Term	Unit	Ref	Topic	GCSE Objective statement
Autumn Year 10	F1 Number	FNum1.1	Fractional Powers	Understand and use the fact that a unitary fractional index means a root, $eg\ \ 4^{\frac{1}{2}} = \sqrt{4} = 2;\ \ 8^{\frac{1}{3}} = \sqrt[3]{8} = 2;\ \ 16^{\frac{3}{2}} = \left(16^{\frac{1}{2}}\right)^3$ Understand that the inverse of raising something to the power of n is raising it to the power of 1/n Understand and use non-unitary fractional powers (positive and negative) of numbers, eg $16^{\frac{3}{2}} = \left(16^{\frac{1}{2}}\right)^3 = 4^3 = 64$ Be able to solve problems using all of the index laws Estimate powers and roots of any positive number
		FNum1.2	Surds	Understand the concept of some square roots being irrational numbers and the need to leave answers to problems in surd form Appreciate the infinite nature or real and rational numbers Know which square roots are surds Be able to simplify numerical calculations by manipulating surds, eg simplify $\sqrt{2}\times\sqrt{8}$; simplify $\sqrt{18}$ Know how to rationalise a denominator, such as $\frac{1}{\sqrt{3}}$ or $\frac{1}{2\sqrt{3}}$ Be able to expand brackets with surds, eg $(1+\sqrt{5})(3-2\sqrt{5})$ Be able to write an expression involving surds in the form $a+b\sqrt{n}$ for a given n Know how to use surds and pi in exact calculations, without a calculator (making links with Pythagoras questions, for example)
		F1Alg2.1	Algebraic Manipulation	Expand brackets containing more complex expressions, eg multiplying a linear expression by a quadratic such as $(x+2)(x^2+2x-3)$, expanding three binomial expressions such as $(x+1)(2x-3)(4x-1)$, expanding an expression which has been cubed such as $(2x-1)^3$ Find the LCM and HCF of two algebraic expressions

Term	Unit	Ref	Topic	GCSE Objective statement
	F1 Algebra	F1Alg2.2	Quadratics	Solve equations such as $x^2=25$, giving both the positive and negative roots Know that x^2+a has values ≥a for all x Know how to factorise a quadratic expression into two brackets (where the coefficient of x^2 need not be 1) Understand how to solve quadratic equations by factorisation (where the coefficient of x^2 need not be 1) Be able to rewrite a quadratic expression by completing the square, including an understanding that "Write ... in the form $a(x-b)^2+c$" means to complete the square Be able to deduce turning points by completing the square Be able to solve quadratic equations by using the technique of completing the square Understand how the quadratic formula works, memorise it and use it to solve quadratic equations Know which method of solving a quadratic equation is likely to be the most useful in different situations Be able to solve quadratic equations that require rearrangement, eg $\frac{1}{x}+\frac{1}{x+1}=1$ Know that trial and improvement is not an acceptable method for solving quadratic equations
		F1Alg3	Algebraic Fractions	Know that algebraic fractions still obey the same rules and have the same meaning as numerical fractions Know that (x+b)/(x-c) is undefined when x=c Realise that to simplify an algebraic fraction the numerator and denominator must both be factorised and then common factors cancelled, eg $(x^2+10)/(x+5)$ does not equal (x+2) ! Be able to carry out simple simplifications of algebraic fractions with numerical denominators, eg $\frac{3x}{5}+\frac{2x}{7}$; $\frac{x}{3}-\frac{3x}{8}$; $\frac{3x}{5}\times\frac{2x}{5}$; $\frac{4^x}{3}\div\frac{2x}{9}$ Know how to simplify algebraic fractions where the numerator and denominator are both quadratics, eg simplify $\frac{x^2-1}{x^2+2x+1}$ Be able to simplify expressions involving algebraic fractions, eg $\frac{3}{x}+\frac{5}{2x+1}$ Be able to solve equations that involve algebraic fractions where these generate a quadratic, eg Solve: $\frac{2}{x+1}+\frac{1}{x+2}=1$
		2.4	Algebraic fractions SCHEME D & E	Apply the four operations (+, -, ×, ÷), including formal written methods, to simple fractions Simplify and manipulate algebraic expressions involving algebraic fractions by: - collecting like terms - multiplying a single term over a bracket - taking out common factors - simplifying expressions involving sums, products and powers, including the laws of indices

Term	Unit	Ref	Topic	GCSE Objective statement
	F1 Geometry	F1Geom1.1	Circle theorems	Understand and be able to use the vocabulary of a circle: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment Understand that inscribed regular polygons can be constructed by equal division of a circle Understand and be able to use the circle theorems below to solve problems: • The angle subtended at the circumference by a semicircle is a right angle • The angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference • Angles subtended from the same chord (or in the same segment) are equal • Opposite angles in a cyclic quadrilateral add up to 180 • The alternate segment theorem • The tangent at any point on a circle is perpendicular to the radius at that point • Two tangents from the same external point are equal in length Use congruent triangles to explain why the perpendicular from the centre to a chord bisects the chord Be able to prove these circle theorems (using a diagram), with clear and logical steps shown and reasons given Be able to construct other proofs using the circle theorems Be able to use Pythagoras to solve problems involving tangents and chords
		F1Geom1.2	Pythagoras and Trigonometry in 3D	Be able to solve problems using Pythagoras in 3D (eg the longest diagonal in a cuboid) Know how to use the three trig ratios (sin, cos, tan) in 3D Understand how to calculate the angle between a line and a plane
		F1Geom1.3	Exact values of trigonometry ratios	Recall or work out the exact values of the trigonometric ratios for angles 0°, 30°, 45° and 60° Recall that sin⟦90°⟧=1 and cos⟦90°⟧=0 With manipulation of surds covered in FNum1, more complex questions can be attempted: Solve right-angled triangles with angles of 30°, 45° or 60° without using a calculator

Term	Unit	Ref	Topic	GCSE Objective statement
		F1Geom1.4	Trigonometry in non-right angles triangles	Know how to find the area of a triangle using the formula 1/2 ab sinC Be able to solve problems using this formula (such as the area of a parallelogram) Understand and be able to use the sine rule to calculate a side in a non-right-angled triangle Understand and be able to use the sine rule to calculate an angle in a non-right-angled triangle Appreciate how to deal with the ambiguous angle case when using the sine rule Understand and be able to use the cosine rule to calculate a side in a non-right-angled triangle Understand and be able to use the cosine rule to calculate an angle in a non-right-angled triangle Be able to solve problems (including those involving bearings) using the sine and cosine rules, and the area of a triangle formula, in 2D Be able to solve problems using the sine and cosine rules in 3D Memorise the sine rule, cosine rule and area formulae
		F1Data 1.1	Quartiles and inter-quartile range	Be able to order raw data (or draw a stem and leaf diagram) then read off the median and quartiles. Understand how to interpret a data set, or compare data sets, using the median(s) and quartiles Know how to find the inter-quartile range and range from ordered data (in a list or stem and leaf diagram) and interpret what they tell you about the data Know that an IQR can be a more representative measure of spread for a data set with anomalies, and that it only involves the middle 50% of the data

Term	Unit	Ref	Topic	GCSE Objective statement
	F1 Data	F1Data 1.2	Cumulative frequency	Understand that cumulative frequency is a running total and complete a cumulative frequency table, including a column for the upper bounds Be able to interpret cumulative frequencies, eg given the table, how many people took less than 5.5 minutes? 5.5 mins or more? Between 3.5 and 8.5 mins? Understand that cumulative frequency uses things we know, eg that a certain frequency is ≤ the upper bound of each group, to interpolate other values Know how to plot a cumulative frequency curve, understanding why you use the upper class boundary Know that cumulative frequency diagrams can either be plotted with straight lines (dot-to-dot) or a smooth curve (an "ogive") in the GCSE exam. However, if points are missed out, or the gradient ever becomes negative (which might happen when attempting to draw a curve), marks will be lost: this perhaps suggests that straight lines are a safer strategy. Be able to answer questions using a cumulative frequency curve, eg How many less than 19 cm? If want to take shortest 22 people, how tall is the tallest? Understand that a steep gradient on the curve means lots of data values and a shallow section means not many data values Given a cumulative frequency curve, be able to write an interpretation of the spread of the data values by splitting the curve up into sections with different gradients Know how to compare two cumulative frequency curves by looking at the
		F1Data 1.3	Box plots	**Be able to use raw data (or a stem and leaf diagram) to draw a box plot, paying particular attention to choosing a suitable x-axis** **Be able to read off quartiles and median from a box plot** **Know how to calculate the inter-quartile range, and understand that it can be more representative of the spread as it ignores extreme values** **Understand how to draw a box plot underneath a cumulative frequency curve**
		F1Data 1.4	Interpreting data and comparing data sets	Be able to interpret a box plot, appreciating that each section contains 25% of the data Be able to compare two data sets illustrated in box plots, discussing shape (comparing measures of location and measures of spread), odd values, and percentage difference between medians. Appreciate that the size of the sample doesn't matter when comparing box plots for different data sets, nor does the source (eg stem and leaf versus cumulative frequency diagram)

Term	Unit	Ref	Topic	GCSE Objective statement
		F1Data 1.5	Data-handling cycle	Given a research question, be able to: frame a hypothesis, decide what type data is needed Understand which diagrams are appropriate for different types of data Construct suitable diagrams for grouped discrete and continuous data Compare two diagrams in order to make decisions about a hypothesis Compare two distributions in order to make decisions about a hypothesis by comparing the range or the inter-quartile range if available, and a suitable measure of average, such as the mean or median. Be able to use all the evidence from a cumulative frequency table, curve, median, quartiles, IQR and box and whisker diagram to reach a conclusion on a hypothesis Interpret diagrams for grouped discrete and continuous data Understand how to use the language of probability when reaching a conclusion on a hypothesis, taking into account the significance of the evidence

Term	Unit	Ref	Topic	GCSE Objective statement
Spring Year 10	F2 Number	F2Num1	Bounds and accuracy	Be able to use upper and lower bounds in calculations that may involve perimeters, areas and volumes, eg find the maximum area of a rectangle where the upper and lower bounds of each side are given Be able to use upper and lower bounds in calculations where division or subtraction are involved Be able to perform calculations with rounded measurements to identify maximum and minimum possible values for the compound measure, eg speed, time, etc
		F2Num2	Product rule for counting	Apply systematic listing strategies including use of the product rule for counting (i.e. if there are m ways of doing one task and for each of these, there are n ways of doing another task, then the total number of ways the two tasks can be done is m×n ways) Solve problems using the product rule for counting. For example: "how many odd numbers greater than 60 000 can be made using these five digits: 2, 3, 4, 5, 6"
	F2 Algebra	F1Alg1	Graphs	Know the graphs of the following functions and be able to draw and sketch them: a linear function (not necessarily in the form y=mx+c) a quadratic a cubic: eg $y=x^3+3$ the reciprocal function, y=1/x the exponential function, eg $y=ak^x$ for positive values of k such as $y=100\times2^x$ trig functions: y=sinx; y=cosx; y=tanx (within the range -360 to 360) circle with centre at the origin: eg $x^2+y^2=25$ Given any of a linear or non-linear function, including quadratics, cubics, circles, and reciprocals, know how to make a table of values and plot their graphs accurately Draw or sketch simple piecewise functions. Know that non-linear graphs should be drawn as smooth curves. As a minimum requirement students should plot coordinates for integer values of x. Understand and use the fact that equations of the form $x^2+y^2=r^2$ generate circular graphs Be able to match equations (as above) with their graphs Be able to identify lines of symmetry of graphs Understand the main features of an exponential graph Know the maximum and minimum of the graphs of y=cos⟦x⟧ and y=sinx

Term	Unit	Ref	Topic	GCSE Objective statement
		F1Ag2	Simultaneous Equations	Know how to solve linear simultaneous with two variables using a substitution method, with a particular focus on systems of equations where at least one is of the form y=···. For example: solve 3x+5y=70 and y=2x-12 By drawing graphs, be able to find approximate solutions to a pair of simultaneous equations where one equation is linear and the other is linear or quadratic /circular Understand how to use the substitution method to solve a pair of simultaneous equations where one is linear and the other quadratic (including cases that lead to a quadratic that won't factorise, so will require the formula or a graphical approach) Understand how to use the substitution method to solve a pair of simultaneous equations where one is linear and the other circular, eg find the points where a straight-line, y=3x+2 meets the circle $x^2+y^2=36$ Use simultaneous equations to solve geometrical problems, problems set in context and questions requiring a graphical solution Be able to combine a linear and a non-linear simultaneous equation in simple cases, eg 2x+y=3 and $y=x^3$
		F1Alg3	Iterative methods	Use a systematic method to find approximate solutions of equations where there is no simple analytical method Use suffix notation in recursive formulae Find approximate solutions using recursive formulae Test the mid-value of the one decimal place interval to establish which one decimal place value is nearest to the solution, eg if 2.3 and 2.4 bound the solution, test 2.35 to determine whether the solution is closer to 2.3 or 2.5
	F2 Geometry	F2Geom1	Volume and surface area	Be able to recall and use Pythagoras' theorem in 2D or 3D in order to find missing lengths Be able to recall and use trigonometric formula (both right-angled and non-right-angled) in 2D or 3D in order to find missing lengths or angles Be able to calculate the volume of a prism, cone, pyramid or sphere Be able to use the formula to work out the surface area of a prism, cone, pyramid or sphere Be able to calculate the volume of a frustum of a cone Be able to calculate the surface area of a frustum of a cone Be able to work out lengths on a cone given its net in the form of a circular sector Be able to solve problems involving volume or surface area, including those where lengths are given algebraically
		F2Geom2	Circles	Know how to use trigonometry (from FGeom1) and the area of a sector to help calculate the area of a segment of a circle Be able to solve problems involving circular ponds, table tops, wheels, etc (eg find the perimeter of a semi-circular rug of given diameter; find the distance moved by the tip of a clock hand of radius 5 cm in 10 mins; find the number of revolutions of a wheel of diameter 50 cm when it travels 100 metres)

Term	Unit	Ref	Topic	GCSE Objective statement
		F2FGeom3	Enlarged areas/volumes	Understand the effect of enlargement on area, surface area and volume Compare the areas of volumes of similar shapes or solids, knowing that if a∶ b is the ratio of lengths then a^2 ∶ b^2 is the ratio of areas and a^3 ∶ b^3 is the ratio of volumes. Questions may be set which ask, for example, how many times bigger is the area of shape A than shape B? Be able to solve problems involving calculating missing lengths, areas, surface areas and volumes, including where the mass is used as a proxy for volume (when the density is the same) or area for the cost of paint Use fractions, decimals or percentages to calculate lengths, areas or volumes
		FGeom3	Proof	Understand how the formula for the surface area of a cone relates to the area of a sector of a circle Understand that Pythagoras holds when triangles are enlarged; link this with relationship between areas of similar shapes
	F2 Data	F2Data1	Histograms	Know that a histogram is an appropriate diagram to draw when we have continuous data that is grouped. When the classes are equal in width, we can draw a histogram with bars equal in width (which we would have previously referred to as a “frequency diagram”). When the classes are unequal in width, we can draw a histogram with bars unequal in width. Know that histograms with equal groups can be drawn with frequency or the vertical axis (but equally frequency density could be used) Know how to draw a histogram for grouped continuous data with unequal groups using the concept of frequency density Be able to use a histogram to work out the frequency for a particular class interval and be able to complete a frequency table from a histogram Be able to find an estimated of the mean from a histogram Be able to find an estimate of the median from a histogram Be able to find other information from a histogram, including making estimations using parts of bars, eg estimate the number of runners that finished the marathon in 4 hours or less, including where "4 hours" is part-way through a class

Term	Unit	Ref	Topic	GCSE Objective statement
Summer Year 10	F3 Number		Revision	There is no further number content in the GCSE Mathematics qualification, however previous number work will need to be revised in preparation for the exam.
	F3 Algebra	F3Alg1	Real-life graphs and kinematics formulae	Know how to draw and interpret real-life graphs such as: conversion graphs, travel graphs, distance/time graphs, velocity/time, ready-reckoner graphs, fuel bills, fixed charge and standing charge (eg taxi) and other financial graphs Be able to use the kinematics formulae supplied in the formula sheet to solve problems, i.e. $v=u+at$, $v^2=u^2+2as$, and $s=ut+at^2$, including in interpretation of distance/time (or displacement/time) and velocity/time graphs. Note that velocity will be given as, eg, m/s and acceleration will be given as, eg m/s^2
		F3Alg2	Areas under graphs	Calculate the area under a graph consisting of straight lines Estimate the area under graphs (including quadratic and non-linear graphs) by splitting the area into rectangles and triangles or trapezia Interpret the meaning of the area calculated as the product of the units of the variable on the vertical axis and the units of the variable on the horizontal axis (in particular, that the area under a speed-time graph represents distance) Estimate gradients of graphs and areas under graphs and interpret results in cases such as distance–time graphs, velocity–time graphs
		F3Alg3	Transformation of graphs	Know how to translate linear and quadratic graphs, y=sinx, y=cosx in the x- and y-directions Understand how to stretch linear and quadratic graphs, y=sinx, y=cosx in the x- and y-directions Know how to reflect linear and quadratic graphs, y=sinx, y=cosx in the x- or y-axis Given the graph of y=f(x), be able to sketch the graph of y=af(x); y=f(bx); y=f(x+c); y=f(x)+d [note in the AQA GCSE, a,b=±1] Given an object point (on the original curve), be able to state the coordinates of the image point (on a transformed curve) Recognise transformations of functions and be able to write down the function of a transformation given the original function.
		F3Alg4	Sequences	Work out the formula for the nth term of a sequence, which many contain linear or quadratic parts Use the nth term formula to solve problems such as "which term has value 440" and "which term is the first to be larger than 1000" Work with sequences whose terms are stated algebraically, eg "a linear sequence starts a+b, a+4b, ... the 4th term has value 44 and the 7th has value 62. Work out the nth term"

Term	Unit	Ref	Topic	GCSE Objective statement
	F3 Ratio	F3Ratio1	Proportion	Be able to set up and use equations to solve word problems involving proportion: Direct proportion: y∝x, leading to y=kx Inverse proportion: y∝1/x, leading to y=k/x Directly proportional to the square: y∝x^2, leading to y=kx^2 Inversely proportional to the square: y∝1/x^2 , leading to y=k/x^2 Be able to calculate the constant of proportionality, k Be able to calculate an unknown quantity from quantities that vary in direct proportion or inverse proportion Know how to use proportion (of all types) in real-life situations and geometrical problems Be able to interpret the constant of proportionality in context Be able to relate algebraic solutions to graphical representation of the equations Sketch an appropriately shaped graph (partly or entirely non-linear) to represent a real-life situation Choose the graph that is sketched correctly from a selection of alternatives Recognise the graph that is sketched correctly from a selection of alternatives
		F3Ratio2	Tangents	Know what a tangent is and be able to draw a tangent to a point on any curve By finding two points on the tangent, calculate the gradient by dividing the difference in y-coordinates by the difference in the x-coordinates, paying close attention to the order of the coordinates. Some pupils may find it easier to memorise and use the formula m=(y_A-y_B)/(x_A-x_B) Understand that gradient is the rate of change (of the variable on the vertical axis compared the horizontal axis) at a particular instance in time is represented by the gradient of the tangent to the curve at that point Use a tangent to solve problems with real-life graphs, such as the velocity at any given time on a distance-time graph or the acceleration at any given time on a velocity-time graph Interpret the meaning (and given units) of the gradient at a point on a curve (particularly that the gradient on a d-t graph would represent speed; the gradient on a v-t graph would represent acceleration) Understand the difference between positive and negative gradients, especially as increasing and decreasing speed on a distance-time graph By extending the tangent, find the point at it crosses the y-axis, ie the y-intercept Understand that the average rate of change is represented by a chord

Term	Unit	Ref	Topic	GCSE Objective statement
	F3 Geometry	F3Geom1	Combinations of transformations	Be able to state the coordinates of points reflected in mirror lines such as the x- and y-axes and y=±x, ideally without needing to make drawings Describe and transform 2D shapes using combined rotations, reflections, translations or enlargements Describe a combination of transformations as a single transformation Understand and use the term 'invariance' for points, lines and shapes achieved by single or combined transformations Map a point on a shape under a combination of transformations
	F3 Data	F3Data1	Conditional probabilities	Use the product rule for counting to quickly solving probability problems without drawing the sample space. Know that when a problem asks for the probability of at least one event you can either list all the possible outcomes or you can use the fact that P(at least one happens)=1-P(none of the events happen) Understand the difference between independent and dependent events to make sense of conditional probability. For example, when the problem states that the items are ‘replaced’ then the events are independent and the probabilities don’t change. When the item is not replaced, the outcome of the second depends on the outcome first event and the probabilities change. Know that for two events A and B, the notation P(B|A) is used to refer to the conditional probability of B happening given that A has already happened. We read B|A as ‘B given A’. Understand the meaning of independence for events If two events A and B are independent, know that P(B|A)=P(B) Know that for dependent events, the outcome of the first event affects the probability of the second. Use the formula $P(A \cap B)=P(A)\times P(B\|A)$ To find P(B|A), you can rearrange the rule to get $P(B \mid A)=P(A \cap B)/(P(A))$ Use a tree diagram as a method for calculating conditional probabilities Use a Venn diagram as a method for calculating conditional probabilities Calculate and interpret conditional probabilities through representation using expected frequencies with Venn diagrams

Term	Unit	Ref	Topic	GCSE Objective statement
Autumn Year 11	G1 Number	G1Num1	Indices	Simplify numeric expressions involving fractional and negative indices which may be written in a variety of forms, including fractions. For example, simplify $\left(\frac{125}{64}\right)^{-\frac{2}{3}}$ Simplify algebraic expressions involving fractional and negative indices. For example: Simplify $\frac{k^{\frac{1}{2}} \times k^{\frac{3}{2}}}{k^2}$ Express $\sqrt{x^{\frac{1}{2}} \times x^{\frac{7}{2}}}$ as a single power of x
		G1Num2	Surds	Be able to simplify numerical calculations by manipulating surds, eg simplify √18 Be able to expand brackets with surds, eg (1 + √5)(3 - 2√5) Know how to rationalise a denominator, including denominators in the form a√b + c√d where a, b, c and d are integers Solve problems involving surds Understand the concept of using surds to give an exact answer
	G1 Algebra	G1Alg1	Algebraic Manipulation	Expand brackets containing more complex expressions, eg multiplying a linear expression by a quadratic or cubic expression, expanding two or more binomial expressions, expanding an expression which has been cubed, applying index laws For example, expand and simplify $(y^2-2y+3)(2y-1)-2(y^3-3y^2+4y-2)$
		G1Alg2	Identities	Use identities including equating coefficients, eg "Work out the values of a and b in the identity $2(ax-5)+3(5x+b)\equiv 21x+2$ Show how one side of an identity can be manipulated to obtain the other side of the identity
		G1Alg3	Proof	Construct rigorous proofs to validate a given result Understand why if n is an integer then 2n is even and 2n+1 is odd Be familiar with the term 'consecutive' and be able to form an expression for consecutive numbers, eg the sum of three consecutive numbers might be n+(n+1)+(n+2) Show that an expression can be manipulated into another given form, eg prove that $(n+5)^2-(n+3)^2$ is divisible by 4 for any integer value of n

Term	Unit	Ref	Topic	GCSE Objective statement
		G1Alg4	Functions	Interpret the succession of two functions as a 'composite function'. Given f(x) and g(x), find fg(x) and gf(x), understanding that they will not necessarily be equivalent.
		G1Alg5	Sequences	Spot patterns in number sequences Find the nth term of a linear sequence or a sequence of fractions where the numerators and/or denominators form a linear sequence Use nth terms of sequences to solve problems. For example, work out the difference between the 16th and 6th terms of the sequence with nth term 2n+4 Find the nth term of a quadratic sequence Find the nth term of a quadratic sequence or a sequence of fractions where the numerators and/or denominators form a quadratic sequence
	G1 Geometry	G1Geom1	Pythagoras and trigonometry	Identify appropriate right-angled triangles in 2 and 3 dimensional shapes and apply Pythagoras' theorem to work out any unknown side using two given sides Recognise and use Pythagorean triples (3, 4, 5; 5, 12, 13; 8, 15, 17; 7, 24, 25 and simple multiples of these) Identify appropriate triangles in 2 and 3 dimensional shapes and apply trigonometry (including recalling and using the sine and cosine rules) to work out any unknown side or angle. Work out the angle between a line and a plane or between two planes, including triangles that do not have right angles. Understand and use bearings Knowledge and use of 30°, 60°, 90° triangles and 45°, 45°, 90° triangles. The use of the ratios 1:√3:2 and 1:1:√2 Recall or work out the exact values of the trigonometric ratios for angles 0°, 30°, 45°, 60° and 90° Use and understand the formulae for sine rule and cosine rule in scalene triangles; Use the area of a triangle formula
		G1Geom2	Further trigonometry	Understand and use the properties of the graphs of y=sinx, y=cosx,y=tanx for 0≤x≤360 Sketch and use the graphs of y=sinx, y=cosx, y=tanx for angles of any size. Sketch and use the graphs to solve problems

Term	Unit	Ref	Topic	GCSE Objective statement
		G1Geom3	Coordinate geometry	Know and use the definition of a gradient Work out the gradient of a line given two points on the line Given a graph, select two points on a line to work out the gradient Work out the equation of a line using the gradient and a known point on the line Work out the equation of a line using two known points on the line Draw a straight line using a given gradient and a given point on the line or using two given points on the line Work out the gradient of lines that are parallel and perpendicular to a given line or show that two lines are parallel or perpendicular using gradients Solve problems involving midpoints Understand that a line divided in the ratio 1 : 3 means that the smaller part is one-quarter of the whole

Term	Unit	Ref	Topic	GCSE Objective statement
Spring Year 11	G2 Algebra	G2Alg1	Simultaneous equations	Solve two linear simultaneous equations using any valid method. For example, solve 4x - 3y = 0 and 6x + 15y = 13 Solve simultaneous equations where one is linear and one is second order For example: Solve $y = x + 2$ and $y^2 = 4x + 5$ Solve $y=x^2$ and $y - 5x = 6$ Solve $xy=8$ and $x + y = 6$
		G2Alg2	Linear equations and inequalities	Set up and solve linear equations, including more complicated equations which require a number of steps to reach a solution and equations involving algebraic fractions Be able to solve equations where the numbers are written in standard form Solve linear inequalities including brackets
		G2Alg3	Quadratic equations and inequalities	Be proficient with factorising quadratics, including those with more than one variable (eg $6x^2 + 13xy + 5y2$) , be able to recognise perfect squares (eg $9x^2 + 24xy + 16y^2$) and find the difference of 2 squares (eg $(5x + 1)^2 - 9x^2$) Solve quadratic equations by factorisation Solve quadratic equations by using the quadratic formula Complete the square in a quadratic equation and solve quadratic equations by completing the square Solve quadratic equations graphically Justify that a quadratic expression will have a certain minimum or maximum value, eg by completing the square Solve quadratic inequalities. For example, solve $x^2<9$ Solve quadratic inequalities that require factorisation, completing the square, the quadratic formula or graphical methods. For example, solve $2x^2 + 5x <= 3$ Understand and use a solution set of continuous values written in the form $-3 < x < 3$
		G2Alg3	Manipulating formula	Manipulate formulae, including changing the subject of a formula where the subject appears on one or both sides of the formulae and containing algebraic fractions.
		G2Alg4	Functions	Solve (linear and non-linear) equations that use function notation Interpret the reverse process as the 'inverse function'. Understand and use notation of $f^{-1}(x)$ Note that domains will be chosen for f to make f one-one.

Term	Unit	Ref	Topic	GCSE Objective statement
		G2Alg5	Drawing and sketching functions	Draw or sketch graphs of linear functions. Draw a straight line from given information. Draw or sketch graphs of quadratic functions. For example, sketch the graph of $y = x^2 - 5x + 6$ Identify any symmetries on a quadratic graph and from this determine the coordinates of the turning point
	G2 Geometry	G2Geom1	Basic geometry revision	Find the perimeter and area of basic shapes, including circles, and compound shapes Calculate the volume and surface area of prisms and cylinders. Calculate the volume of a pyramid. Calculate the volume and surface area of cones and spheres. Work out sizes of angles in triangles, quadrilaterals and other polygons (interior and exterior angles) Work out sizes of angles in circles, and cyclic quadrilaterals, by recalling circle theorems Understand and construct geometrical proofs using formal arguments (making using correct mathematical notation and vocabulary)
		G2Geom2	Equations of straight lines	Know and use the equation of a straight line $y = mx + c$ Be able to work out the gradient and -intercept of a line from various forms of equations of straight lines. Use the gradient of a line and a known point on the line to work out the coordinates of a different point on the line Work out the coordinates of the point of intersection of two lines, including the axes
		G2Geom3	Equations of circles	Recognise and write down the equation of a circle, centre (0,0) radius r Work out coordinate of points of intersection of a given circle and a given straight line Use the fact that the angle between the tangent and radius is 90° to work out the gradient of a tangent and hence the equation of a tangent at a given point
Summer Year 11	Revision			