

KS4 2 Year scheme of Work – Higher

Year 10:

September			October					November				December			
Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	
Basic number, factors and multiples	Rounding and bounds	Speed, Density and Pressure	Basic algebra review	Linear Equations	All angles, polygons and Circle theorems		Review/assess term 1	Holiday	Indices, Surds and Standard Form		$y = mx + c$, gradients, parallel and perpendicular		Fractions and decimals		
December		January				February				March					
Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30	
Review/assess term 2	Holiday	Percentage change, inc/dec	Calculating with percentages using multipliers		Ratio and proportion		Algebra: quadratics, rearranging formulae	Holiday	Algebra: quadratics and proof		Algebraic fractions	Perimeter, area, volume inc. circles, cones etc.			
April			May					June				July			
Wk 31	Wk 32	Wk 33	Wk 34	Wk 35	Wk 36	Wk 37	Wk 38	Wk 39	Wk 40	Wk 41	Wk 42	Wk 43	Wk 44	Wk 45	
holiday		Review/assess terms 3/4	All Probability and sets			Transformations		Holiday	All Statistics, averages, boxplots, c.f, histograms			Pythagoras theorem and basic trigonometry		Constructions and loci	

Year 11:

September			October					November				December		
Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15
Solving quadratic equations and simultaneous equations and review of graphs			Inequalities	Plotting/drawing all types of graphs	Pre-calculus, gradients and area under a curve		Sequences	Holiday	Direct and inverse proportion		iteration and functions		Mock examination and revision	
December		January				February				March				
Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30
Holiday		Sine and cosine rules		Vectors		Congruence and similarity		Holiday	Sketching graphs	Transforming functions	Revision and June Examinations			

Basic number [Flipchart resources/basic number.flipchart](#)

This is most likely not necessary for higher tier groups.

Factors and multiples [Flipchart resources/factors multiples.flipchart](#)

N4	Use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation, and the unique factorisation theorem	prime factor decomposition including product of prime factors written in index form
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Rounding and bounds: Main teaching here is bounds in calculations

[Flipchart resources/Approx estimating and bounds.flipchart](#)

N15	Round numbers and measures to an appropriate degree of accuracy (eg to a specified number of decimal places or significant figures); <u>use inequality notation to specify simple error intervals due to truncation or rounding</u> <u>move into upper and lower bounds as challenge</u>	
N16 Revisit N14	<u>Apply and interpret limits of accuracy including upper and lower bounds</u> <u>N14 – estimation and approximating</u>	<u>Include bounds in calculations</u> <u>And bounds from numbers being truncated</u>

Compound measures: Main teaching here is speed/density and a little pressure....

[Flipchart resources/Speed, density.flipchart](#)

R1	Use compound units such as speed, rates of pay, unit pricing, <u>density and pressure</u>	including making comparisons
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Basic algebra review: All should be a review of learning from Years 7 to 9

[Flipchart resources/expressions basics.flipchart](#)

A1	<ul style="list-style-type: none"> ab in place of $a \times b$ <p>Use and interpret algebraic notation, including:</p> <ul style="list-style-type: none"> $3y$ in place of $y + y + y$ and $3 \times y$ a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$, a^2b in place of $a \times a \times b$ $\frac{a}{b}$ in place of $a \div b$ <p>coefficients written as fractions rather than as decimals brackets</p>	it is expected that answers will be given in their simplest form without an explicit instruction to do so
N3	Use conventional notation for priority of operations, including brackets, powers, roots and reciprocals	
A3	understand and use the concepts and vocabulary of expressions, equations, formulae, <u>identities</u> , inequalities, terms and factors	this will be implicitly and explicitly assessed
A4	Simplify and manipulate algebraic expressions (<u>including those involving surds</u>) by: <ul style="list-style-type: none"> collecting like terms multiplying a single term over a bracket taking out common factors 	

Equations: – solving any and all types of linear equation

[Flipchart resources\solving equations.flipchart](#)

A2	Substitute numerical values into formulae and expressions, including scientific formulae	unfamiliar formulae will be given in the question
A17	Solve linear equations in one unknown algebraically <u>including those with the unknown on both sides of the equation</u>	including use of brackets

Angles: This is all angle facts, including parallel lines, polygons and circle theorems

[Flipchart resources\angle facts and polygons.flipchart](#)

G1	Use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries Use the standard conventions for labelling and referring to the sides and angles of triangles Draw diagrams from written descriptions	
G3	Apply the properties of: <ul style="list-style-type: none"> • angles at a point • angles at a point on a straight line • vertically opposite angles Understand and use alternate and corresponding angles on parallel lines	colloquial terms such as Z angles are not acceptable and should not be used

Properties of polygons:

G3	Derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)	
G4	Derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus and triangles and other plane figures using appropriate language	Including knowing names and properties of isosceles, equilateral, scalene, right-angled, acute-angled, obtuse-angled triangles including knowing names and using the polygons: pentagon, hexagon, octagon and decagon

Circle theorems: [Flipchart resources\circle theorems.flipchart](#)

[Flipchart resources\circle theorems exam questions.flipchart](#)

G10	Apply and prove the standard circle theorems concerning angles, radii, tangents and chords and use them to prove related results	including <ul style="list-style-type: none"> • 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
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Review and assess term 1

Indices: [Flipchart resources\indices \(higher\).flipchart](#)

N6	Use positive integer powers and associated real roots (square, cube and higher) Recognise powers of 2, 3, 4, 5 Estimate powers and roots of any given positive number	including square numbers up to 15 x 15 know that $1000=10^3$ and 1 million $=10^6$
N7	<u>Calculate with roots, and with integer and fractional indices</u>	

Surds: [Flipchart resources\surds.flipchart](#)

N8	Calculate exactly with surds Simplify surd expressions involving squares (eg $\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$) and rationalise denominators	
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Standard form: [Flipchart resources\standard form.flipchart](#)

N2	Understand and use place value (e.g. when working with very large or very small numbers)	including questions set in context
N9	Calculate with and interpret standard form $A \times 10^n$ where $1 \leq A < 10$ and n is an integer	with and without a calculator interpret calculator displays

Coordinates and linear graphs:

[Flipchart resources\straight lines.flipchart](#)

[Flipchart resources\Gradients and equations.flipchart](#)

[Flipchart resources\Gradients and equations \(higher2\).flipchart](#)

A8	Work with co-ordinates in all four quadrants	
G11	Solve geometrical problems on co-ordinate axes	

A9	Plot graphs of equations that correspond to straight line graphs in the co-ordinate plane 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	
A10	Identify and interpret gradients and intercepts of linear functions graphically and algebraically	

Basic fractions: Review of all four operations with fractions

[Flipchart resources\fractions.flipchart](#)

N1	Order positive and negative fractions	
N2	Apply the four operations, including formal written methods, to simple fractions (proper and improper) and mixed numbers - both positive and negative	
N8	Calculate exactly with fractions	

Basic decimals: Main teaching is converting recurring decimal to a fraction

[Flipchart resources\recurring decimals.flipchart](#)

N2	Apply the four operations, including formal written methods, to decimals – both positive and negative Understand and use place value (e.g. when calculating with decimals)	including questions set in context (knowledge of terms used in household finance, for example profit, loss, cost price, selling price, debit, credit and balance, income tax, VAT, interest rate)
N10	Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $7/2$ or 0.375 and $3/8$) including ordering Change recurring decimals into their corresponding fractions and vice versa	

Review and assess term 2

Basic percentages:

[Flipchart resources\percentages \(all\).flipchart](#)

R9	Define percentage as 'number of parts per hundred' Interpret percentages and percentage changes as a fraction or decimal and interpret these multiplicatively Express one quantity as a percentage of another Compare two quantities using percentages Work with percentages greater than 100%	
N12	Interpret fractions and percentages as operators	including interpreting percentage problems using a multiplier

Calculating with percentages: Main teaching is use of percentage multipliers

[Finance resources\Finance - Best buys, percentages & shopping.pdf](#) [Finance resources\Ideas for finance activities - Best buy, %, interest etc.pptx](#)

R9	Solve problems involving percentage change, including: <ul style="list-style-type: none">percentage increase / decrease problemsoriginal value problemssimple interest, including in financial mathematicsPercentage multipliersReverse percentagesCompound interestRepeated percentage changes	problems may be set in context using a multiplier
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Growth and decay

R16	<u>Set up, solve and interpret the answers in growth and decay problems, including compound interest</u>	NOT Iterations These are in Year 11 SOW
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Ratio and proportion:

[Flipchart resources\Ratio and proportion.flipchart](#) [Finance resources\Finance - Ratio.pdf](#)

N11	Identify and work with fractions in ratio problems	
R3	Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1	

R4	Use ratio notation, including reduction to simplest form	
R5	Divide a given quantity into two parts in a given part:part or part:whole ratio Express the division of a quantity into two parts as a ratio Apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing and concentrations)	including better value or best buy problems
R6	Express a multiplicative relationship between two quantities as a ratio or fraction	Use of the following: If $a:b = c:d$ then $a/b = c/d$ or $a/c = b/d$
R7	Understand and use proportion as equality of ratios	
R8	Relate ratios to fractions and to linear functions	
R10	Solve problems involving direct and inverse proportion, including graphical and algebraic representations	

Review and assess term 3

Formulae:

[Flipchart resources\changing the subject.flipchart](#) [Finance resources\Finance - KS4 Equations and Formulae.pdf](#)
[Finance resources\Ideas for finance activities - formulae.pptx](#)

A5	Understand and use standard mathematical formulae; rearrange formulae to change the subject	
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Quadratics: Introduction to quadratics. In this section complete the following:

- Expanding two and three pairs of brackets
- Factorising any quadratic
- Complete the square
- Plotting/drawing quadratic graphs and linking factorising/CTS to the graphs

[Flipchart resources\Quadratics \(higher\).flipchart](#)

[Flipchart resources\changing the subject.flipchart](#)

[Flipchart resources\CTS.flipchart](#)

A4	Simplify and manipulate algebraic expressions by: <ul style="list-style-type: none">• <u>expanding products of two and three binomials</u>• factorising quadratic expressions of the form x^2+bx+c including the difference of two squares• simplifying expressions involving sums, products and powers, including the laws of indices• Include factorising non-unitary quadratics	
A5	Understand and use standard mathematical formulae Rearrange formulae to change the subject including where the subject appears twice	including use of formulae from other subjects in words and using symbols

Completing the square: only for finding least/greatest values and not in solving

[Flipchart resources\CTS.flipchart](#)

A18 Plus part of A11	Completing the square; only unitary quadratics required. Greatest or least values (turning points/vertex) to be found and then used to sketch graph of quadratic <u>find approximate solutions using a graph</u>	The exam board have lied – they also include non-unitary so give it a go if your class can cope
A18	<u>Solve quadratic equations algebraically by factorising,</u>	
A11	<u>Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square</u>	including the symmetrical property of a quadratic

Proof:

[Flipchart resources\Proof.flipchart](#)

A6	<p>Know the difference between an equation and an identity</p> <p>Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments and proofs</p>	Plenty of work with odds and evens
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Algebraic fractions:

A4	<p>Simplify and manipulate algebraic expressions involving algebraic fractions</p>	<p>Add, subtract, multiply and divide, use in solving equations both linear and quadratic and in simplifying fractions by factorising</p>
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Perimeter and area:

[Flipchart resources\Perimeter, area and volume.flipchart](#)
 [Finance resources\Finance - KS4 Perimeter and Area.pdf](#)
[Finance resources\Ideas for finance activities - perimeter area and volume.pptx](#)

G12	<p>Identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres</p>	
G17	<p>Calculate the perimeter of a 2D shapes and composite shapes</p> <p>Find the surface area of pyramids composite shapes</p>	
G16	<p>Know and apply formulae to calculate area of:</p> <ul style="list-style-type: none"> • triangles • parallelograms • trapezia 	

Circumference and area:

[Flipchart resources\circles and 3D.flipchart](#)

G9	Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, <u>tangent, arc, sector and segment</u>	
G17	Know and use the formulae: <ul style="list-style-type: none"> • Circumference of a circle = $2\pi r = \pi d$ • Area of a circle = πr^2 Calculate the perimeters of 2D shapes including circles and composite shapes Calculate areas of circles and composite shapes <u>Calculate surface area of spheres, cones and composite solids</u>	solutions in terms of π may be asked for May be worth teaching density here if time although appears later on in the SOW and could use that as a revision of volume
G18	<u>Calculate arc lengths, angles and areas of sectors of circles</u>	

Volume: a great time to practice changing the subject in context

[Flipchart resources\circles and 3D.flipchart](#)

[Flipchart resources\Perimeter, area and volume.flipchart](#)

R12	Compare lengths, areas and volumes using ratio notation Scale factors Make links to similarity (will be covered in Year 11)	Similar shapes (plus area and volume) is not covered until Year 11
G16	Know and apply the formulae to calculate the volume of cuboids and other right prisms (including cylinders)	
G17	<u>Calculate the volume of spheres, pyramids, cones and composite solids</u>	including frustums
N8	<u>Calculate exactly with multiples of π</u>	

Review and assess terms 3 and 4 – possible Year 10 exams around this time.

Basic probability:

[Flipchart resources\probability.flipchart](#)

P1	Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees.	probabilities should be written as fractions, decimals or percentages
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P4	Apply the property that the probabilities of an exhaustive set of outcomes sum to one Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one	
P7	Construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities	

Probability and Sets:

Include in this section the product rule for counting eg, number of ways

Sets includes intersection, union and complement

[Flipchart resources\probability.flipchart](#)

[Flipchart resources\Product rule counting.flipchart](#)

P2	Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes or multiple future experiments	
P3	Relate relative expected frequencies to theoretical probability, using appropriate language and the 0 – 1 probability scale	
P5	<u>Understand that empirical unbiased samples tend towards theoretical probability distributions with increasing sample size</u>	
P6	Enumerate sets and combinations of sets systematically using tables, grids, Venn diagrams <u>and tree diagrams</u>	
P8	<u>Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</u>	know when to add and when to multiply two or more probabilities
P9	Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams	
N5	Apply systematic listing strategies and the use of the product rule for counting	including using lists, tables and diagrams

Transformations:

[Flipchart resources\combinations of transformations.flipchart](#)

G7	Identify, describe and construct congruent and similar shapes, including on co-ordinate axes, by considering rotation, reflection, translation and enlargement (<u>including fractional and negative scale factors</u>)	
G24	Describe translations as 2D vectors	
G8	Describe the changes and invariance achieved by combinations of rotations, reflections and translations	including using column vector notation for translations

Scatter graphs [Flipchart resources\Data \(basic\) scatters and F polys.flipchart](#)

S6	<p>Use and interpret scatter graphs of bivariate data</p> <p>Recognise correlation and know that it does not indicate causation</p> <p><u>Draw estimated lines of best fit</u></p> <p><u>Make predictions</u></p> <p><u>Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so</u></p>	<p>know and understand the terms positive correlation, negative correlation, no correlation, weak correlation and strong correlation</p>
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Statistics: **Everything there is to do with data and GCSE in this section.**

Start with Averages and spread (S4) including from frequency tables (inc. grouped) and in problem solving where you are given the mean

[Flipchart resources\Averages.flipchart](#)

[Flipchart resources\Two way tables and frequency trees.flipchart](#)

[Flipchart resources\pie charts.flipchart](#)

[Flipchart resources\Stem, boxplot, c.f..flipchart](#)

[Flipchart resources\Data \(basic\) scatters and F polys.flipchart](#)

[Flipchart resources\histograms.flipchart](#)

[Flipchart resources\Stem, boxplot, c.f..flipchart](#)

[Flipchart resources\Two way tables and frequency trees.flipchart](#)

[Finance resources\Ideas for finance activities - Finding & comparing data.pptx](#)

[Finance resources\Finance - Statistics.pdf](#)

[Finance resources\Ideas for finance activities - Finding & comparing data.pptx](#)

S2	<p>Interpret and construct tables, charts and diagrams including, for categorical data:</p> <ul style="list-style-type: none">• frequency tables• bar charts• pie charts• Stem and leaf diagrams• Two way tables• pictograms• vertical line charts for ungrouped discrete numerical data• tables and line graphs for time series data <p>know their appropriate use</p>	<p>including choosing suitable statistical diagrams yellow highlighted possibly the only ones needed for higher tier</p>
S4	<p>Interpret, analyse and compare distributions of data sets from univariate empirical distributions through:</p> <ul style="list-style-type: none">• appropriate graphical representation involving discrete, continuous and grouped data, including boxplots• appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers) quartiles and inter-quartile range	<p>know and understand the terms primary data, secondary data, discrete data and continuous data</p>
S3	<p>Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use</p>	
S5	<ul style="list-style-type: none">• Apply statistics to describe a population	
S1	<ul style="list-style-type: none">• <u>Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling</u>	

S3	<ul style="list-style-type: none"> • Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use 	
S6	<ul style="list-style-type: none"> • <u>Draw estimated lines of best fit</u> • <u>Make predictions</u> • <u>Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so</u> 	

Pythagoras theorem and basic trigonometry:

[Flipchart resources\Pythagoras.flipchart](#)

[Flipchart resources\Trigonometry.flipchart](#)

G20	<p><u>Know the formula for Pythagoras' Theorem</u> $a^2+b^2=c^2$</p> <p><u>Apply it to find angles and lengths in right angled triangles and, where possible, general triangles in two and three dimensional figures</u></p> <p><u>Know and use the trigonometric ratios</u></p> $\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}}, \quad \cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}} \text{ and } \tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$	
G21	<p><u>Know the exact values of</u> $\sin \theta$ and $\cos \theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°</p> <p><u>Know the exact value of</u> $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60°</p>	
G6	<u>Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides including Pythagoras' Theorem and use known results to obtain simple proofs</u>	
R12	<u>Compare lengths using ratio notation; make links to trigonometric ratios</u>	

Constructions and loci:

[Flipchart resources\constructions and loci.flipchart](#)

G2	<u>Use the standard ruler and compass constructions:</u> <ul style="list-style-type: none"> • <u>perpendicular bisector of a line segment</u> • <u>constructing a perpendicular to a given line from / at a given point</u> • <u>bisecting a given angle</u> <u>Know that the perpendicular distance from a point to a line is the shortest distance to the line</u> <u>Use these to construct given figures and solve loci problems</u>	including constructing an angle of 60°
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2D representations of 3D shapes:

[Flipchart resources\Plans and Elevations.flipchart](#)

G13	<u>Construct and interpret plans and elevations of 3D shapes</u>	
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End of Year 10 learning

Year 11:

September			October					November				December		
Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15
Solving quadratic equations and simultaneous equations and review of graphs			Inequalities	Plotting/drawing all types of graphs	Pre-calculus, gradients and area under a curve		Sequences	Holiday	Direct and inverse proportion		iteration and functions		Mock examination and revision	
December		January				February				March				
Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30
Holiday		Sine and cosine rules		Vectors		Congruence and similarity		Holiday	Sketching graphs	Transforming functions	Revision and June Examinations			

Further quadratics:

The main part of this is all about solving quadratics, by factorising (a reminder) and in using the formula. This includes solving both linear simultaneous equations and linear/quadratic simultaneous equations.

[Flipchart resources\Quadratics \(higher\).flipchart](#)

[Flipchart resources\Inequality overlearning and regions.flipchart](#)

A4	<p>Simplify and manipulate algebraic expressions (including those involving surds) by: <u>expanding products of two or more binomials</u> <u>factorising quadratic expressions of the form $x^2 + bx + c$ including the difference of two squares</u> factorising quadratic expressions of the form $x^2 + bx + c$ simplifying expressions involving sums, products and powers, including the laws of indices</p>	<p>A lot of this section is a review of learning completed in Year 10</p>
A18	<p><u>Solve quadratic equations (including those that require rearrangement) algebraically by factorising, by completing the square and by using the quadratic formula</u> <u>Find approximate solutions using a graph</u></p>	

Simultaneous equations:

[Flipchart resources\simultaneous equations.flipchart](#)

A19	<p><u>Solve two simultaneous equations in two variables (linear / linear or linear/quadratic) algebraically</u> <u>Find approximate solutions using a graph</u></p>	
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Inequalities: Solving linear/quadratic inequalities and linear inequality regions graphically

[Flipchart resources\Inequalities.flipchart](#)

[Flipchart resources\Inequality overlearning and regions.flipchart](#)

A22	<p><u>Solve linear inequalities in one or two variables and quadratic inequalities in one variable</u> <u>Represent the solution set on a number line, using set notation and on a graph</u></p>	<p>Quadratic inequalities in Year 11 Know the conventions of an open circle on a number line for a strict inequality and a closed circle for an included boundary In graphical work the convention of a dashed line for strict inequalities and a solid line for an included inequality will be required</p>
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A22	Solve linear inequalities in one or two variables and quadratic inequalities in one variable; <u>represent the solution set on a number line</u> , using set notation and on a graph	
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Plotting/drawing other graphs: (see later in SoL for more flipchart resources with circle and trig graph learning)

[Flipchart resources\Drawing graphs.flipchart](#)

Drawing lots of different types of graphs: quadratic, cubic, reciprocal, exponential, trig and circle

A14	Plot and interpret graphs (including <u>reciprocal graphs</u> and exponential graphs) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration	including problems requiring a graphical solution
R14	<u>Interpret the gradient of a straight-line graph as a rate of change</u>	

Pre-Calculus: Gradients and rate of change:

[Flipchart resources\Pre calculus.flipchart](#)

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	<u>Interpret the gradient of a straight-line graph as a rate of change</u>	

Area under a curve:

[Flipchart resources\Pre calculus.flipchart](#)

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	
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Sequences: Main teaching is nth terms of linear and quadratic sequences with a little knowledge of geometric sequences and Fibonacci thrown in

[Flipchart resources\sequences \(higher\).flipchart](#)

A23	Generate terms of a sequence from either a term-to-term or a position-to-term rule	including from patterns and diagrams
A24	Recognise and use: <ul style="list-style-type: none"> sequences of triangular, square and cube numbers simple arithmetic progression <u>Fibonacci type sequences</u> <u>quadratic sequences</u> <u>and simple geometric progressions (r^n where n is an integer and r is a rational number > 0)</u> other sequences 	other recursive sequences will be defined in the question
A25	Deduce expressions to calculate the n th term of linear and quadratic sequences	

Direct and inverse proportion:

[Flipchart resources\Proportionality.flipchart](#)

R10	Solve problems involving direct and inverse proportion, including graphical and algebraic representations	
R13	<u>Understand that x is inversely proportional to y is equivalent to x is proportional to $\frac{1}{y}$</u> Construct and interpret equations that describe direct and inverse proportion	
R14	<u>Recognise and interpret graphs that illustrate direct and inverse proportion</u>	

Functions: composite and inverse

[Flipchart resources\functions.flipchart](#)

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: $f(x)$, $fg(x)$, $f^{-1}(x)$ $f^{-1}(x)$ is expected at higher tier
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Numerical methods: Iteration

[Flipchart resources\Iteration.flipchart](#)

A20	Find approximate solutions to equations numerically using iteration	including the use of suffix notation in recursive formulae
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Sine and cosine rules:

[Flipchart resources\sine cosine rules.flipchart](#)

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

Vectors:

[Flipchart resources\Vectors.flipchart](#)

G25	<p><u>Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors</u></p> <p>Use vectors to construct geometric arguments and proofs</p>	
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Congruence and similarity:

[Flipchart resources\congruency.flipchart](#)

[Flipchart resources\similarity \(higher\).flipchart](#)

G5	<u>Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)</u>	
G6	<u>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</u>	
G19	<u>Apply and use the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures</u>	Similar lengths, areas and volumes

Sketching graphs:

[Flipchart resources\Further graphs and transformations.flipchart](#)

A12	Recognise, sketch and interpret graphs of linear functions, quadratic functions, <u>simple cubic functions and the reciprocal function</u> $y = \frac{1}{x}$ with $x \neq 0$	including using the symmetry of functions
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Trigonometric graphs/Transforming functions:

[Flipchart resources\Further graphs and transformations.flipchart](#)

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, <u>simple cubic functions and the reciprocal function</u> $y = \frac{1}{x}$ with $x \neq 0$, exponential functions $y = k^x$ for positive values of k	A review of graph work covered earlier in the SOW
A13	Sketch translations and reflections of a given function	

Equation of a circle:

[Flipchart resources\Gradients and equations \(higher2\).flipchart](#)

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	<u>Use the form $y=mx+c$ to identify parallel lines and perpendicular lines</u> <u>Find the equation of the line through two given points, or through one point with a given gradient</u>	This stuff

A10	Identify and interpret gradients and intercepts of linear functions graphically and algebraically	
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REVISION

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



