Year 10

Mathematics Curriculum Overview

Autumn 1

Topic	Big Questions
Equations and Inequalities	What does the word “solve” mean? What connection does this have to the word solution? What is the same and what is different about solving equations and inequalities? How do you represent the solutions to an inequality on a number line? How can you use set notation to represent solutions to inequalities? (H) How do you draw a straight-line graph and can you use straight line graphs to find solutions to equations? How can we show inequality regions on a graph, and what is the significance of the dotted or solid line? (H) How do you solve equations with unknowns on both sides? How do you solve inequalities with unknown on both sides? What methods can we use to solve more complex equations and inequalities? How do you use factorisation to solve quadratic equations? (H) How do you solve quadratic inequalities with one variable? (H)
Trigonometry and Pythagoras	How do you use the tangent, sine and cosine ratios to find missing side lengths? What is an inverse trigonometric function and how do you use it to find missing angles? What is Pythagoras' theorem and how do you use it to find missing lengths?

	What are the key exact trigonometric values and how do you use these to solve problems? How do we solve problems involving right-angled triangles in 3D? (H) What is the sine rule and how is it used to find missing lengths and angles? (H) What is the cosine rule and how is it used to find missing lengths and angles? (H) How do we calculate the area of non-right angled triangles? (H) How do you know whether to use the sine or cosine rule to solve a problem? (H)

Autumn 2

Topic	Big Questions
Congruence, Similarity and Enlargement	How do we enlarge a shape by a fractional scale factor? How do we enlarge a shape by a negative scale factor? (H) How can you confirm that two shapes are similar and, therefore, find missing sides and angles in similar shapes? What are the rules for finding angles in parallel lines and how can we use these to establish that triangles are similar? How can you use the length scale factor to find the area scale factor of two similar shapes? (H) How can you use the length scale factor to find the volume scale factor of two similar shapes? (H) How can you use similarity to solve geometry problems? (H) Do you know the difference between congruency and similarity and what are the conditions for congruency? How do you prove that two triangles are congruent? (H)

Simultaneous Equations	How many possible solutions are there to an equation, and is (x, y) a solution? How do you solve a pair of simultaneous equations by using substitution? What is true about the coordinates of the points where two lines meet? How do you solve a pair of simultaneous equations by subtracting and adding? How do we adjust both equations to solve simultaneously? How do you form and solve a pair of simultaneous equations? What's the same and what's different about the equations of a straight line and the equations of a curve? (H) How do you solve a linear and quadratic equation using graphs? (H) How do you solve a linear and quadratic equation algebraically? (H)

Spring 1

Topic	Big Questions
Angles and Bearings	What are the compass points and how do they relate to angles? Why is a scale drawing useful? How do you represent, measure and read bearings? How do you use scale drawings and bearings to solve more complex problems? Why are rules for angles in parallel lines useful for solving bearing problems? How can we use our knowledge of right-angled geometry to solve problems with bearings?

	How can we use our knowledge of the sine and cosine rule to solve problems with bearings? (H)
Working with Circles	What are the names of the different parts of a circle? How do you find the length of an arc of a circle? How does the area of a circle help us to find the area of a sector? What are the circle theorems and how can we use them to find angles in problems involving circles? (H) How do you use circle theorems to find angles in the same segment? (H) How can we identify the opposite angles of a cyclic quadrilateral? (H) How do you calculate the volume of a cylinder and cone? How many lengths do you need to know to be able to find the volume of a sphere? How does the surface area of a sphere compare to the area of a circle? How do you calculate the surface area of a cylinder and a cone? How does doubling one length affect the area and volume of a shape? (H)
Vectors	What notation is used to represent vectors? What's the same and what's different about parallel vectors? What is the resultant vector when you add or subtract two or more vectors? Why is there sometimes more than one way of writing a vector journey? (H) How can we identify parallel vectors on a diagram? (H) What does the term 'collinear' mean? (H)

	How do you use vectors in geometric arguments and proofs? (H)

Spring 2

Topic	Big Questions
Ratios and Fractions	How do you compare quantities and share in a ratio? How can you use ratios and fractions to compare quantities? How can you use ratios to covert between currencies? How does getting the ratio into the form 1 : n help you to compare ratios? Is it the largest or smallest number that tells you which is the best value for money? How can we use equivalent ratios to combine ratios? How do we use algebraic notation within ratios? How can we use the ratio of the areas and volumes of two similar shapes to find the scale factor? (H)
Percentages and Interest	How do you calculate percentages including percentage increase and decreases? What is the difference between simple and compound interest? How do you calculate repeated percentage change? How do we solve problems involving FDP and ratio?
Probability	What types of number can we use to represent probabilities? How do you estimate probabilities and find probabilities using tables and diagrams? How can we present outcomes using a sample space diagram? How do you use tree diagrams to represent independent events?

	How do you use tree diagrams to represent dependent events? How do we use tree diagrams to represent conditional repeated events? (H)

Summer 1

Topic	Big Questions
Collecting, representing and interpreting data	Why do statisticians take samples rather than interview the whole population? (including Startified Sampling H) How can we categorise different types of data? How do you construct a frequency polygon from frequency tables? What probabilities can you find from two way tables? What's the difference between a multiple bar chart and a composite bar chart? If you know the proportion of the whole, how can we work out the angle we need for the pie chart? What are the main differences between frequency polygons and histograms? (H) How do you find averages from lists and tables? How do you describe trends from time series graphs? Why do we need a key for a stem and leaf diagram? Why are cumulative frequency polygons plotted at the upper end points? (H) How can you use averages and the range to compare data set? What information can we infer from box plots to compare data sets? (H) How do you draw and interpret scatter graphs?

Non-Calculator Methods	Which methods can you use to add, subtract, multiply and divide (including fractions)? What does it mean to leave an answer in 'exact form'? What's the difference between a rational and irrational number? (H) What are the rules for simplifying expressions involving surds? (H) Why do we use rounding to estimate calculations? What is the difference between rounding and truncating? How can you find upper and lower bounds of calculations? (H) What information do we need to solve multi-step problems?

Summer 2

Topic	Big Questions
Types of Number and Sequences	What does it mean to write a number as a product of its prime factors? What is the difference between a linear and geometric sequence, and how do you find the nth term of a linear sequence? What are the other types of non-linear sequence? Why is simplification important when a sequence involves surds? (H) What are the steps in finding the nth term of a quadratic sequence? (H)
Indices and roots	How do you calculate powers and roots of numbers including negatives? How do you calculate with numbers written in standard form?

	How can you simplify the multiplication and division of two terms involving indices if they have the same base? Why do we need to be careful with expressions like $(6x^2)^3$? What's the difference between "finding one half" and "raising to the power one half"? (H)
Manipulating expressions	What's different about simplifying when you're multiplying/dividing rather than adding/subtracting? What's the difference between an identity and an equation? How do you add and subtract algebraic fractions? (H) How do you multiply and divide algebraic fractions? (H) What is the best approach when solving equations with fractions? How do you solve equations which involve algebraic fractions? (H) What's the difference between a demonstration and a proof?