves with <math>r</math> given as a function of <math>\theta</math>, including use of trigonometric functions.</li> </ul>   | <ul style="list-style-type: none"> <li>Find the area enclosed by a polar curve.</li> </ul>  |
|      | Hyperbolic Functions |               |         | <ul style="list-style-type: none"> <li>Understand the definitions of hyperbolic functions <math>\sinh x</math>, <math>\cosh x</math> and <math>\tanh x</math>, including their domains and ranges, and be able to sketch their graphs.</li> <li>Differentiate and integrate hyperbolic functions</li> <li>Understand and be able to use the definitions of the inverse hyperbolic functions and their domains and ranges.</li> <li>Derive and use the logarithmic forms of the inverse hyperbolic functions.</li> <li>Understand and use               <ul style="list-style-type: none"> <li><math>\tanh x = \frac{\sinh x}{\cosh x}</math></li> <li>Derive and use <math>\cosh^2 x - \sinh^2 x = 1</math></li> <li>use identities to solve equations or derive other results</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>Understand the definitions of hyperbolic functions <math>\operatorname{sech} x</math>, <math>\operatorname{cosech} x</math> and <math>\operatorname{coth} x</math>, including their domains and ranges.</li> <li>Integrate functions of the form <math>(x^2+a^2)^{-1/2}</math>, <math>(x-a)^{-1/2}</math> and be able to choose substitutions to integrate associated functions.</li> <li>Construct proofs involving hyperbolic functions and identities.</li> <li>Construct proofs involving hyperbolic functions and identities.</li> </ul>                |
|      | Complex Numbers      |               |         | <ul style="list-style-type: none"> <li>Solve any quadratic equation with real coefficients; solve cubic or quartic equations with real coefficients</li> <li>Understand and use the complex conjugate; know that non-real roots of polynomial equations with real coefficients occur in conjugate pairs.</li> <li>Use and interpret Argand diagrams.</li> <li>Convert between the Cartesian form and the modulus-argument form of a complex number</li> <li>Multiply and divide complex numbers in modulus-argument form</li> <li>Construct and interpret simple loci in the Argand diagram</li> </ul>  | <ul style="list-style-type: none"> <li>Understand de Moivre's theorem and use it to find multiple angle formulae and sums of series.</li> <li>Know and use the definition <math>e^{i\theta} = \cos\theta + i\sin\theta</math> and the form <math>z = re^{i\theta}</math></li> <li>Find the <math>n</math> distinct <math>n</math>th roots of <math>re^{i\theta}</math> for <math>r \neq 0</math> and know that they form the vertices of a regular <math>n</math>-gon in the Argand diagram.</li> <li>Use complex roots of unity to solve geometric problems.</li> </ul>                            |
|      | Matrices             |               |         | <ul style="list-style-type: none"> <li>Add, subtract and multiply conformable matrices; multiply a matrix by a scalar.</li> <li>Understand and use zero and identity matrices.</li> <li>Use matrices to represent linear transformations in 2D; successive transformations; single transformations in 3D</li> <li>Find invariant points and lines for a linear transformation.</li> <li>Calculate determinants of <math>2 \times 2</math> matrices and <math>3 \times 3</math> matrices and interpret as scale factors, including the effect on orientation.</li> <li>Understand and use singular and non-singular matrices; properties of inverse matrices. Calculate and use the inverse of non-singular <math>2 \times 2</math> matrices and <math>3 \times 3</math> matrices</li> </ul>           | <ul style="list-style-type: none"> <li>Solve three linear simultaneous equations in three variables by use of the inverse matrix.</li> <li>Interpret geometrically the solution and failure of solution of three simultaneous linear equations</li> <li>Factorisation of determinants using row and column operations</li> <li>Find eigenvalues and eigenvectors of <math>2 \times 2</math> and <math>3 \times 3</math> matrices. Find and use the characteristic equation. Understand the geometrical significance of eigenvalues and eigenvectors</li> <li>Diagonalisation of matrices</li> </ul> |



|           |                             | A Level Maths   |  | A Level Further Maths  |  |
|-----------|-----------------------------|---|--|--|--|
|           |                             | Year 12   | Year 13  | Year 12  | Year 13  |
| Mechanics | Kinematics                  | <ul style="list-style-type: none"> <li>Understand and use fundamental quantities and units in the S.I. system and language of kinematics</li> <li>Understand, use and interpret graphs in kinematics for motion in a straight line</li> <li>Understand, use and derive the formulae for constant acceleration for motion in a straight line</li> <li>Use calculus in kinematics for motion in a straight line</li> </ul>  | <ul style="list-style-type: none"> <li>Extend use of the formulae for constant acceleration for motion in a straight line to 2D vectors</li> <li>Extend use calculus in kinematics for motion in a straight line to 2D vectors</li> <li>Model motion under gravity in a vertical plane using vectors</li> <li>Use and understand assumptions made when modelling projectiles</li> </ul>  |  |  |
|           | Forces and Newton's Laws    | <ul style="list-style-type: none"> <li>Understand the concept of a force; understand and use Newton's first law</li> <li>Understand and use Newton's second law for motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors)</li> <li>Understand and use weight and motion in a straight line under gravity</li> <li>Understand and use Newton's third law, applying to problems involving smooth pulleys and connected particles</li> </ul> | <ul style="list-style-type: none"> <li>Extend use of Newton's second law for motion in a straight line to situations where forces need to be resolved (2D only)</li> <li>Extend use of Newton's third law to situations where forces need to be resolved (2D only) and equilibrium of a particle under coplanar forces</li> <li>Understand and use addition of forces and resultant forces</li> <li>Understand and use the model for friction</li> <li></li> </ul> |  |  |
|           | Centres of Mass and Moments |   | <ul style="list-style-type: none"> <li>Understand and use moments in simple static contexts</li> </ul>   |  | <ul style="list-style-type: none"> <li>Centre of mass for a system of particles.</li> <li>Centre of mass for a composite body</li> <li>Centre of mass of a lamina by integration</li> <li>Centres of mass of bodies formed by rotating a region about the x-axis</li> <li>Conditions for sliding and toppling. Problems including suspension and on an inclined plane.</li> <li>Determine the forces acting on a rigid body in equilibrium. Use of moments and couples.</li> </ul> |
|           | Dimensional                 |   |  | <ul style="list-style-type: none"> <li>Finding dimensions of quantities; checking for dimensional consistency.</li> <li>Prediction of formulae; finding powers in potential formulae.</li> </ul>   | <ul style="list-style-type: none"> <li></li> </ul>   |
|           | Momentum and                |   |  | <ul style="list-style-type: none"> <li>Conservation of momentum for linear motion and cases where velocities are given as one or two dimensional vectors</li> <li>Coefficient of Restitution and Newton's Experimental Law. Use in direct collisions and impacts with a fixed smooth surface</li> <li>Impulse and its relation to momentum (in one or two dimensions)</li> <li>Impulse for variable forces. One dimension only. Use of <math>I = \int F dt</math></li> </ul>   | <ul style="list-style-type: none"> <li>problems that require resolving</li> </ul>  |
|           | Work Energy and Power       |   |  | <ul style="list-style-type: none"> <li>Work done by a force acting in the direction of motion or directly opposing the motion. Use of <math>WD = Fd\cos\theta</math></li> <li>Gravitational potential energy. Use in conservation of energy problems.</li> <li>Kinetic energy. Use in conservation of energy problems.</li> <li>Hooke's Law including using modulus of elasticity.</li> <li>Work done by a variable force. Use of <math>WD = \int F dx</math>.</li> <li>Use in conservation of energy problems.</li> <li>Elastic Potential Energy using modulus of elasticity</li> </ul> |  |
|           | Circular Motion             |   |  | <ul style="list-style-type: none"> <li>Motion of a particle moving in a circle with constant speed</li> <li>Understand the definition of angular speed</li> <li>Relationships between speed, angular speed, radius and acceleration.</li> </ul>  | <ul style="list-style-type: none"> <li>resolving forces in contexts such as cars moving on banked tracks, particles moving on the inside of an upturned cone or hemisphere.</li> <li>Use position, velocity and acceleration as vectors in the context of circular motion</li> <li>Circular motion in a vertical plane. Includes conditions to complete vertical circles. Use of conservation of energy in this context</li> </ul>   |



|            |                                      | A Level Maths  |  | A Level Further Maths |         |
|------------|--------------------------------------|--|--|-----------------------|---------|
|            |                                      | Year 12  | Year 13  | Year 12               | Year 13 |
| Statistics | Statistical Sampling                 | <ul style="list-style-type: none"> <li>Understand and use the terms 'population' and 'sample'</li> <li>Understand, use and critique sampling techniques, including simple random sampling and opportunity sampling</li> </ul>  |  |                       |         |
|            | Data Presentation and Interpretation | <ul style="list-style-type: none"> <li>DATA PRESENTATION &amp; INTERPRETATION</li> <li>Interpret diagrams for single-variable data</li> <li>Interpret diagrams for bivariate data</li> <li>Understand informal interpretation of correlation and that correlation does not imply causation</li> <li>Interpret measures of central tendency and variation</li> <li>Be able to calculate standard deviation</li> </ul> |  |                       |         |
|            | Probability                          | <ul style="list-style-type: none"> <li>Understand and use mutually exclusive and independent events when calculating probabilities</li> </ul>  | <ul style="list-style-type: none"> <li>Understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables and the conditional probability formula</li> <li>Modelling with probability, including critiquing assumptions</li> <li>Find probabilities using the Normal distribution</li> <li>Select an appropriate probability distribution for a context</li> </ul>  |                       |         |
|            | Statistical Distributions            | <ul style="list-style-type: none"> <li>Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution</li> </ul>  |  |                       |         |
|            | Statistical Hypothesis Testing       | <ul style="list-style-type: none"> <li>STATISTICAL HYPOTHESIS TESTING</li> <li>Understand and apply the language of statistical hypothesis testing, developed through a binomial model</li> <li>Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context</li> </ul>  | <ul style="list-style-type: none"> <li>Extend the language of statistical hypothesis testing to correlation coefficients as measures of how close data points lie to a straight line and be able to interpret a given correlation coefficient using a given p-value or critical value</li> <li>Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context</li> </ul> |                       |         |



|          |                                    | A Level Maths |         | A Level Further Maths  |   |
|----------|------------------------------------|---------------|---------|--|---|
|          |                                    | Year 12       | Year 13 | Year 12  | Year 13   |
| Discrete | Graphs                             |               |         | <ul style="list-style-type: none"> <li>Understand and use the language of graphs, including vertex, edge, trail, cycle, connected, degree, subgraph, subdivision, multiple edge and loop.</li> <li>Identify or prove properties of a graph including that a graph is Eulerian, semi-Eulerian or Hamiltonian.</li> <li>Understand and use Euler's formula for connected planar graphs.</li> <li>Understand and use complete graphs and bipartite graphs, including adjacency matrices and the complement of a graph</li> <li>Understand and use simple graphs, simple-connected graphs and trees</li> </ul> | <ul style="list-style-type: none"> <li>Use Kuratowski's Theorem to determine the planarity of graphs</li> <li>Recognise and find isomorphism between graphs</li> </ul>  |
|          | Networks                           |               |         | <ul style="list-style-type: none"> <li>Understand and use the language of networks including: node, arc and weight</li> <li>Solve network optimisation problems using spanning trees</li> <li>Solve route inspection problems</li> <li>Find and interpret upper bounds and lower bounds for the Travelling Salesperson problem</li> <li>Evaluate, modify and refine models that use networks.</li> </ul>   |   |
|          | Network Flows                      |               |         | <ul style="list-style-type: none"> <li>Interpret flow problems represented by a network of directed arcs</li> <li>Find the value of a cut and understand its meaning</li> <li>Use and interpret the maximum flow-minimum cut theorem</li> </ul>  | <ul style="list-style-type: none"> <li>Augment flows and determine the maximum flow in a network</li> <li>Solve problems including arcs with upper and lower capacities</li> <li>Refine network flow problems including using nodes of restricted capacity</li> </ul> |
|          | Linear Programming                 |               |         | <ul style="list-style-type: none"> <li>Formulate and solve constrained optimisation problems</li> </ul>  | <ul style="list-style-type: none"> <li>Use the Simplex algorithm for optimising (maximising and minimising) an objective function including the use of slack variables.</li> <li>Interpret a Simplex tableau</li> </ul>   |
|          | Critical Path Analysis             |               |         | <ul style="list-style-type: none"> <li>Construct, represent and interpret a precedence (activity) network using activity-on-node.</li> <li>Determine earliest and latest start and finish times for an activity network</li> <li>Identify critical activities, critical paths and the float of non-critical activities.</li> <li>Refine models and understand the implications of possible changes in the context of critical path analysis</li> </ul>   | <ul style="list-style-type: none"> <li>Construct and interpret Gantt (cascade) charts and resource histograms</li> <li>Carry out resource levelling (using heuristic procedures) and evaluate problems where resources are restricted</li> </ul>                      |
|          | Game Theory for Zero Sum Games     |               |         | <ul style="list-style-type: none"> <li>Understand, interpret and construct pay-off matrices</li> <li>Find play-safe strategies and the value of the game</li> <li>Prove the existence or non-existence of a stable solution</li> <li>Identify and make use of dominated strategies</li> <li>Find optimal mixed strategies for a game including use of graphical methods</li> </ul>   | <ul style="list-style-type: none"> <li>Convert higher order games to linear programming problems and solve using the Simplex algorithm</li> </ul>   |
|          | Binary Operations and Group Theory |               |         | <ul style="list-style-type: none"> <li>Understand and use binary operations including use of modular arithmetic and matrix multiplication.</li> <li>Understand, use and prove the commutativity of a binary operation</li> <li>Understand, use and prove the associativity of a binary operation</li> <li>Understand and prove the existence of an identity element for a given set under a given binary operation.</li> <li>Find the inverse of an element belonging to a given set under a given binary operation</li> </ul>   |   |



# Prince William School

## Maths Curriculum Map – Disciplinary Progression



|   | KS3   | KS4  | KS5  |
|---|---|--|--|
| <b>Build mathematical fluency</b>             | <p>Develop fluency in use of mathematical language.</p> <p>Develop use of mathematical tools ie protractor, compass and calculator.</p> | Revisit core disciplinary and procedural knowledge   | Understand mathematical processes in a way that promotes confidence, promotes enjoyment and provides a strong foundation for further study |
| <b>Reason mathematically</b>                  |   | Think mathematically and apply procedural and disciplinary knowledge to problem-solving, reasoning and communication | Make deductions and inferences using mathematical reasoning  |
| <b>Problem solve in a variety of contexts</b> | Develop problem solving processes   |  | Use mathematical skills and techniques to make logical and reasoned decisions in solving problems in a variety of contexts                 |
| <b>Making connections</b>                     |   | Explore concepts and how they make connections both within and across topics   |  |





# Prince William School

## Maths Curriculum Map – Year 7 Vocabulary



| Year 7 Maths Vocabulary | Autumn  |  |   | Spring   |   |   | Summer   |   |  |   |
|-------------------------|---|--|---|--|---|---|--|---|--|---|
|                         | INVESTIGATING NUMBER SYSTEMS  | EXPLORING CALCULATION  | EXPLORING SHAPE   | EXPLORING SHAPE  | DISCOVERING EQUIVALENCE   | SOLVING PROBLEMS WITH NUMBER  | INVESTIGATING STATISTICS   | EXPLORING CHANGE  | DESCRIBING POSITION  |   |
|                         | ascending; descending<br>billion<br>decimal<br>decimal place(s)<br>decimal point<br>greater than, ><br>integer<br>less than, <<br>million<br>nearest integer<br>negative<br>order<br>partition<br>place value<br>positive<br>round<br>significant figure(s)   | < less than<br>= equal to<br>≠ not equal to<br>> greater than<br>add, plus, sum, total<br>approximate<br>brackets<br>calculate<br>decimal<br>divide, quotient<br>estimate<br>Evaluate<br>expression<br>formula<br>integer<br>multiply, product<br>negative<br>operation<br>order of operations<br>positive<br>square root, cube root, root<br>square, cube, power<br>subject (of a formula)<br>substitute<br>subtract, take away, difference<br>term<br>Evaluate | (acute-angled)<br>(obtuse-angled)<br>2 dimensional<br>3 dimensional<br>angle<br>angles around a point<br>angles on a straight line<br>cone<br>convention<br>cross-section<br>cube<br>cuboid<br>cylinder<br>edge<br>equilateral<br>face<br>isosceles<br>isosceles<br>kite<br>label<br>line<br>mark<br>notation: <i>AB</i><br>notation: <i>ABCD</i><br>notation: <i>BAC</i><br>parallel<br>parallelogram<br>perpendicular<br>plane<br>point<br>polygon<br>polygon<br>prism<br>property<br>pyramid<br>quadrilateral<br>rectangle<br>regular polygon<br>rhombus<br>rhombus<br>right angles<br>right-angled<br>scalene<br>shape<br>sphere<br>square<br>surface<br>tetrahedron<br>trapezium<br>triangle<br>triangle<br>vertex/vertices<br>vertically opposite | diagonal<br>irregular<br>mirror line<br>regular<br>rotational symmetry<br>symmetry | <b>REASONING WITH MEASURES</b><br>composite<br>cuboid/cube<br>derive<br>dimension<br>dissect<br>distance<br>formula<br>km, m, cm,<br>km <sup>2</sup> , m <sup>2</sup> , cm <sup>2</sup> , mm <sup>2</sup><br>length<br>mm<br>parallelogram<br>perimeter<br>perpendicular height<br>rectangle<br>shape<br>surface<br>total<br>trapezium<br>triangle<br>volume<br>width | <b>REASONING WITH FRACTIONS</b><br>experiment<br>(of an) amount<br>certain<br>chance<br>denominator<br>difference<br>equivalent<br>even<br>event<br>expected<br>experiment<br>experimental<br>fraction<br>fraction<br>fraction<br>frequency<br>frequency tree<br>impossible<br>improper<br>likely<br>mixed number<br>numerator<br>outcome<br>part<br>probability<br>probability<br>product<br>proper fraction<br>quotient<br>random<br>repeated<br>scale<br>simplest form<br>simplify<br>sum<br>theoretical<br>unit fraction<br>unlikely<br>whole | bar model<br>construct<br>equals =<br>equation<br>equivalent<br>expression<br>function machine<br>greater than ><br>greater than or equal ≥<br>inverse (operation)<br>less than <<br>less than or equal ≤<br>letter (variable)<br>operation<br>solution<br>solve<br>term<br>test<br>unknown  | average: mean, median, mode<br>bar chart<br>categorical data<br>categories<br>chart<br>classes/class intervals<br>Compare<br>continuous<br>data set<br>discrete<br>frequency<br>pictogram<br>pie chart<br>spread: range<br>table<br>vertical line                   | coordinate<br>(x, y)<br>x coordinate<br>y coordinate<br>quadrant<br>negative<br>axis<br>x-axis<br>y-axis<br>origin<br>horizontal<br>vertical<br>plot<br>first quadrant<br>2nd quadrant<br>3rd quadrant<br>4th quadrant<br>construct<br>coordinate grid<br>vertices<br>line<br>midpoint<br>equation                           | <b>MEASURING AND ESTIMATING</b><br>angle of rotation<br>centre<br>column vector<br>combination<br>congruent<br>describe<br>direction of rotation<br>equation of line<br>horizontal<br>image<br>line<br>midpoint<br>object<br>quadrant<br>reflection<br>rotation<br>segment<br>transformation<br>translation<br>vertex<br>vertical |
|                         | <b>PATTERN SNIFFING</b><br>arithmetic progression<br>common factor<br>common multiple<br>cube (number)<br>factor<br>first term<br>highest common factor<br>integer<br>linear<br>lowest common multiple<br>multiple<br>power<br>prime<br>root<br>sequence<br>square (number)<br>term<br>term to term rule<br>triangular (number) | <b>GENERALISING ARITHMETIC</b><br>addition<br>collect like terms<br>distributive law<br>division<br>equation<br>expand<br>expression<br>formula<br>identity<br>inverse (operation)<br>multiplication<br>operation<br>raising to a power<br>simplify<br>subtraction<br>term   |   |  |   |   | <b>VISUALISING SHAPE</b><br>(arc)<br>(sector)<br>(segment)<br>accurate<br>acute<br>angle measurer<br>centre<br>chord<br>circle<br>circumference<br>construct<br>degrees<br>diagram<br>diameter<br>draw<br>equilateral<br>isosceles<br>line<br>measure<br>nearest angle<br>obtuse<br>parallel line<br>perpendicular line<br>polygon<br>protractor<br>radius<br>reflex<br>regular<br>right angle triangle<br>scalene<br>sketch<br>symmetry | <b>PROPORTIONAL REASONING</b><br>simplify<br>cancel<br>common factors<br>compare<br>fraction<br>fraction (of amount)<br>lowest terms<br>multiplier<br>part<br>part per whole<br>proportion<br>proportion<br>ratio<br>scaling up (or down)<br>share<br>unit<br>whole | <b>DESCRIBING POSITION</b><br>angle of rotation<br>centre<br>column vector<br>combination<br>congruent<br>describe<br>direction of rotation<br>equation of line<br>horizontal<br>image<br>line<br>midpoint<br>object<br>quadrant<br>reflection<br>rotation<br>segment<br>transformation<br>translation<br>vertex<br>vertical |   |



# Prince William School

## Maths Curriculum Map – Year 8 Vocabulary



|                         | Autumn  |   |   | Spring   |  |   | Summer  |  |   |
|-------------------------|---|---|---|--|--|---|---|--|---|
| Year 8 Maths Vocabulary | <b>INVESTIGATING NUMBER SYSTEMS</b><br>round<br>decimal place<br>significant figure<br>appropriate degree of accuracy<br><br><b>PATTERN SNIFFING</b><br>term to term rule<br>position to term rule<br>nth term<br>prime(number)<br>highest common factor<br>lowest common multiple<br>prime factor (decomposition)<br>factorisation<br>unique factorisation theorem<br>index notation<br><br><b>EXPLORING CALCULATION</b><br>calculate<br>integer<br>positive<br>negative<br>decimal<br>add, plus, sum, total<br>multiply, product<br>divide, quotient, dividend, divisor<br>square, cube, power<br>operation<br>order of operations<br>brackets<br>formula<br>subject (of a formula)<br>equation<br>identity<br>term<br>expression<br>substitute<br>evaluate | <b>GENERALISING ARITHMETIC</b><br>product<br>quotient<br>co-efficient<br>power<br>index(indices)<br>law<br>simplify<br>bracket<br>distributive law<br>expand<br>factor<br>factorise<br>common factor<br>notation<br>inequality<br>equation<br>Formula<br><br><b>EXPLORING SHAPE</b><br>parallel lines<br>transversal line<br>alternate angles<br>corresponding angles<br>co-interior angles<br>equal<br>prove<br>polygon<br>regular/irregular<br>sum<br>interior angle<br>exterior angle<br>angle sum<br>vertices | <b>REASONING WITH MEASURES</b><br>perimeter<br>rectangle<br>parallelogram trapezium<br>triangle composite<br>shape<br>compound shape<br>dissect<br>circumference<br>circle<br>radius/radii<br>diameter<br>circumference<br>arc<br>area<br>annulus<br>constituent<br>cuboid<br>prism<br>cylinder<br>cross-section<br>surface area<br>net<br>curved surface<br>Volume | <b>DISCOVERING EQUIVALENCE</b><br>fraction<br>numerator denominator<br>simplify<br>in its simplest form<br>decimal<br>terminating<br>recurring<br>tenths, hundredths, thousandths... equivalent<br>division<br>percentage %<br>multiplier<br>mentally with a calculator<br>single calculation<br>increase<br>decrease<br>original amount<br>inverse<br>percentage change<br>interest<br>simple interest<br>per annum<br>invest(ment) | <b>REASONING WITH FRACTIONS</b><br>fraction<br>numerator<br>denominator<br>part<br>whole<br>equivalent<br>fraction<br>unit fraction<br>proper fraction<br>mixed number<br>improper<br>fraction<br>simplest form<br>simplify<br>sum<br>difference<br>product<br>quotient<br>(of an) amount<br>probability<br>chance<br>impossible<br>even<br>certain<br>likely<br>unlikely<br>experiment<br>probability scale<br>outcome<br>event<br>exhaustive<br>independent<br>exclusive<br>mutually exclusive<br>frequency<br>frequency tree<br>expected<br>theoretical<br>experimental<br>random<br>repeated<br>experiment | <b>SOLVING PROBLEMS WITH NUMBER</b><br>solve<br>variable<br>side<br>solution<br>linear<br>equal<br>flow<br>both sides<br>same as<br>equation<br>unknown<br>inverse<br>symbol<br>not equal<br><br><b>INVESTIGATING STATISTICS</b><br>scatter graph<br>connection<br>correlation<br>positive correlation<br>negative correlation<br>no correlation<br>frequency diagram<br>frequency polygon<br>mode, modal<br>class<br>grouped data<br>frequency table<br>estimate<br>mean, median, range spread<br>average<br>central tendency<br>variation<br>sample<br>Population | <b>VISUALISING SHAPE</b><br>scale<br>scale drawing<br>accurate ratio proportion<br>similar<br>bearing<br>north (line)<br>clockwise<br>construct<br>sketch<br>bisect<br>perpendicular<br>locus/loci<br>intersect<br>equidistant<br>plan<br>elevation<br>viewpoint<br>Isometric<br><br><b>EXPLORING CHANGE</b><br>coordinate<br>x coordinate; y coordinate<br>(x, y)<br>x-axis; y-axis<br>origin<br>graph<br>table of values<br>substitute<br>linear<br>straight line equation<br>relationship horizontal vertical<br>gradient<br>slope<br>steepness<br>y-intercept<br>intersection<br>solve<br>equation<br>function<br>quadratic | <b>PROPORTIONAL REASONING</b><br>ratio<br>proportion<br>fraction<br>whole<br>part<br>quantity<br>variable<br>multiplier<br>Per unit rate<br>scale factor<br>similar<br>enlargement<br>length, area and volume<br>perimeter<br>relative<br>simplify<br>in simplest terms/form<br><br><b>DESCRIBING POSITION</b><br>transformation<br>similar<br>congruent<br>enlargement<br>centre of enlargement<br>ray<br>scale factor<br>integer<br>ratio<br>proportion<br>describe<br>object<br>image | <b>MEASURING AND ESTIMATING</b><br>compound measures<br>formula(e)<br>unit<br>rates of change<br>per<br>speed<br>best value<br>real life graph<br>distance/displacement<br>speed/velocity<br>acceleration<br>stationary |



# Prince William School

## Maths Curriculum Map – Year 9 Support Vocabulary



|  | Autumn   |  |   | Spring  |  |   | Summer  |  |  |
|--|--|--|---|---|--|---|---|--|--|
|  | <b>NUMBER-CALCULATION</b>  | <b>GEOMETRY - SHAPE</b>  | <b>NUMBER - CALCULATION 2</b>   | <b>RATIO &amp; PROPORTION - FRACTIONS, DECIMALS, PERCENTAGES</b>  | <b>NUMBER AND ALGEBRA - SEQUENCES</b>  | <b>GEOMETRY – MEASURING</b>   | <b>RATIO &amp; PROPORTION – SCALING</b>   | <b>PROBABILITY</b>   | <b>STATISTICS</b>  |
|  | place value<br>partition<br>million<br>billion<br>positive<br>negative<br>integer<br>decimal<br>decimal point<br>decimal place(s)<br>round to the nearest ...<br>greater than, ><br>less than, <<br>order<br>ascending; descending<br>appropriate degree of accuracy<br>calculate<br>add, plus, sum, total<br>subtract, take away,<br>difference multiply, product,<br>divide, quotient, dividend, divisor<br>operation<br>order of operations<br>brackets | shape<br>dimensional<br>dimensional<br>polyhedron<br>cube<br>cuboid<br>prism<br>cross-section<br>pyramid<br>tetrahedron<br>cylinder<br>cone<br>sphere<br>point<br>line<br>vertex/vertices<br>edge<br>plane<br>face<br>surface<br>parallel<br>perpendicular<br>right angles<br>polygon<br>regular polygon<br>label<br>mark<br>angle<br>triangle<br>equilateral<br>isosceles<br>scalene<br>right-angled<br>quadrilateral<br>square<br>rectangle<br>parallelogram<br>rhombus<br>trapezium<br>kite<br>polygon<br>regular<br>irregular<br>diagonal<br>symmetry<br>mirror line<br>rotational symmetry<br>angles around a point<br>angles on a straight line<br>vertically opposite<br>equal<br>sum | square<br>cube<br>square root<br>cube root<br>root<br>power<br>prime (number)<br>highest common factor<br>lowest common multiple<br>prime factor (decomposition)<br>product of primes<br>unique factorisation theorem<br>index notation<br><br><b>ALGEBRA – SIMPLIFYING</b><br>operation<br>inverse (operation)<br>addition<br>subtraction<br>multiplication<br>division<br>sum<br>difference<br>product<br>quotient<br>power<br>index (indices)<br>raising to a power<br>term<br>expression<br>Simplify<br>Collect<br>Like Terms<br>Bracket<br>Co-efficient<br>Expand<br>Factor<br>Factorise<br>Factorise fully<br>Common Factor<br>Notation | fraction<br>numerator<br>denominator<br>part<br>whole<br>equivalent<br>unit fraction<br>proper fraction<br>improper fraction<br>simplest form<br>simplify<br>sum<br>difference<br>product<br>quotient<br>percentage<br>per cent<br>out of<br>per<br>compare<br>greater than<br>less than<br>decimal<br>convert<br>equivalent<br>terminating | sequence<br>term<br>term-to-term rule<br>linear<br>first term<br>triangular (number)<br>square (number)<br>cube (number)<br>arithmetic<br>progression<br>term-to-term rule<br>position-to-term rule<br>nth term<br>pattern number<br><br><b>ALGEBRA – SOLVING</b><br>expression<br>term<br>equation<br>unknown<br>substitute<br>solve<br>solution<br>side<br>equal<br>both sides<br>inverse operation<br>bracket<br>check<br>Construct | perimeter<br>distance<br>length<br>width<br>dimension<br>total<br>km, m, cm, mm<br>composite shape<br>compound shape<br>dissect<br>area<br>squares<br>formula<br>derive<br>rectangle<br>parallelogram<br>trapezium<br>triangle<br>perpendicular height<br>km <sup>2</sup> , m <sup>2</sup> , cm <sup>2</sup> , mm <sup>2</sup><br>volume<br>cuboid/cube<br>prism<br>surface area<br>net | proportion<br>fraction<br>compare<br>ratio part<br>whole<br>unit<br>share<br>simplify<br>common factors<br>cancel<br>lowest terms<br>part per whole<br>multiplier<br>scaling up (or down)<br>proportion<br>fraction (of amount)<br><br><b>ALGEBRA - GRAPHING</b><br>coordinate<br>x coordinate;<br>y coordinate<br>(x, y)<br>quadrant<br>x-axis; y-axis<br>origin<br>horizontal<br>vertical<br>plot<br>vertices<br>midpoint<br>intersection<br>graph<br>table of values<br>substitute<br>linear<br>straight line graph equation<br>relationship<br>function | Probability<br>Chance<br>Impossible<br>Even<br>Certain<br>Likely<br>Unlikely Outcome<br>Event<br>Experiment<br>Probability Scale<br>Frequency<br>Frequency Tree<br>Sample Space<br>List of Outcomes<br>Expected<br>Theoretical<br>Experimental<br>Random<br>Repeated | data<br>data set<br>discrete<br>continuous<br>grouped<br>class<br>class interval<br>categories<br>ungrouped<br>tally chart<br>frequency table<br>chart<br>bar chart<br>pie chart<br>pictogram<br>categorical data<br>vertical line chart<br>frequency diagram<br>frequency polygon<br>stem-and-leaf diagram<br>key<br>average: mean, median, mode<br>modal class |



# Prince William School

## Maths Curriculum Map – Year 9 Core Vocabulary



|  | Autumn  |   |   | Spring  |   |   | Summer   |  |   |
|--|---|---|---|---|---|---|--|--|---|
|  | <p><b>NUMBER-CALCULATION</b></p> <p>place value<br/>partition<br/>million<br/>billion<br/>positive<br/>negative<br/>integer<br/>decimal<br/>decimal point<br/>decimal place(s)<br/>round<br/>significant figure(s)<br/>greater than, &gt;<br/>less than, &lt;<br/>order<br/>ascending<br/>descending<br/>appropriate degree<br/>calculate<br/>add, plus, sum, total<br/>subtract, take away,<br/>difference multiply, product<br/>divide, quotient, dividend, divisor<br/>operation<br/>order of operations<br/>brackets<br/>square<br/>cube<br/>square root<br/>cube root<br/>root<br/>power<br/>index/indices<br/>simplify<br/>prime (number)<br/>highest common factor<br/>lowest common multiple<br/>prime factor decomposition<br/>product of primes<br/>unique factorisation theorem<br/>index notation</p> | <p><b>GEOMETRY - SHAPE</b></p> <p>2 dimensional<br/>3 dimensional<br/>cube<br/>cuboid<br/>prism<br/>pyramid<br/>tetrahedron<br/>cylinder<br/>cone<br/>sphere<br/>point<br/>line<br/>vertex/vertices<br/>edge<br/>plane<br/>face<br/>surface<br/>cross-section<br/>parallel<br/>perpendicular<br/>right angles<br/>polygon<br/>regular polygon<br/>label<br/>mark<br/>notation: <i>BAC</i><br/>notation: <i>AB</i><br/>notation: <i>ABCD</i><br/>convention<br/>angle<br/>rhombus<br/>triangle<br/>isosceles<br/>property<br/>triangle<br/>equilateral<br/>isosceles<br/>scalene<br/>right-angled<br/>(acute-angled)<br/>(obtuse-angled)<br/>quadrilateral<br/>square<br/>rectangle<br/>parallelogram<br/>rhombus<br/>trapezium<br/>kite<br/>polygon<br/>regular</p> | <p>irregular<br/>diagonal<br/>symmetry<br/>mirror line<br/>rotational symmetry<br/>angles around a point<br/>angles on a straight line<br/>vertically opposite<br/>parallel lines<br/>transversal (line)<br/>alternate angles<br/>corresponding angles<br/>co-interior angles<br/>equal<br/>prove<br/>polygon<br/>regular / irregular<br/>sum<br/>interior angle<br/>exterior angle<br/>angle sum<br/>vertices</p> <p><b>NUMBER - CALCULATION 2</b></p> <p>operation<br/>inverse (operation)<br/>addition<br/>subtraction<br/>multiplication<br/>division<br/>sum<br/>difference<br/>product<br/>quotient<br/>power<br/>index (indices)<br/>law<br/>raising to a power</p> <p><b>ALGEBRA - SIMPLIFYING</b></p> <p>term<br/>expression<br/>simplify<br/>collect<br/>like terms<br/>bracket<br/>co-efficient<br/>distributive law<br/>expand<br/>factor<br/>factorise<br/>factorise fully<br/>common factor<br/>notation<br/>inequality<br/>number line<br/>equation<br/>identity</p> | <p><b>RATIO &amp; PROPORTION - FRACTIONS, DECIMALS, PERCENTAGES</b></p> <p>fraction numerator<br/>denominator part<br/>whole<br/>equivalent<br/>unit fraction<br/>proper fraction<br/>mixed number<br/>improper fraction<br/>simplest form<br/>simplify<br/>sum<br/>difference product quotient<br/>(of an) amount percentage per cent<br/>out of per whole</p> | <p><b>NUMBER AND ALGEBRA - SEQUENCES</b></p> <p>sequence<br/>term<br/>term-to-term rule<br/>linear<br/>first term<br/>triangular (number)<br/>square (number)<br/>cube (number)<br/>arithmetic progression<br/>term-to-term rule<br/>position-to-term rule<br/>nth term<br/>pattern number</p> <p><b>ALGEBRA – SOLVING</b></p> <p>formula<br/>subject (of a formula)<br/>equation<br/>identity<br/>term<br/>expression<br/>substitute<br/>evaluate<br/>variable<br/>solve<br/>variable<br/>side<br/>solution<br/>linear<br/>equal<br/>unknown<br/>inverse</p> | <p><b>GEOMETRY – MEASURING</b></p> <p>perimeter<br/>distance<br/>length<br/>width<br/>dimension<br/>total<br/>km, m, cm, mm<br/>composite shape<br/>compound shape<br/>dissect<br/>circle<br/>centre<br/>circumference<br/>radius/radii<br/>diameter<br/><math>\pi</math><br/>sector<br/>area<br/>squares<br/>formula<br/>derive<br/>rectangle<br/>parallelogram<br/>trapezium<br/>triangle<br/>perpendicular height<br/>km<sup>2</sup>, m<sup>2</sup>, cm<sup>2</sup>, mm<sup>2</sup><br/>annulus<br/>volume<br/>cuboid/cube<br/>prism<br/>cross-section<br/>right prism<br/>triangular prism<br/>surface<br/>surface area<br/>net<br/>curved surface cylinder<br/>km<sup>3</sup>, m<sup>3</sup>, cm<sup>3</sup>, mm<sup>3</sup></p> | <p><b>RATIO &amp; PROPORTION – SCALING</b></p> <p>ratio<br/>proportion<br/>fraction<br/>whole<br/>part<br/>quantity<br/>variable<br/>multiplier<br/>per unit<br/>rate<br/>scale factor<br/>similar<br/>corresponding<br/>enlargement<br/>length, area and volume<br/>perimeter</p> | <p><b>ALGEBRA - GRAPHING</b></p> <p>relative<br/>coordinate<br/>x coordinate; y coordinate<br/>(x, y)<br/>quadrant x-axis; y-axis<br/>origin<br/>horizontal<br/>vertical<br/>plot<br/>vertices<br/>midpoint<br/>intersection<br/>graph<br/>table of values<br/>substitute<br/>linear<br/>straight line<br/>equation<br/>relationship<br/>horizontal<br/>vertical<br/>gradient/slope/steepness<br/>y-intercept<br/>intersection<br/>solve<br/>equation<br/>function</p> | <p><b>GEOMETRY - VISUALISING</b></p> <p>transformation<br/>rotation<br/>reflection<br/>translation<br/>describe<br/>vertex<br/>centre<br/>angle of rotation<br/>direction<br/>equation of line<br/>horizontal<br/>vertical<br/>column<br/>vector combination congruent<br/>object<br/>image<br/>similar<br/>enlargement<br/>centre of enlargement<br/>ray scale factor proportion<br/>describe<br/>vertical<br/>column<br/>vector combination congruent<br/>object<br/>image<br/>similar<br/>enlargement<br/>centre of enlargement<br/>ray scale factor proportion<br/>describe</p> |



# Prince William School

## Maths Curriculum Map – Year 9 Higher Vocabulary



|                                | Autumn  |  |  | Spring  |   |   | Summer  |   |   |
|--------------------------------|---|--|--|---|---|---|---|---|---|
| Year 9 Higher Maths Vocabulary | <b>NUMBER-CALCULATION</b>   | <b>GEOMETRY - SHAPE</b>  | <b>ALGEBRA - SIMPLIFYING</b>   | <b>RATIO &amp; PROPORTION - FRACTIONS, DECIMALS, PERCENTAGES</b>  | <b>NUMBER AND ALGEBRA - SEQUENCES</b>   | <b>ALGEBRA – SOLVING</b>  | <b>RATIO &amp; PROPORTION – SCALING</b>   | <b>ALGEBRA - GRAPHING</b>   | <b>STATISTICS - DATA</b>                            |
|                                | measurement<br>rounded<br>truncated<br>error<br>inequality<br>'to the nearest' accuracy<br>power<br>square (root)<br>cube (root)<br>index, indices<br>base<br>exponent<br>laws of indices<br>simplify<br>reciprocal<br>evaluate<br>standard form<br>ordinary form<br>in terms of<br>calculate exactly<br>formula<br>substitute<br>evaluate<br>equation<br>identity<br>expression<br>expand<br>factorise<br>simplify<br>decimal terminating<br>recurring)<br>equivalent<br>corresponding<br>(rational)<br>denominator<br>numerator | centre radius diameter<br>circumference chord<br>arc, segment sector<br>tangent<br>construct<br>sketch<br>bisect<br>perpendicular<br>locus/loci<br>intersect<br>equidistant<br>plan<br>elevation<br>viewpoint<br>isometric | expression<br>term<br>expand bracket<br>product<br>simplify<br>multiply over<br>binomial<br>distributive law<br>quadratic<br>coefficient<br>factor<br>factorise<br>factorise fully<br>common factor<br>square<br>difference of two<br>squares<br>equivalent<br>identity<br>equation<br>prove/show<br>argument<br>formula<br>substitute<br>evaluate | percentage %<br>multiplier<br>mentally with a calculator<br>single calculation<br>increase<br>decrease<br>original amount<br>inverse<br>percentage<br>change<br>interest<br>simple interest<br>square<br>invest(ment)<br>proportion<br>direct proportion<br>inverse proportion<br>multiplier<br>scale factor<br>linear function<br>graph<br>product<br>fixed product<br>congruent/congruence<br>similar/similarity<br>transformation<br>reflection, rotation,<br>translation, enlargement scale<br>factor<br>ratio (of sides)<br>corresponding<br>preserve<br>unit<br>standard unit<br>compound unit<br>per<br>density<br>mass<br>pressure<br>speed<br>acceleration | term<br>first term<br>linear sequence<br>arithmetic progression<br>quadratic sequence<br>Fibonacci sequence<br>Fibonacci-type<br>recurrence relation<br>notation<br>position (n)<br>nth term<br>notation: t(n)<br>first differences<br>second differences<br>delta1, delta 2<br>geometric progression<br>ratio<br>multiplier<br>convergent<br>divergent | expression<br>formula<br>variable<br>unknown subject rearrange<br>inequality $<$ , $>$ , $\leq$ , $\geq$ number<br>line solution set integer set<br>set notation<br>$x, y, z$<br><b>GEOMETRY – MEASURING</b><br>Pythagoras' theorem<br>right-angled triangle<br>hypotenuse<br>shorter side (leg) notation of<br>right-angled notation of equal<br>length sides<br>prove<br>square<br>square root<br>properties<br>equal<br>angles | congruent/congruence<br>similar/similarity<br>transformation<br>reflection<br>rotation<br>translation<br>enlargement<br>scale factor<br>ratio (of sides)<br>corresponding<br>preserve | straight line equation<br>function $f(x)$<br>$y=mx+c$<br>gradient<br>y-intercept<br>intersection<br>parallel<br>coefficient<br>constant<br>root<br>solution<br>intercept<br>turning point<br>vertex<br>quadratic<br>quadratic function<br>graphically<br>algebraically<br>factorise<br>cubic function<br>inverse<br>function<br>reciprocal<br>sketch<br>plot<br>graph plot<br>linear equation<br>solve<br>solution<br>intersect/intersection<br>simultaneous equations<br>variables<br>elimination<br>substitution<br>set of points satisfied by<br>solve graphically<br>inequality<br>system<br>region<br>region satisfied by intersection | boundary<br>solution set<br>set notation 2, 3, 6, 7 |



# Prince William School

## Maths Curriculum Map – Number Vocabulary KS3



|                           | Year 7  |   |  |  | Year 8  |   |   |   | Year 9 - SUPPORT  |  | Year 9 - CORE   | Year 9 - HIGHER   |
|---------------------------|---|---|--|--|---|---|---|---|---|--|---|---|
| Maths Vocabulary - Number | INVESTIGATING NUMBER SYSTEMS  | EXPLORING CALCULATION   | EQUIVALENCE  | SOLVING PROBLEMS WITH NUMBER   | INVESTIGATING NUMBER SYSTEMS  | REASONING WITH MEASURES   | REASONING WITH FRACTIONS  | SOLVING PROBLEMS WITH NUMBER  | NUMBER-CALCULATION  | RATIO & PROPORTION - FRACTIONS, DECIMALS, PERCENTAGES  | NUMBER-CALCULATION  | NUMBER-CALCULATION  |
|                           | ascending; descending<br>billion<br>decimal<br>decimal place(s)<br>decimal point<br>greater than, ><br>integer<br>less than, <<br>million<br>nearest integer<br>negative<br>order<br>partition<br>place value<br>positive<br>round<br>significant figure(s) | < less than<br>= equal to<br>≠ not equal to<br>> greater than<br>add, plus, sum, total<br>approximate<br>brackets<br>calculate<br>decimal<br>divide, quotient<br>estimate<br>Evaluate<br>expression<br>formula<br>integer<br>multiply, product<br>negative<br>operation<br>order of operations<br>positive<br>square root, cube root,<br>root<br>square, cube, power<br>subject (of a formula)<br>substitute<br>subtract, take away,<br>difference<br>term<br>Evaluate<br><br><b>REASONING WITH MEASURES</b><br>composite<br>cuboid/cube<br>derive<br>dimension<br>dissect<br>distance<br>formula<br>km, m, cm,<br>km <sup>2</sup> , m <sup>2</sup> , cm <sup>2</sup> , mm <sup>2</sup><br>length<br>mm<br>parallelogram<br>perimeter<br>perpendicular height<br>rectangle<br>shape<br>surface<br>total<br>trapezium<br>triangle<br>volume<br>width | compare<br>convert equivalent multiplier<br>operator quantity percentage<br>increase percentage decrease<br>fraction<br>greater than, less than<br>integer<br>numerator denominator<br>decimal<br>order<br>out of<br>part(s)<br>per<br>per cent<br>percentage<br>whole<br><br><b>REASONING WITH FRACTIONS</b><br>experiment<br>(of an) amount<br>certain<br>denominator<br>difference<br>equivalent<br>even<br>event<br>expected<br>experiment<br>experimental<br>fraction<br>fraction<br>frequency<br>frequency tree<br>impossible<br>improper<br>likely<br>mixed number<br>numerator<br>outcome<br>part<br>whole | bar model<br>construct<br>construct<br>equals =<br>equation<br>equivalent<br>expression<br>function machine<br>greater than ><br>greater than or equal ≥<br>inverse (operation)<br>less than <<br>less than or equal ≤<br>letter (variable)<br>operation<br>solution<br>solve<br>term<br>test<br>unknown<br><br><b>EXPLORING CHANGE</b><br>coordinate<br>(x, y)<br>x coordinate<br>y coordinate<br>quadrant<br>negative<br>axis<br>x-axis<br>y-axis<br>origin<br>horizontal<br>vertical<br>plot<br>first quadrant<br>2nd quadrant<br>3rd quadrant<br>4th quadrant<br>construct<br>coordinate grid<br>vertices<br>line<br>midpoint<br>equation<br><br><b>MEASURING AND ESTIMATING</b><br>convert<br>equivalence<br>estimate<br>prefixes: milli, centi, kilo<br>scaling<br>standard units<br>together with metres, grams,<br>litres inches, feet, pounds<br>ounces, stone, miles, pints<br>units | round<br>decimal place<br>significant figure<br>appropriate degree of accuracy<br><br><b>PATTERN SNIFFING</b><br>term to term rule<br>position to term rule<br>nth term<br>prime(number)<br>highest common factor<br>lowest common<br>multiple<br>prime factor<br>(decomposition)<br>factorisation<br>unique factorisation<br>theorem<br>index notation<br><br><b>EXPLORING CALCULATION</b><br>calculate<br>integer<br>positive<br>negative<br>decimal<br>add, plus, sum, total<br>multiply, product<br>divide, quotient,<br>dividend, divisor<br>square, cube, power<br>operation<br>brackets<br>formula<br>subject (of a formula)<br>equation<br>identity<br>term<br>expression<br>substitute<br>evaluate | fraction<br>numerator<br>denominator<br>part<br>whole<br>equivalent<br>fraction<br>unit fraction<br>proper fraction<br>mixed number<br>improper<br>fraction<br>simplest form<br>simplify<br>sum<br>difference<br>product<br>quotient<br>(of an) amount<br><br><br><br><b>DISCOVERING EQUIVALENCE</b><br>fraction<br>numerator denominator<br>simplify<br>in its simplest form<br>decimal<br>terminating<br>recurring<br>tenths, hundredths,<br>thousandths... equivalent<br>division<br>percentage %<br>multiplier<br>mentally with a calculator<br>single calculation<br>increase<br>decrease<br>original amount<br>inverse<br>percentage change<br>interest<br>simple interest<br>per annum<br>invest(ment) | fraction<br>numerator<br>denominator<br>part<br>whole<br>equivalent<br>fraction<br>unit fraction<br>proper fraction<br>mixed number<br>improper<br>fraction<br>simplest form<br>simplify<br>sum<br>difference<br>product<br>quotient<br>(of an) amount<br><br><br><br><b>DISCOVERING EQUIVALENCE</b><br>fraction<br>numerator denominator<br>simplify<br>in its simplest form<br>decimal<br>terminating<br>recurring<br>tenths, hundredths,<br>thousandths... equivalent<br>division<br>percentage %<br>multiplier<br>mentally with a calculator<br>single calculation<br>increase<br>decrease<br>original amount<br>inverse<br>percentage change<br>interest<br>simple interest<br>per annum<br>invest(ment) | fraction<br>numerator<br>denominator<br>part<br>whole<br>equivalent<br>fraction<br>unit fraction<br>proper fraction<br>mixed number<br>improper<br>fraction<br>simplest form<br>simplify<br>sum<br>difference<br>product<br>quotient<br>(of an) amount<br><br><br><br><b>DISCOVERING EQUIVALENCE</b><br>fraction<br>numerator denominator<br>simplify<br>in its simplest form<br>decimal<br>terminating<br>recurring<br>tenths, hundredths,<br>thousandths... equivalent<br>division<br>percentage %<br>multiplier<br>mentally with a calculator<br>single calculation<br>increase<br>decrease<br>original amount<br>inverse<br>percentage change<br>interest<br>simple interest<br>per annum<br>invest(ment) | fraction<br>numerator<br>denominator<br>part<br>whole<br>equivalent<br>fraction<br>unit fraction<br>proper fraction<br>mixed number<br>improper<br>fraction<br>simplest form<br>simplify<br>sum<br>difference<br>product<br>quotient<br>(of an) amount<br><br><br><br><b>DISCOVERING EQUIVALENCE</b><br>fraction<br>numerator denominator<br>simplify<br>in its simplest form<br>decimal<br>terminating<br>recurring<br>tenths, hundredths,<br>thousandths... equivalent<br>division<br>percentage %<br>multiplier<br>mentally with a calculator<br>single calculation<br>increase<br>decrease<br>original amount<br>inverse<br>percentage change<br>interest<br>simple interest<br>per annum<br>invest(ment) | place value<br>partition<br>million<br>billion<br>positive<br>negative<br>integer<br>decimal<br>decimal point<br>decimal place(s)<br>round to the nearest ...<br>greater than, ><br>less than, <<br>order<br>ascending; descending<br>appropriate degree of<br>accuracy<br>calculate<br>add, plus, sum, total<br>subtract, take away,<br>difference multiply, product,<br>divide, quotient, dividend,<br>divisor<br>operation<br>order of operations<br>brackets<br><br><b>NUMBER - CALCULATION 2</b><br>square<br>cube<br>square root<br>cube root<br>root<br>power<br>prime (number)<br>highest common factor<br>lowest common multiple<br>prime factor<br>(decomposition) product of<br>primes<br>unique factorisation<br>theorem<br>index notation | fraction<br>numerator<br>denominator<br>part<br>whole<br>equivalent<br>unit fraction<br>proper fraction<br>improper fraction<br>simplest form<br>simplify<br>sum<br>difference<br>product<br>quotient<br>percentage<br>per cent<br>out of<br>per<br>compare<br>greater than<br>less than<br>decimal<br>convert<br>equivalent<br>terminating | place value<br>partition<br>million<br>billion<br>positive<br>negative<br>integer<br>decimal<br>decimal point<br>decimal place(s)<br>round<br>significant figure(s)<br>greater than, ><br>less than, <<br>order<br>ascending<br>descending<br>appropriate degree<br>calculate<br>per cent<br>out of<br>per<br>compare<br>greater than<br>less than<br>decimal<br>convert<br>equivalent<br>square<br>cube<br>square root<br>cube root<br>root<br>power<br>index/indices<br>simplify<br>prime (number)<br>highest common factor<br>lowest common multiple<br>prime factor decomposition<br>product of primes<br>unique factorisation<br>theorem<br>index notation |



# Prince William School

## Maths Curriculum Map – Ratio and Proportion Vocabulary KS3



|   | Year 7   | Year 8  | Year 9 - SUPPORT  | Year 9 - CORE   | Year 9 - HIGHER   |
|---|--|---|---|---|---|
| Maths Vocabulary – Ratio and Proportion | <b>PROPORTIONAL REASONING</b>  | <b>PROPORTIONAL REASONING</b>   | <b>RATIO &amp; PROPORTION –SCALING</b>  | <b>RATIO &amp; PROPORTION –SCALING</b>  | <b>RATIO &amp; PROPORTION –SCALING</b>  |
|   | simplify<br>cancel<br>common factors<br>compare<br>fraction<br>fraction (of amount)<br>lowest terms<br>multiplier<br>part<br>part per whole<br>proportion<br>proportion<br>ratio<br>scaling up (or down)<br>share<br>unit<br>whole | ratio<br>proportion<br>fraction<br>whole<br>part<br>quantity<br>variable<br>multiplier<br>Per unit rate<br>scale factor<br>similar<br>enlargement<br>length, area and volume<br>perimeter<br>relative<br>simplify<br>in simplest terms/form | proportion<br>fraction<br>compare<br>ratio part<br>whole<br>unit<br>share<br>simplify<br>common factors<br>cancel<br>lowest terms<br>part per whole<br>multiplier<br>scaling up (or down)<br>proportion<br>fraction (of amount) | ratio<br>proportion<br>fraction<br>whole<br>part<br>quantity<br>variable<br>multiplier<br>per unit<br>rate<br>scale factor<br>similar<br>corresponding<br>enlargement<br>length, area and volume<br>perimeter | congruent/congruence<br>similar/similarity<br>transformation<br>reflection<br>rotation<br>translation<br>enlargement<br>scale factor<br>ratio (of sides)<br>corresponding<br>preserve |



# Prince William School

## Maths Curriculum Map – Geometry Vocabulary KS3



|                             | Year 7  |  | Year 8   |   | Year 9 - SUPPORT   |  | Year 9 - CORE   |   | Year 9 - HIGHER  |  |
|-----------------------------|---|--|--|---|--|--|---|---|--|--|
| Maths Vocabulary – Geometry | <b>EXPLORING SHAPE</b>  | <b>EXPLORING SHAPE</b>   | <b>DESCRIBING POSITION</b>   | <b>EXPLORING SHAPE</b>  | <b>DESCRIBING POSITION</b>   | <b>GEOMETRY &amp; SHAPE</b>  | <b>GEOMETRY – MEASURING</b>   | <b>GEOMETRY - SHAPE</b>   | <b>GEOMETRY - VISUALISING</b>  | <b>GEOMETRY - SHAPE</b>  |
|                             | (acute-angled)<br>(obtuse-angled)<br>2 dimensional<br>3 dimensional<br>angle<br>angles around a point<br>angles on a straight line<br>cone<br>convention<br>cross-section<br>cube<br>cuboid<br>cylinder<br>edge<br>equilateral<br>face<br>isosceles<br>isosceles<br>kite<br>label<br>line<br>mark<br>notation: <i>AB</i><br>notation: <i>ABCD</i><br>notation: <i>BAC</i><br>parallel<br>parallelogram<br>perpendicular<br>plane<br>point<br>polygon<br>polygon<br>prism<br>property<br>pyramid<br>quadrilateral<br>rectangle<br>regular polygon<br>rhombus<br>rhombus<br>right angles<br>right-angled<br>scalene<br>shape<br>sphere<br>square<br>surface<br>tetrahedron<br>trapezium<br>triangle<br>triangle<br>vertex/vertices<br>vertically opposite | diagonal<br>irregular<br>mirror line<br>regular<br>rotational symmetry<br>symmetry<br><br><b>VISUALISING SHAPE</b><br>(arc)<br>(sector)<br>(segment)<br>accurate<br>acute<br>angle measurer<br>centre<br>chord<br>circle<br>circumference<br>construct<br>degrees<br>diagram<br>diameter<br>draw<br>equilateral<br>isosceles<br>line<br>measure<br>nearest angle<br>obtuse<br>parallel line<br>perpendicular line<br>polygon<br>protractor<br>radius<br>reflex<br>regular<br>right angle triangle<br>scalene<br>sketch<br>symmetry | angle of rotation<br>centre<br>column vector<br>combination<br>congruent<br>describe<br>direction of rotation<br>equation of line<br>horizontal<br>image<br>line<br>midpoint<br>object<br>quadrant<br>reflection<br>rotation<br>segment<br>transformation<br>translation<br>vertex<br>vertical | parallel lines<br>transversal line<br>alternate angles<br>corresponding angles<br>co-interior angles<br>equal<br>prove<br>polygon<br>regular/irregular<br>sum<br>interior angle<br>exterior angle<br>angle sum<br>vertices<br><br><b>VISUALISING SHAPE</b><br>scale<br>scale drawing<br>accurate ratio proportion<br>similar<br>bearing<br>north (line)<br>clockwise<br>construct<br>sketch<br>bisect<br>perpendicular<br>locus/loci<br>intersect<br>equidistant<br>plan<br>elevation<br>viewpoint<br>Isometric | transformation<br>similar<br>congruent<br>enlargement<br>centre of enlargement<br>ray<br>scale factor<br>integer<br>ratio<br>proportion<br>describe<br>object<br>image | shape<br>dimensional<br>dimensional<br>polyhedron<br>cube<br>cuboid<br>prism<br>cross-section<br>pyramid<br>tetrahedron<br>cylinder<br>cone<br>sphere<br>point<br>line<br>vertex/vertices<br>edge<br>plane<br>face<br>surface<br>parallel<br>perpendicular<br>right angles<br>polygon<br>regular polygon<br>label<br>mark<br>angle<br>triangle<br>equilateral<br>isosceles<br>scalene<br>right-angled<br>quadrilateral<br>square<br>rectangle<br>parallelogram<br>rhombus<br>trapezium<br>kite<br>polygon<br>regular<br>irregular<br>diagonal<br>symmetry<br>mirror line<br>rotational symmetry<br>angles around a point<br>angles on a straight line<br>vertically opposite<br>equal<br>sum | perimeter<br>distance<br>length<br>width<br>dimension<br>total<br>km, m, cm, mm<br>composite shape<br>compound shape<br>dissect<br>area<br>squares<br>formula<br>derive<br>rectangle<br>parallelogram<br>trapezium<br>triangle<br>perpendicular height<br>km <sup>2</sup> , m <sup>2</sup> , cm <sup>2</sup> , mm <sup>2</sup><br>volume<br>cuboid/cube<br>prism<br>surface area<br>net<br><br><b>DESCRIBING POSITION</b><br>transformation<br>similar<br>congruent<br>enlargement<br>centre of enlargement<br>ray<br>scale factor<br>integer<br>ratio<br>proportion<br>describe<br>object<br>image | 2 dimensional<br>3 dimensional<br>cube<br>cuboid<br>prism<br>pyramid<br>tetrahedron<br>cylinder<br>cone<br>sphere<br>point<br>line<br>vertex/vertices<br>edge<br>plane<br>face<br>surface<br>cross-section<br>parallel<br>perpendicular<br>right angles<br>polygon<br>regular polygon<br>label<br>mark<br>notation: <i>BAC</i><br>notation: <i>AB</i><br>notation: <i>ABCD</i><br>angle<br>rhombus<br>triangle<br>isosceles<br>property<br>triangle<br>equilateral<br>isosceles<br>scalene<br>right-angled<br>(acute-angled)<br>(obtuse-angled)<br>quadrilateral<br>square<br>rectangle<br>parallelogram<br>rhombus<br>trapezium<br>kite<br>polygon<br>regular<br>irregular<br>diagonal<br>symmetry<br>mirror line<br>rotational symmetry<br>angles around a point<br>angles on a straight line | vertically opposite<br>parallel lines<br>transversal (line)<br>alternate angles<br>corresponding angles<br>co-interior angles<br>equal<br>prove<br>polygon<br>regular / irregular<br>sum<br>interior angle<br>exterior angle<br>angle sum<br>vertices<br><br><b>GEOMETRY – MEASURING</b><br>perimeter<br>distance<br>length<br>width<br>dimension<br>total<br>km, m, cm, mm<br>composite shape<br>compound shape<br>dissect<br>circle<br>centre<br>circumference<br>radius/radii<br>diameter<br>pi, π<br>sector<br>area<br>squares<br>formula<br>derive<br>rectangle<br>parallelogram<br>trapezium<br>triangle<br>perpendicular height<br>km <sup>2</sup> , m <sup>2</sup> , cm <sup>2</sup> , mm <sup>2</sup><br>annulus<br>volume<br>cuboid/cube<br>prism<br>cross-section<br>right prism<br>triangular prism<br>surface<br>surface area<br>net<br>curved surface cylinder<br>km <sup>3</sup> , m <sup>3</sup> , cm <sup>3</sup> , mm <sup>3</sup> | <b>GEOMETRY - VISUALISING</b><br>transformation<br>rotation<br>reflection<br>translation<br>describe<br>vertex<br>centre<br>angle of rotation<br>direction<br>equation of line<br>horizontal<br>vertical<br>column<br>vector combination<br>congruent object<br>image<br>similar<br>enlargement<br>centre of enlargement<br>ray scale factor<br>proportion describe<br>vertical<br>column<br>vector combination<br>congruent object<br>image<br>similar<br>enlargement<br>centre of enlargement<br>ray scale factor<br>proportion describe |





# Prince William School

## Maths Curriculum Map – Algebra Vocabulary KS3



|                            | Year 7   | Year 8  | Year 9 - SUPPORT   |   | Year 9 - CORE  |  |  | Year 9 - HIGHER  |  |  |  |
|----------------------------|--|---|--|---|--|--|--|--|--|--|--|
| Maths Vocabulary – Algebra | <b>GENERALISING ARITHMETIC</b>   | <b>GENERALISING ARITHMETIC</b>  | <b>ALGEBRA – SIMPLIFYING</b>   | <b>NUMBER AND ALGEBRA - SEQUENCES</b>   | <b>ALGEBRA - GRAPHING</b>  | <b>ALGEBRA - SIMPLIFYING</b>   | <b>NUMBER AND ALGEBRA - SEQUENCES</b>  | <b>ALGEBRA - GRAPHING</b>  | <b>ALGEBRA - SIMPLIFYING</b>   | <b>RATIO &amp; PROPORTION - FRACTIONS, DECIMALS, PERCENTAGES</b>   | <b>ALGEBRA - GRAPHING</b>  |
|                            | addition<br>collect like terms<br>distributive law<br>division<br>equation<br>expand<br>expression<br>formula<br>identity<br>inverse (operation)<br>multiplication<br>operation<br>raising to a power<br>simplify<br>subtraction<br>term | product<br>quotient<br>co-efficient<br>power<br>index(indices)<br>law<br>simplify<br>bracket<br>distributive law<br>expand<br>factor<br>factorise<br>common factor<br>notation<br>inequality<br>equation<br>Formula | operation<br>inverse (operation)<br>addition<br>subtraction<br>multiplication<br>division<br>sum<br>difference<br>product<br>quotient<br>power<br>index (indices)<br>raising to a power<br>term<br>expression<br>Simplify<br>Collect<br>Like Terms<br>Bracket<br>Co-efficient<br>Expand<br>Factor<br>Factorise<br>Factorise fully<br>Common Factor<br>Notation | sequence<br>term<br>term-to-term rule<br>linear<br>first term<br>triangular (number)<br>square (number)<br>cube (number)<br>arithmetic progression<br>term-to-term rule<br>position-to-term rule<br>nth term<br>pattern number<br><br><b>ALGEBRA – SOLVING</b><br>formula<br>subject (of a formula)<br>equation<br>identity<br>term<br>expression<br>substitute<br>evaluate<br>variable<br>solve<br>variable<br>side<br>solution<br>linear<br>equal<br>unknown<br>inverse | coordinate<br>x coordinate;<br>y coordinate<br>(x, y)<br>quadrant<br>x-axis; y-axis<br>origin<br>horizontal<br>vertical<br>plot<br>vertices<br>midpoint<br>intersection<br>graph<br>table of values<br>substitute<br>linear<br>straight line graph<br>equation<br>relationship<br>function | term<br>expression<br>simplify<br>collect<br>like terms<br>bracket<br>co-efficient<br>distributive law<br>expand<br>factor<br>factorise<br>factorise fully<br>common factor<br>notation<br>inequality<br>number line<br>equation<br>identity | sequence<br>term<br>term-to-term rule<br>linear<br>first term<br>triangular (number)<br>square (number)<br>cube (number)<br>arithmetic<br>progression<br>term-to-term rule<br>position-to-term rule<br>nth term<br>pattern number<br><br><b>ALGEBRA – SOLVING</b><br>formula<br>subject (of a formula)<br>equation<br>identity<br>term<br>expression<br>substitute<br>evaluate<br>variable<br>solve<br>variable<br>side<br>solution<br>linear<br>equal<br>unknown<br>inverse | relative<br>coordinate<br>x coordinate; y coordinate<br>(x, y)<br>quadrant x-axis; y-axis<br>origin<br>horizontal<br>vertical<br>plot<br>vertices<br>midpoint<br>intersection<br>graph<br>table of values<br>substitute<br>linear<br>straight line<br>equation<br>relationship<br>horizontal<br>vertical<br>gradient/slope/steepness<br>y-intercept<br>intersection<br>solve<br>equation<br>function | expression<br>term<br>expand bracket<br>product<br>simplify<br>multiply over<br>binomial<br>distributive law<br>quadratic<br>coefficient<br>factor<br>factorise<br>factorise fully<br>common factor<br>square<br>difference of two<br>squares<br>equivalent<br>identity<br>equation<br>prove/show<br>argument<br>formula<br>substitute<br>evaluate<br><br><b>NUMBER AND ALGEBRA - SEQUENCES</b><br>term<br>first term<br>linear sequence<br>arithmetic progression<br>quadratic sequence<br>Fibonacci sequence<br>Fibonacci-type<br>recurrence relation<br>notation<br>position (n)<br>nth term<br>notation: t(n)<br>first differences<br>second differences<br>delta1, delta 2<br>geometric progression<br>ratio<br>multiplier<br>convergent<br>divergent | percentage %<br>multiplier<br>mentally with a<br>calculator<br>single calculation<br>increase<br>decrease<br>original amount<br>inverse<br>percentage<br>change<br>interest<br>simple interest<br>per annum<br>invest(ment)<br>proportion<br>direct proportion<br>inverse proportion<br>multiplier<br>scale factor<br>linear function<br>graph<br>product<br>fixed product<br>congruent/congruence<br>similar/similarity<br>transformation<br>reflection, rotation,<br>translation,<br>enlargement scale<br>factor<br>ratio (of sides)<br>corresponding<br>preserve<br>unit<br>standard unit<br>compound unit<br>per<br>density<br>mass<br>pressure<br>speed<br>acceleration | straight line equation<br>function f(x)<br>y=mx+c<br>gradient<br>y-intercept<br>intersection<br>parallel<br>coefficient<br>constant<br>root<br>solution<br>intercept<br>turning point<br>vertex<br>quadratic<br>quadratic function<br>graphically<br>algebraically<br>factorise<br>cubic function<br>inverse<br>function<br>reciprocal<br>sketch<br>plot<br>graph plot<br>linear equation<br>solve<br>solution<br>intersect/intersection<br>simultaneous<br>equations<br>variables<br>elimination<br>substitution<br>set of points satisfied<br>by<br>solve graphically<br>inequality<br>system<br>region<br>region satisfied by<br>intersection |



# Prince William School

## Maths Curriculum Map – Statistics Vocabulary KS3



|                               | Year 7   | Year 8   | Year 9 - SUPPORT  | Year 9 - CORE | Year 9 - HIGHER |
|-------------------------------|--|--|---|---------------|-----------------|
| Maths Vocabulary – Statistics | <b>INVESTIGATING STATISTICS</b><br>average: mean, median, mode<br>bar chart<br>categorical data<br>categories<br>chart<br>classes/class intervals<br>Compare<br>continuous<br>data set<br>discrete<br>frequency<br>pictogram<br>pie chart<br>spread: range<br>table<br>vertical line | <b>INVESTIGATING STATISTICS</b><br>scatter graph<br>connection<br>correlation<br>positive correlation<br>negative correlation<br>no correlation<br>frequency diagram<br>frequency polygon<br>mode, modal<br>class<br>grouped data<br>frequency table<br>estimate<br>mean, median, range spread<br>average<br>central tendency<br>variation<br>sample<br>Population | <b>PROBABILITY</b><br>Probability<br>Chance<br>Impossible<br>Even<br>Certain<br>Likely<br>Unlikely Outcome<br>Event<br>Experiment<br>Probability Scale<br>Frequency<br>Frequency Tree<br>Sample Space<br>List of Outcomes<br>Expected<br>Theoretical<br>Experimental<br>Random<br>Repeated<br><br><b>STATISTICS</b><br>data<br>data set<br>discrete<br>continuous<br>grouped<br>class<br>class interval<br>categories<br>ungrouped<br>tally chart<br>frequency table<br>chart<br>bar chart<br>pie chart<br>pictogram<br>categorical data<br>vertical line chart<br>frequency diagram<br>frequency polygon<br>stem-and-leaf diagram<br>key<br>average: mean, median, mode<br>modal class |               |                 |
|                               |  |  |   |               |                 |



# Prince William School

## Maths Curriculum Map – Probability Vocabulary KS3



|                                | Year 7   | Year 8   | Year 9 - SUPPORT | Year 9 - CORE | Year 9 - HIGHER |
|--------------------------------|--|--|------------------|---------------|-----------------|
| Maths Vocabulary – Probability | <b>REASONING WITH FRACTIONS</b>  | <b>REASONING WITH FRACTIONS</b>  |                  |               |                 |
|                                | probability<br>probability<br>product<br>proper fraction<br>quotient<br>random<br>repeated<br>scale<br>simplest form<br>simplify<br>sum<br>theoretical<br>unit fraction<br>unlikely<br>whole | probability<br>chance<br>impossible<br>even<br>certain<br>likely<br>unlikely<br>experiment<br>probability scale<br>outcome<br>event<br>exhaustive<br>independent<br>exclusive<br>mutually<br>exclusive<br>frequency<br>frequency tree<br>expected<br>theoretical<br>experimental<br>random<br>repeated<br>experiment |                  |               |                 |





# Prince William School

## Maths Curriculum Map – Year 10 Core Vocabulary KS4



| Autumn  |   |   |   | Spring |  | Summer |  |
|---|---|---|---|--------|--|--------|--|
| <b>CALCULATION</b>  | <b>GEOMETRY (Continued)</b>   | <b>ALGEBRA</b>  | <b>RATIO AND PROPORTION (Continued)</b>   |        |  |        |  |
| calculate<br>add, plus, sum, total<br>subtract, take away, difference<br>multiply, product<br>divide, quotient, dividend, divisor<br>operation<br>order of operations<br>brackets<br>square<br>cube<br>square root<br>cube root<br>power index/indices<br>simplify<br>prime (number)<br>highest common factor;<br>lowest common multiple<br>prime factor (decomposition)<br>product of primes/prime<br>factorisation<br>unique factorisation theorem  | Rectangle<br>Parallelogram<br>Rhombus<br>Trapezium<br>Kite<br>Regular<br>Irregular<br>Diagonal<br>Symmetry<br>Mirror Line<br>Rotational Symmetry<br>Angles around a point<br>Angles on a straight line<br>Vertically opposite<br>parallel lines<br>transversal (line)<br>alternate angles<br>corresponding angles<br>co-interior angles<br>equal<br>prove<br>polygon<br>regular / irregular sum<br>interior angle<br>exterior angle<br>angle sum<br>Vertices<br>perimeter<br>distance<br>length<br>width<br>dimension<br>total<br>km, m, cm, mm<br>composite shape<br>compound shape<br>dissect<br>circle<br>centre<br>circumference<br>radius/radii<br>diameter<br>$\pi$ , $\pi$<br>sector | Operation<br>Inverse (operation)<br>Addition, Subtraction,<br>Multiplication, Division<br>Sum<br>Difference<br>Product<br>Quotient<br>Power<br>Index (Indices) Law<br>Raising to a power<br>Term<br>Expression<br>Simplify<br>Collect<br>Like Terms<br>Bracket<br>Co-efficient<br>Distributive Law<br>Expand<br>Factor<br>Factorise<br>Factorise fully<br>Common Factor<br>Notation<br>Inequality<br>Number Line<br>Equation (Identity) | substitute<br>evaluate<br>variable<br>solve<br>variable<br>side<br>solution<br>linear<br>equal<br>both sides<br>unknown<br>inverse<br>inequality<br><, >, $\leq$ , $\geq$<br>number line<br>solution set<br>integer<br>ratio<br>proportion<br>fraction<br>whole<br>part<br>quantity<br>variable<br>multiplier<br>per<br>unit<br>rate<br>scale factor<br>similar<br>corresponding<br>enlargement<br>length,<br>area and volume<br>perimeter<br>relative<br>simplify<br>in simplest terms/form lowest<br>terms<br>part per whole<br>scaling up (or down)<br>standard units<br>convert<br>equivalent<br>notation of right-angled<br>notation of equal length<br>sides<br>prove<br>square(d)<br>square root |        |  |        |  |
| <b>GEOMETRY</b>   |   | <b>RATIO AND PROPORTION</b>   |   |        |  |        |  |
| Shape<br>2 dimensional<br>3 dimensional<br>Cube<br>Cuboid<br>Prism<br>Pyramid<br>Tetrahedron<br>Cylinder<br>Cone<br>Sphere<br>Point<br>Line Vertex/Vertices<br>Edge<br>Plane<br>Face<br>Surface<br>Cross-section<br>Parallel<br>Perpendicular<br>Right angles<br>Polygon<br>Regular polygon<br>Label<br>Mark<br>Angle<br>Triangle<br>Equilateral<br>isosceles<br>Scalene<br>Right-angled (Acute-angled)<br>(Obtuse-angled)<br>Quadrilateral<br>Square |   | fraction<br>numerator<br>denominator<br>part<br>whole<br>equivalent<br>unit fraction<br>proper fraction<br>mixed number<br>improper fraction<br>simplest form<br>simplify<br>sum<br>difference<br>product<br>quotient<br>(of an) amount<br>percentage<br>per cent<br>out of<br>per<br>whole<br>part(s)<br>formula<br>subject (of a formula) term<br>expression  |   |        |  |        |  |



# Prince William School

## Maths Curriculum Map – Year 10 Higher Vocabulary KS4



Year 10 Higher Maths Vocabulary

| Autumn   |   |  | Spring  |  | Summer |  |  |
|--|---|--|---|--|--------|--|--|
| <b>CALCULATION</b>   | <b>GEOMETRY</b>   |  | <b>ALGEBRA</b>  |  |        |  |  |
| bound<br>upper bound<br>lower bound<br>measurement<br>error interval<br>compounded accuracy<br>power<br>root<br>estimate<br>nearest<br>squares/cubes<br>base number<br>index/indices<br>unit fraction<br>non-unit fraction<br>surd s<br>simplify<br>equivalent<br>rational irrational<br>rationalise (the denominator)<br>complement | triangle<br>trigon<br>Pythagoras' Theorem<br>right-angled triangle<br>hypotenuse root<br>(Pythagorean) triple<br>trigonometry<br>opposite<br>adjacent<br>sine, cosine, tangent ratio<br>similar (triangles)<br>exact value<br>denominator<br>numerator<br>arcsin or $\sin^{-1}$<br>arccos or $\cos^{-1}$<br>arctan or $\tan^{-1}$<br>surface area<br>net cube<br>cuboid<br>prism<br>cross-section<br>curved surface area<br>cylinder<br>pyramid<br>cone<br>frustum<br>sector<br>slant height<br>sphere<br>hemisphere<br>Pythagoras' Theorem<br>volume<br>similar<br>scale factor<br>area scale factor<br>volume scale factor<br>proportion<br>transformation<br>rotation<br>reflection<br>translation<br>describe<br>vertex<br>centre<br>angle of rotation<br>direction of rotation<br>column vector<br>combination<br>congruent<br>object<br>image<br>similar<br>enlargement | centre of enlargement<br>ray<br>scale factor<br>inversion<br>proportion<br>vector<br>magnitude<br>direction<br>notation<br>displacement<br>velocity<br>acceleration<br>coordinate<br>plane<br>parallel line<br>line segment<br>proof | Simplify<br>Algebraic Fraction<br>Numerator<br>Denominator<br>Factorise<br>Indices<br>Brackets<br>Expression<br>Quadratic<br>Factorise<br>Surd<br>Linear<br>Binomial<br>Product<br>Expand<br>Cancel<br>Divide<br>Representation<br>Fluency<br>Probing question  |  |        |  |  |
|  |   |  | <b>RATIO AND PROPORTION</b>   |  |        |  |  |
|  |   |  | numerator<br>denominator<br>recurring decimal<br>equivalent<br>terminating decimal<br>rational number<br>irrational number<br>notation of recurring<br>multiplier<br>percentage<br>change<br>compound interest<br>compounded<br>original<br>growth decay<br>exponential<br>initial value<br>appreciate<br>depreciate.<br>directly proportional $\propto$<br>constant of proportionality<br>multiplier<br>inversely proportional<br>reciprocal |  |        |  |  |



# Prince William School

## Maths Curriculum Map – Year 11 Vocabulary (Autumn)



| Year 11 Autumn Maths Vocabulary | Support   |   |  | Core   |   |   | Higher   |  |  |
|---------------------------------|---|---|--|--|---|---|--|--|--|
|                                 | DATA: STATISTICS  | PROBABILITY   | NUMBER CALCULATIONS  | DATA: STATISTICS   | PROBABILITY   | GEOMETRY: SHAPE   | DATA: STATISTICS   | PROBABILITY  | ALGEBRA: SOLVING   |
|                                 | data<br>data set<br>discrete<br>continuous<br>grouped<br>class<br>class interval<br>categories<br>ungrouped<br>tally chart<br>frequency table<br>chart<br>bar chart<br>pie chart<br>pictogram<br>categorical data<br>vertical line chart<br>frequency diagram<br>frequency polygon<br>key<br>central tendency<br>average<br>mean<br>median<br>mode<br>modal class<br>estimated mean<br>variation<br>spread<br>range<br>compare<br>sample<br>population<br>scatter graph<br>connection<br>correlation<br>positive correlation<br>negative correlation<br>no correlation<br>causation<br>line of best fit<br>predict<br>estimate<br>trend<br>interpolate<br>Extrapolate | Probability<br>Chance<br>Impossible<br>Even<br>Certain<br>Likely<br>Unlikely<br>Experiment<br>Sample size<br>Tendency<br>Probability Scale<br>Outcome<br>Event<br>Exhaustive<br>Independent<br>Dependent<br>Exclusive<br>Mutually Exclusive<br>List<br>Systematically<br>Frequency<br>Frequency Tree<br>Tree Diagram<br>Branch<br>Expected<br>Theoretical<br>Experimental<br>Random<br>Repeated<br>Experiment<br>Biased<br>Unbiased<br>And<br>Or<br>Both<br>Neither | measurement<br>rounded<br>truncated<br>error<br>inequality<br>'to the nearest'<br>accuracy<br>standard form<br>ordinary form<br>power<br>Index<br>Base<br>pi $\pi$<br>in terms of<br>calculate exactly<br>formula<br>Substitute<br>evaluate<br>equation<br>identity<br>expression<br>expand<br>factorise<br>Simplify<br><br><b>GEOMETRY: SHAPE</b><br><br>Pythagoras' Theorem<br>right-angled triangle<br>hypotenuse<br>shorter side<br>notation of right-angled<br>notation of equal length<br>sides<br>prove<br>square(d)<br>square root | box plot<br>box and whisker diagram<br>median<br>maximum<br>minimum<br>range<br>upper quartile<br>lower quartile<br>interquartile range<br>outlier<br>central tendency<br>spread<br>dispersion<br>consistency<br>compare<br>infer<br>variation<br>skew<br>positive/negative skew<br>cumulative frequency<br>curve<br>grouped data<br>continuous data<br>estimate<br>limitation<br>histogram<br>frequency<br>class interval<br>equal and unequal<br>distortion<br>construct<br>frequency density<br>ratio (of frequency to class width)<br>area of bar<br>sample<br>representative<br>bias<br>population<br>random<br>stratified<br>double sampling | Probability<br>Chance<br>Impossible<br>Even<br>Certain<br>Likely<br>Unlikely<br>Experiment<br>Sample size<br>Tendency<br>Probability Scale<br>Outcome<br>Event<br>Exhaustive<br>Independent<br>Dependent<br>Exclusive<br>Mutually Exclusive<br>List<br>Systematically<br>Frequency<br>Frequency Tree<br>Tree Diagram<br>Branch<br>Expected<br>Theoretical<br>Experimental<br>Random<br>Repeated<br>Experiment<br>Biased<br>Unbiased<br>And<br>Or<br>Both<br>Neither | triangle<br>trigon<br>Pythagoras' Theorem<br>right-angled triangle<br>hypotenuse<br>root<br>surd<br>Pythagorean triple<br>trigonometry<br>opposite<br>adjacent<br>sine<br>cosine<br>tangent<br>ratio<br>similar (triangles)<br>exact value<br>denominator<br>Numerator<br>arcsin or $\sin^{-1}$<br>arccos or $\cos^{-1}$<br>arctan or $\tan^{-1}$ | box plot<br>box and whisker diagram<br>median<br>maximum<br>minimum<br>range<br>upper quartile<br>lower quartile<br>interquartile range<br>outlier<br>central tendency<br>spread<br>dispersion<br>consistency<br>compare<br>infer<br>variation<br>skew<br>positive/negative skew<br>cumulative frequency<br>curve<br>grouped data<br>continuous data<br>estimate<br>limitation<br>histogram<br>frequency<br>class interval<br>equal and unequal<br>distortion<br>construct<br>frequency density<br>ratio (of frequency to class width)<br>area of bar<br>sample<br>representative<br>bias<br>population<br>random<br>stratified<br>double sampling | Probability<br>Outcome<br>Event<br>Exhaustive<br>Independent<br>Dependent<br>Exclusive<br>Mutually Exclusive<br>Conditional<br>Two-way table<br>Venn Diagram<br>Intersection $\cap$<br>Union U<br>Not e.g. A'<br>List Systematically<br>Frequency<br>Frequency Tree<br>Tree Diagram<br>Expected<br>Theoretical<br>Experimental<br>Random<br>Repeated<br>Experiment<br>Biased<br>Unbiased | quadratic equation<br>completed square form<br>coefficient<br>general quadratic<br>vertex<br>turning point<br>quadratic formula<br>root<br>discriminant<br>rearranging<br>setting equal to 0<br>numerical method<br>approximate<br>Iteration<br>$x_0, x_1, x_2, \dots$<br>$x_n, x_{n+1}, \dots$<br>iterative formula<br>diverge<br>change of sign<br>interval<br>interval bisection<br>(a, b) for an open interval<br>[a, b] for a closed interval<br><br><b>GEOMETRY: SHAPE</b><br><br>trigonometry<br>Pythagoras' Theorem<br>sine<br>cosine<br>tangent<br>ratio<br>arcsin<br>arcos<br>arctan<br>angle of elevation<br>sine rule<br>cosine rule<br>subject (of formula)<br>non-right-angled<br>proof<br>derive<br>perpendicular<br>area |

