Year 11

Mathematics Curriculum Overview

Autumn 1

Topic	Big Questions
Gradients and Lines	What is the minimum number of points needed to plot a straight-line graph? In $y = mx + c$, what do m and c represent? How do you find the equation of a straight line graphically? How can you find the equation of a straight line from two points? How many solutions does a pair of linear simultaneous equations have? How do you calculate the gradient of a perpendicular line? (H)
Non-linear Graphs	What are the significant points on the graph of a quadratic function? What's different about linear, quadratic, cubic and reciprocal graphs? Can you think of a real-life situation that can be modelled using exponential graphs? (H) How can you find the radius from the equation of a circle? (H) Why is finding the gradient of a tangent to a curve useful? (H)
Using Graphs	What's the same and what's different about reflecting a shape in a diagonal line compared to a vertical/horizontal line? Can you think of a real-life situation that can be modelled using a graph? What does a 'flat' section on a distance/time graph represent?

	How do the graphs of direct proportional and inverse proportional relationships differ? How do we find approximations for solutions graphically? How can you use the formula for the area of trapezia to estimate the area under a graph? (H)

Autumn 2

Topic	Big Questions
Expanding and Factorising	What is the difference between expanding and factorising linear expressions? Do simplified quadratics always have three terms? What is the maximum number of binomial factors that a quadratic expression can have? Which coefficients need to be considered when factorising complex quadratic expressions? (H) What is the difference between factorising and solving quadratics? How do solutions link to the graph of a quadratic equations? (H) Why is this method called completing the square? (H) What is the quadratic formula and what is it used for? (H)
Changing the Subject	How many solutions does a linear equation have? What are the four possible solutions you might see in an inequality? How can we use equations and inequalities to solve geometric problems? Why are inverse operations important when rearranging a formula?

	Why do the order of steps taken to rearrange formula matter? When a subject is repeated, why do we need to collect like terms or factorise? (H) How can we check whether an iteration is a good estimate for the solution of an equation? (H)
Functions	How do you calculate the input when given the output? What's the difference between f(x) and f(2)? What's different about fg(x) compared to gf(x)? (H) What is an inverse function? (H) How many turning points will the graph of a quadratic function have? What is a solution set of a quadratic function? (H) What are the three trigonometric functions that you need to know to solve GCSE problems?

Spring 1

Topic	Big Questions
Multiplicative Reasoning	How can you work out the scale factor between similar shapes? What does it mean to be in 'direct proportion'? How do you find the constant of proportionality? (H) How do you solve problems involving density and pressure? What does it mean to be inversely proportional? How can we write an equation to represent inverse proportion? (H) How do we solve complex ratio problems? (H)

Geometric Reasoning	How do we use angle facts to find missing angles including on parallel lines? What is the difference between interior and exterior angles, and how do you calculate these? How can you use angle facts to prove geometric facts? How do you solve problems involving vectors? What do you recall about solving problems involving circle theorems? (H) What are the circle theorems relating to the radius? (H) What are the circle theorems relating to the tangent? (H) What do you recall about solving problems involving trigonometry and Pythagoras?
Algebraic Reasoning	How do you simplify complex expressions? How do you calculate and use the nth term of a linear sequence? How do you find the nth term of a quadratic sequence? (H) How do you solve two linear equations simultaneously? How do you solve a linear and quadratic equation simultaneously? How do you prove a statement algebraically? (H) How do you graph inequalities and show a specified region? (H)

Spring 2

Topic	Big Questions
Transforming & Constructing	What is the difference between line symmetry and reflecting in a line? What is the difference between rotational symmetry and rotating an object about a point? What do we recall about translating shapes using column vectors? What do we recall about enlargements? (including Negative H) How do you perform a combination of transformations? What is meant by an invariant point? (H) How do we solve problems involving loci and constructions? What do the graphs of the trigonometric functions look like? (H) How do we complete reflections and translations of a range of graphs? (H)
Listing & Describing	How can we systematically list information, including using sample space diagrams? What is the product rule for counting? (H) What do we recall about Venn diagrams, including set notation? What are the different plans and elevations that we can draw for 3D shapes? How can we compare data sets using averages and the range? What do we recall about scatter diagrams?

Summer Term

Revision and Preparation for GCSE Exams.