| Topic Name | Term | Skills Developed | Next link in curriculum |
| --- | --- | --- | --- |
| **Number** | Autumn | * Calculations, checking and rounding * Indices, roots, reciprocals and hierarchy of operations * Factors, multiples and primes * Standard form and surds | * Many of these skills are reinforced throughout the course. * Use of product rule for counting involved in probability questions. * Solving equations involving surds. * Rationalising the denominator is to be looked at in further detail in the future. |
| **Algebra** | Autumn | * Index laws * Expanding and factorising * Setting up, rearranging and solving equations * Sequences | * Use of algebraic manipulation to complete mathematical proofs. * Use of substitution to solve equations using iterative methods. * Quadratic sequences. |
| **Interpreting and representing data** | Autumn | * Averages and range * Representing and interpreting data   + Pie charts   + Time-Series graphs   + Scatter graphs   + Two-way Tables | * Construct more challenging statistical diagrams such as cumulative frequency diagrams, box plots and histograms which require greater understanding of continuous data. |
| **Fractions, ratio and percentages** | Autumn/Spring | * Fractions * Percentages * Ratio and proportion | * Change recurring decimals into their corresponding fractions and vice versa. * Use fractions to solve probability questions. * Use understanding of ratio to solve complex algebraic fractions problems. |
| **Polygons, angles and parallel lines** | Spring | * Develop understanding of properties of 2D shapes and how to classify them * Use angle rules in polygons to tackle a variety of problems including using internal and external angles of polygons * Learn angle rules for parallel lines * Use algebra to solve angle rule problems * Recap of rotational symmetry from KS3 * Recap of tessellating shapes from KS3 | * Circle theorems * Could be used within a Pythagoras/trigonometry problem * Be able to identify and “quote” the correct angle rule used in a given scenario including the circle theorems |
| **Pythagoras’ Theorem and trigonometry** | Spring | * Understand how to use Pythagoras’ Theorem in 2D including to decide whether a triangle is right-angled or not * Calculate the length of line segments using Pythagoras * Learn the three trigonometric ratios for sine, cosine and tangent and be able to use them to find missing sides and angle in right angled triangles * Learn the exact values of sin, cos and tan for the angles, 0°, 30°, 45°, 60° & 90° | * Finding the length of line segments on coordinate grids * Graphs of trigonometric functions * Further trigonometry   + Area of a triangle using 0.5 ab sin C   + Sine rule   + Cosine rule   + Trigonometry without a calculator * 3D trigonometry |
| **Graphs: the basics and real-life graphs** | Summer | * Draw and interpret graphs from real-life situations * Draw and interpret distance-time and velocity-time graphs * Understand different properties of various graphs to find information such as gradient of a velocity-time graph for acceleration * Find the coordinates of a midpoint or a line segment * Finding the length of line segments on coordinate grids * Find missing coordinates from shapes using understanding of geometric properties * Find the equation of a line through two given points | * Equations of parallel and perpendicular lines * Equations of perpendicular bisectors * Exact areas under graphs are studied at A-level by using integration to find distance travelled from a velocity-time graph |
| **Linear graphs and coordinate geometry** | Summer | * Recap the equations of horizontal and vertical line as well as the lines and * Calculate and use gradients of straight-line graphs * Learn what the equation represents and how to use it * Plot and draw straight line graphs with and without a table of values * Find the equation of a line algebraically from a given gradient and point * Explore the gradients of parallel and perpendicular lines * Be able to rearrange equations of straight-line graphs into the form * Find the equations of parallel and perpendicular lines | * Use a table of values to plot more complex graphs such as quadratics, cubics, exponentials and trigonometric graphs * Use algebraic manipulation to help solve simultaneous equations * Draw straight-line graphs to solve simultaneous equations graphically |
| **Quadratic, cubic and other graphs** | Summer | * Learn how to plot quadratic, cubic, reciprocal and circle graphs whose centres are and know what the shape of the graph will be from its equation * Find (estimate) the roots of quadratic functions from a graph * Understand that quadratics are used in a variety of real-life situations and be able to apply new learning in this unit to those types of problems | * Be able to recognise the shapes of these graphs when related to proportionality * Finding the turning point on a quadratic graph by completing the square * Solving simultaneous equations graphically * At A-level maximum and minimum points are found by using differentiation for polynomials |
| **Perimeter, area and circles** | Summer | * Recall the formulae for area of the following: triangle, rectangle, trapezium and parallelogram * Calculate the area and perimeter of compound shapes * Define all the parts of a circle * Explore the number π * Learn and use the formula for area of a circle and circumference of a circle * Calculate arc lengths and sector areas * Given the area or circumference, calculate the radius of a circle * Work in terms of π and understand that leaving answers like this is more accurate than the rounded decimal version | * Use area formulae to help calculate the volume and surface area of 3D shapes including cylinders |