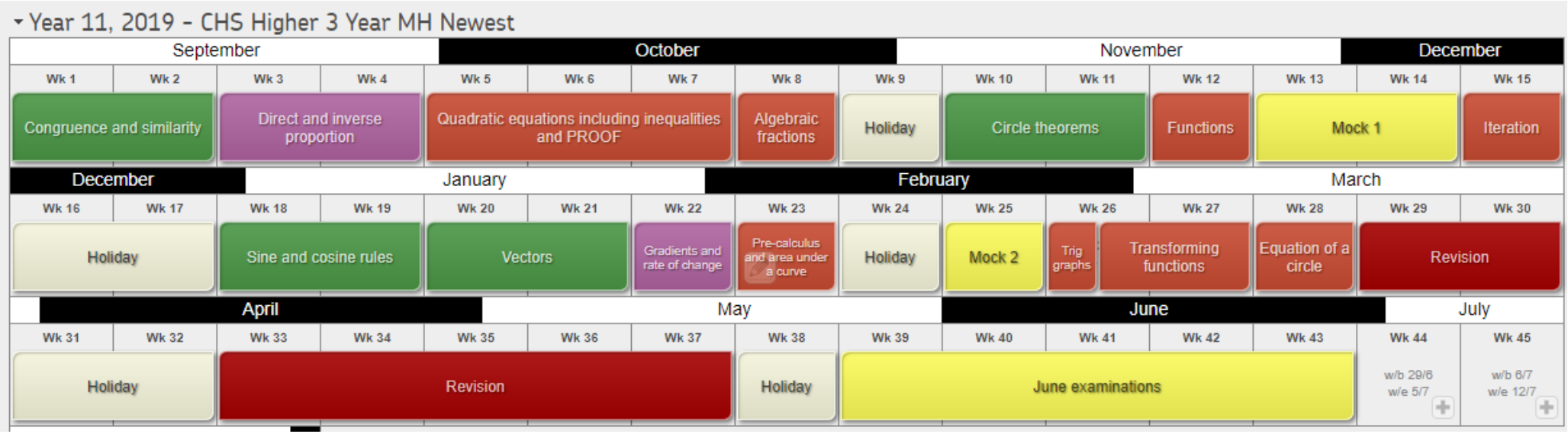
KS4 3 Year scheme of Work – Year 11 Higher



Congruence and similarity

G5	Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)	
G6	Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides including the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs	
G19	Apply and use the concepts of congruence and similarity, including the relationships between lengths, **areas and volumes** in similar figures	Similar lengths, areas and volumes

Direct and inverse proportion

R10	Solve problems involving direct and inverse proportion, including graphical and algebraic representations	**Recap on work done in year 10**
R13	Understand that x is inversely proportional to y is equivalent to x is proportional to $\frac{1}{y}$ **Construct and** interpret equations that describe direct and inverse proportion	
R14	Recognise and interpret graphs that illustrate direct and inverse proportion	

Algebra: further quadratics, rearranging formulae and identities – the main part of this is all about solving quadratics, by factorising, using the formula, CTS and with plenty of problem solving
This section also includes **PROOF**

A4	Simplify and manipulate algebraic expressions (including those involving surds) by: expanding products of two **or more** binomials factorising quadratic expressions of the form $x^2 + bx + c$ including the difference of two squares **factorising quadratic expressions of the form** $x^2 + bx + c$ simplifying expressions involving sums, products and powers, including the laws of indices	**A lot of this section is a review of learning completed in Years 9 and 10**
A5	Understand and use standard mathematical formulae Rearrange formulae to change the subject	including use of formulae from other subjects in words and using symbols
A6	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 **and proofs**	Plenty of work with odds and evens

A17	Solve linear equations in one unknown algebraically including those with the unknown on both sides of the equation Find approximate solutions using a graph	including use of brackets
A18	Solve quadratic equations **(including those that require rearrangement)** algebraically by factorising, **by completing the square and by using the quadratic formula** Find approximate solutions using a graph	

A11	Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically **and turning points by completing the square**	including the symmetrical property of a quadratic
A21	Translate simple situations or procedures into algebraic expressions or formulae derive an equation, solve the equation and interpret the solution	including solution of geometrical problems and problems set in context

A22	Solve linear inequalities in one or two variables and quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph	

Algebraic fractions

A4	**Simplify and manipulate algebraic expressions involving algebraic fractions**	Add, subtract, multiply and divide, use in solving equations both linear and quadratic and in simplifying fractions by factorising

Circle theorems

G10	**Apply and prove the standard circle theorems concerning angles, radii, tangents and chords and use them to prove related results**	including • angle at centre is equal to twice angle at circumference; • angle in a semi-circle is 90°; • angles in the same segment are equal; • opposite angles in a cyclic quadrilateral sum to 180°; • tangent at any point on a circle is perpendicular to the radius at that point • tangents from an external point are equal in length; • the perpendicular from the centre to a chord bisects the chord; • alternate segment theorem

Functions – composite and inverse

A7	Where appropriate, interpret simple expressions as functions with inputs and outputs **Interpret the reverse process as the 'inverse function'** **Interpret the succession of two functions as a 'composite function'**	understand and use function notation: f(x)f(x), fg(x)fg(x), f−1(x)f-1(x) is expected at higher tier

Numerical methods - Iteration

A20	Find approximate solutions to equations numerically using iteration	including the use of suffix notation in recursive formulae

Sine and cosine rules

G22	**Know and apply the Sine rule** $\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$ **and Cosine rule** $a^2=b^2+c^2-2bc\cos A$ **to find unknown lengths and angles**	
G23	**Know and apply** $=\frac{1}{2}abs\sin C$ **to calculate the area, sides or angles of any triangle**	

Vectors

G25	Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors **Use vectors to construct geometric arguments and proofs**	

Gradients and rate of change

R15	**Interpret the gradient at a point on a curve as the instantaneous rate of change** **Apply the concepts of average and instantaneous rates of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts**	

R14	Interpret the gradient of a straight-line graph as a rate of change	

Pre-calculus and area under a curve

A15	**Calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs)** **Interpret the results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts**	

Trigonometric graphs

A12	Recognise, sketch and interpret **the trigonometric functions (with arguments in degrees)** $y = \sin x, y = \cos x$ **and** $y = \tan x$ **for angles of any size**	
A12	Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$, **exponential functions** $y = kx$ **for positive values of** k	**A review of graph work covered earlier in the SOW**

Transforming functions

A13	**Sketch translations and reflections of a given function**	

Equation of a circle

A16	**Recognise and use the equation of a circle with centre at the origin** **Find the equation of a tangent to a circle at a given point.**	A really good time to revise all straight line coordinate geometry

A9	Use the form *y=mx+c* to identify parallel lines **and perpendicular lines** Find the equation of the line through two given points, or through one point with a given gradient	**This stuff**
A10	Identify and interpret gradients and intercepts of linear functions graphically and algebraically	

REVISION

Teacher choice – what needs to be gone back over/re-taught. Issues from mocks, lowlights from pinpoint learning etc.