

► Topic Areas

► Year 10, 2015 - chosen higher 2 2016

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	Angles, scale diagrams and bearings	Properties of polygons	Fractions and decimals		Basic algebra review	Equations	Holiday	Collecting and representing data	Statistical measures	Basic percentages	Calculating with percentages			
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		Ratio and proportion		Coordinates and linear graphs		Real life graphs	Perimeter and area	Holiday	Circumference and area	Indices	Surds	Standard form	holiday		
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	Transformations	Basic probability	Probability		Algebra: quadratics, rearranging formulae and identities			Holiday	Pythagoras theorem and basic trigonometry			Sequences	Scatter graphs	2D representations of 3D shapes	Constructions and loci
July		August													
Wk 46	Wk 47	Wk 48													
Summer examinations and revision	Examinations and revision	SPARE													

► Year 11, 2016 - chosen higher 2 2016

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
Measures	Congruence and similarity	Volume	Further equations and graphs	Inequalities	Holiday	Algebraic fractions	Simultaneous equations	Equation of a circle	Direct and inverse proportion	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	Growth and decay	Sine and cosine rules	Gradients and rate of change	Pre-calculus and area under a curve	Holiday	Sketching graphs	Numerical methods	Transforming functions	Vectors	Circle theorems	Holiday			
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	Revision and June Examinations						Holiday	Revision and June Examinations	w/b 5/6 w/e 11/6	w/b 12/6 w/e 18/6	w/b 19/6 w/e 25/6	w/b 26/6 w/e 2/7	w/b 3/7 w/e 9/7	w/b 10/7 w/e 16/7

Basic number, factors and multiples

	Specification content	Specification notes
N1	<ul style="list-style-type: none"> Order positive and negative integers Use the symbols $=$, \neq, $<$, $>$, \leq, \geq 	<ul style="list-style-type: none"> including use on a number line know the conventions of an open circle on a number line for a strict inequality and a closed circle for an included boundary
N2	<ul style="list-style-type: none"> Apply the four operations, including formal written methods, to integers – both positive and negative Understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals) 	<ul style="list-style-type: none"> 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 and interest rate
N3	<ul style="list-style-type: none"> Recognise and use relationships between operations including inverse operations (e.g. cancellation to simplify calculations and expressions) 	
N14	<ul style="list-style-type: none"> Estimate answers Check calculations using approximation and estimation, including answers obtained using technology 	<ul style="list-style-type: none"> including evaluation of results obtained
N4	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> prime factor decomposition including product of prime factors written in index form
N5	<ul style="list-style-type: none"> Apply systematic listing strategies and the use of the product rule for counting 	<ul style="list-style-type: none"> including using lists, tables and diagrams

NEW

Rounding

	Specification content	Specification notes
N15	<ul style="list-style-type: none">Round numbers and measures to an appropriate degree of accuracy (e.g. 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>	<ul style="list-style-type: none">including appropriate rounding for questions set in contextstudents should know not to round values during intermediate steps of a calculation
N16	<ul style="list-style-type: none"><u>Apply and interpret limits of accuracy</u> including upper and lower bounds	



NEW

Angles, scale diagrams and bearings

	Specification content	Specification notes
G1	<ul style="list-style-type: none"> • Use conventional terms and notations: <ul style="list-style-type: none"> ◦ 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	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • colloquial terms such as Z angles are not acceptable and should not be used
R2	<ul style="list-style-type: none"> • Use scale factors, scale diagrams and maps 	<ul style="list-style-type: none"> • including geometrical problems
G15	<ul style="list-style-type: none"> • Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings 	<ul style="list-style-type: none"> • including the eight compass point bearings and three-figure bearings

Properties of polygons

	Specification content	Specification notes
G3	<ul style="list-style-type: none">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	<ul style="list-style-type: none">Derive and apply the properties and definitions of:<ul style="list-style-type: none">special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombusand triangles and other plane figures using appropriate language	<ul style="list-style-type: none">Including knowing names and properties of isosceles, equilateral, scalene, right-angled, acute-angled, obtuse-angled trianglesincluding knowing names and using the polygons: pentagon, hexagon, octagon and decagon

Fractions and decimals

	Specification content	Specification notes
N1	<ul style="list-style-type: none"> Order positive and negative decimals and fractions 	
N2	<ul style="list-style-type: none"> Apply the four operations, including formal written methods, to simple fractions (proper and improper) and mixed numbers - both positive and negative 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) 	<ul style="list-style-type: none"> 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
N8	<ul style="list-style-type: none"> Calculate exactly with fractions 	
N10	<ul style="list-style-type: none"> Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$) including ordering Change recurring decimals into their corresponding fractions and vice versa 	<ul style="list-style-type: none"> including ordering

Basic algebra review

Specification content	Specification notes
<p>A1</p> <ul style="list-style-type: none"> ab in place of $a \times b$ Use and interpret algebraic notation, including: <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 $a \div b$ coefficients written as fractions rather than as decimals brackets 	<ul style="list-style-type: none"> it is expected that answers will be given in their simplest form without an explicit instruction to do so
<p>N3</p> <ul style="list-style-type: none"> Use conventional notation for priority of operations, including brackets, powers, roots and reciprocals 	
<p>A3</p> <ul style="list-style-type: none"> understand and use the concepts and vocabulary of expressions, equations, formulae, <u>identities</u>, inequalities, terms and factors 	<ul style="list-style-type: none"> this will be implicitly and explicitly assessed
<p>A4</p> <ul style="list-style-type: none"> 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 	<p>SURDS COME LATER</p>

Equations

	Specification content	Specification notes
A2	<ul style="list-style-type: none">Substitute numerical values into formulae and expressions, including scientific formulae	<ul style="list-style-type: none">unfamiliar formulae will be given in the question
A17	<ul style="list-style-type: none">Solve linear equations in one unknown algebraically <u>including those with the unknown on both sides of the equation</u>	<ul style="list-style-type: none">including use of brackets

Algebraic fractions do come later but if you want to do here then please do

Collecting and representing data

	Specification content	Specification notes
S2	<ul style="list-style-type: none"> Interpret and construct tables, charts and diagrams including, for categorical data: <ul style="list-style-type: none"> frequency tables bar charts pie charts pictograms vertical line charts for ungrouped discrete numerical data <u>tables and line graphs for time series data</u> know their appropriate use 	<ul style="list-style-type: none"> including choosing suitable statistical diagrams
S4	<ul style="list-style-type: none"> Interpret, analyse and compare distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, including boxplots 	<ul style="list-style-type: none"> know and understand the terms primary data, secondary data, discrete data and continuous data
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 	

Statistical measures

	Specification content	Specification notes
S4	<ul style="list-style-type: none">• Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:<ul style="list-style-type: none">◦ appropriate measures of central tendency (median, mean, mode and modal class)◦ spread (range, including consideration of outliers, quartiles and inter-quartile range)	students should know and understand the terms: primary data, secondary data, discrete data and continuous data
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>	

Basic percentages

	Specification content	Specification notes
R9	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Interpret fractions and percentages as operators 	<ul style="list-style-type: none"> including interpreting percentage problems using a multiplier

Calculating with percentages

	Specification content	Specification notes
R9	<ul style="list-style-type: none"> Solve problems involving percentage change, including: <ul style="list-style-type: none"> percentage increase / decrease problems original value problems simple interest, including in financial mathematics 	<ul style="list-style-type: none"> problems may be set in context using a multiplier

Compound interest on SOW later (with Growth and Decay)
Makes sense to do here as well

Ratio and proportion

	Specification content	Specification notes
N11	<ul style="list-style-type: none">Identify and work with fractions in ratio problems	
R3	<ul style="list-style-type: none">Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1	
R4	<ul style="list-style-type: none">Use ratio notation, including reduction to simplest form	
R5	<ul style="list-style-type: none">Divide a given quantity into two parts in a given part:part or part:whole ratioExpress the division of a quantity into two parts as a ratioApply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing and concentrations)	<ul style="list-style-type: none">including better value or best buy problems
R6	<ul style="list-style-type: none">Express a multiplicative relationship between two quantities as a ratio or fraction	
R7	<ul style="list-style-type: none">Understand and use proportion as equality of ratios	
R8	<ul style="list-style-type: none">Relate ratios to fractions and to linear functions	



NEW

Coordinates and linear graphs

	Specification content	Specification notes
A8	<ul style="list-style-type: none"> Work with co-ordinates in all four quadrants 	
G11	<ul style="list-style-type: none"> Solve geometrical problems on co-ordinate axes 	
A9	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Identify and interpret gradients and intercepts of linear functions graphically and algebraically 	

Real life graphs

	Specification content	Specification notes
A14	<ul style="list-style-type: none"> Plot and interpret graphs (including reciprocal graphs 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 	<ul style="list-style-type: none"> including problems requiring a graphical solution
R14	<ul style="list-style-type: none"> Interpret the gradient of a straight-line graph as a rate of change 	

Speed comes later but can do here as well

Perimeter and area

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

Pupils must know formulae

Circumference and area

	Specification content	Specification notes
G9	<ul style="list-style-type: none"> Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, <u>tangent, arc, sector and segment</u> 	
G17	<ul style="list-style-type: none"> Know and use the formulae: <ul style="list-style-type: none"> Circumference of a circle $= 2\pi r = \pi d$ Area of a circle $= \pi r^2$ 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> 	<ul style="list-style-type: none"> solutions in terms of π may be asked for
G18	<ul style="list-style-type: none"> <u>Calculate arc lengths, angles and areas of sectors of circles</u> 	

Indices

Specification content	Specification notes
N6 <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> including square numbers up to 15×15 know that $1000 = 10^3$ and 1 million $= 10^6$
N7 <ul style="list-style-type: none"> <u>Calculate with roots, and with integer and fractional indices</u> 	

Surds

Specification content	Specification notes
N8 <ul style="list-style-type: none"> 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 	
A24 <ul style="list-style-type: none"> Recognise and use <u>simple geometric progressions (r^n where n is an integer and r is a surd)</u> 	

Standard form

NEW

Specification content	Specification notes
N2 <ul style="list-style-type: none"> Understand and use place value (e.g. when working with very large or very small numbers) 	<ul style="list-style-type: none"> including questions set in context
N9 <ul style="list-style-type: none"> Calculate with and interpret standard form $a \times 10^n$ where a and n is an integer 	<ul style="list-style-type: none"> with and without a calculator interpret calculator displays

Transformations

	Specification content	Specification notes
G7	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Describe translations as 2D vectors 	
G8	<ul style="list-style-type: none"> Describe the changes and invariance achieved by combinations of rotations, reflections and translations 	including using column vector notation for translations

Basic probability

	Specification content	Specification notes
P1	<ul style="list-style-type: none"> Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees 	<ul style="list-style-type: none"> probabilities should be written as fractions, decimals or percentages
P4	<ul style="list-style-type: none"> Apply the property that the probabilities of an exhaustive set of outcomes sum to 1 Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to 1 	
P7	<ul style="list-style-type: none"> Construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities 	

NEW

Probability

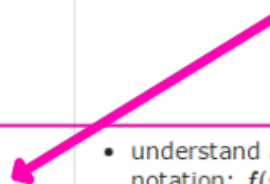
	Specification content	Specification notes
P2	<ul style="list-style-type: none"> Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes or multiple future experiments 	
P3	<ul style="list-style-type: none"> Relate relative expected frequencies to theoretical probability, using appropriate language and the 0 – 1 probability scale 	
P5	<ul style="list-style-type: none"> <u>Understand that empirical unbiased samples tend towards theoretical probability distributions with increasing sample size</u> 	
P6	<ul style="list-style-type: none"> Enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams 	
P8	<ul style="list-style-type: none"> <u>Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</u> 	<ul style="list-style-type: none"> know when to add and when to multiply two or more probabilities
P9	<ul style="list-style-type: none"> Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams 	

NEW

Algebra: quadratics, rearranging formulae and identities

Specification content	Specification notes
<p>A4</p> <ul style="list-style-type: none"> Simplify and manipulate algebraic expressions (<u>including those involving surds</u>) by: <ul style="list-style-type: none"> <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>A5</p> <ul style="list-style-type: none"> Understand and use standard mathematical formulae Rearrange formulae to change the subject 	<ul style="list-style-type: none"> including use of formulae from other subjects in words and using symbols
<p>A6</p> <ul style="list-style-type: none"> <u>Know the difference between an equation and an identity</u> <u>Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments and proofs</u> 	
<p>A7</p> <ul style="list-style-type: none"> 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' 	<ul style="list-style-type: none"> understand and use function notation: $f(x)$, $fg(x)$, $f^{-1}(x)$ is expected at higher tier

NEW



Pythagoras theorem and basic trigonometry

	Specification content	Specification notes
G20	<ul style="list-style-type: none"> Know the formula for Pythagoras' Theorem $a^2 + b^2 = c^2$ Apply it to find angles and lengths in right angled triangles and, where possible, general triangles in two and three dimensional figures Know and use the trigonometric ratios $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}},$ $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}} \text{ and}$ $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$ 	
G21	<ul style="list-style-type: none"> Know the exact values of $\sin \theta \text{ and } \cos \theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ \text{ and } 90^\circ$ Know the exact value of $\tan \theta \text{ for } \theta = 0^\circ, 30^\circ, 45^\circ \text{ and } 60^\circ$ 	
G6	<ul style="list-style-type: none"> 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 	
R12	<ul style="list-style-type: none"> Compare lengths using ratio notation; make links to trigonometric ratios 	

NEW

Congruence and similarity appear later

Sequences

Specification content	Specification notes
A23 <ul style="list-style-type: none"> Generate terms of a sequence from either a term-to-term or a position-to-term rule 	<ul style="list-style-type: none"> including from patterns and diagrams
A24 <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> other recursive sequences will be defined in the question
A25 <ul style="list-style-type: none"> Deduce expressions to calculate the nth term of linear and quadratic sequences 	

NEW

Scatter graphs

Specification content	Specification notes
S6 <ul style="list-style-type: none"> Use and interpret scatter graphs of bivariate data Recognise correlation <u>and know that it does not indicate causation</u> <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> 	<ul style="list-style-type: none"> know and understand the terms positive correlation, negative correlation, no correlation, weak correlation and strong correlation

NEW

2D representations of 3D shapes

	Specification content	Specification notes
G13	<ul style="list-style-type: none">• <u>Construct and interpret plans and elevations of 3D shapes</u>	

Constructions and loci

	Specification content	Specification notes
G2	<ul style="list-style-type: none">• <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>	<ul style="list-style-type: none">• including constructing an angle of 60°

Measures

	Specification content	Specification notes
N16	<ul style="list-style-type: none"> • <u>Apply and interpret limits of accuracy</u> including upper and lower bounds 	
G14	<ul style="list-style-type: none"> • Use standard units of measure and related concepts (length, area, volume / capacity, mass, time, money etc) 	
N13	<ul style="list-style-type: none"> • Use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate 	<ul style="list-style-type: none"> • know and use metric conversion factors for length, area, volume and capacity. Imperial / metric conversions will be given in the question
R1	<ul style="list-style-type: none"> • Change freely between related standard units (e.g. time, length, area, volume / capacity, mass) and compound units (e.g. speed, rates of pay, prices, <u>density</u>, <u>pressure</u>) in numerical <u>and algebraic contexts</u> 	
R11	<ul style="list-style-type: none"> • Use compound units such as speed, rates of pay, unit pricing, <u>density</u> and <u>pressure</u> 	<ul style="list-style-type: none"> • including making comparisons

SOME NEW

Congruence and similarity

	Specification content	Specification notes
G5	<ul style="list-style-type: none"> • <u>Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)</u> 	
G6	<ul style="list-style-type: none"> • <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	<ul style="list-style-type: none"> • <u>Apply and use the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures</u> 	

Volume

	Specification content	Specification notes
R12	<ul style="list-style-type: none"> • Compare lengths, areas and volumes using ratio notation • Scale factors • <u>Make links to similarity</u> 	
G16	<ul style="list-style-type: none"> • Know and apply the formulae to calculate the volume of cuboids and other right prisms (including cylinders) 	
G17	<ul style="list-style-type: none"> • <u>Calculate the volume of spheres, pyramids, cones and composite solids</u> 	<ul style="list-style-type: none"> • including frustums
N8	<ul style="list-style-type: none"> • <u>Calculate exactly with multiples of π</u> 	

Further equations and graphs

Specification content	Specification notes
A17 <ul style="list-style-type: none"> Solve linear equations in one unknown algebraically <u>including those with the unknown on both sides of the equation</u> Find approximate solutions using a graph 	<ul style="list-style-type: none"> including use of brackets
A18 <ul style="list-style-type: none"> 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 	
A12 <ul style="list-style-type: none"> Recognise, sketch and interpret graphs of linear and quadratic functions 	
A11 <ul style="list-style-type: none"> Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square 	<ul style="list-style-type: none"> including the symmetrical property of a quadratic
A21 <ul style="list-style-type: none"> Translate simple situations or procedures into algebraic expressions or formulae derive an equation, solve the equation and interpret the solution 	<ul style="list-style-type: none"> including solution of geometrical problems and problems set in context

Must learn the formula

SOME NEW

Inequalities

Specification content	Specification notes
A22 <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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

SOME NEW

Algebraic fractions

	Specification content	Specification notes
A4	<ul style="list-style-type: none"> Simplify and manipulate algebraic expressions involving algebraic fractions 	

Simultaneous equations

	Specification content	Specification notes
A19	<ul style="list-style-type: none"> <u>Solve two simultaneous equations in two variables (linear / linear or linear/quadratic) algebraically</u> <u>Find approximate solutions using a graph</u> 	
A21	<ul style="list-style-type: none"> <u>Translate simple situations or procedures into algebraic expressions or formulae</u> <u>Derive two simultaneous equations</u> <u>Solve the equations and interpret the solution</u> 	<ul style="list-style-type: none"> including the solution of geometrical problems and problems set in context

Equation of a circle

	Specification content	Specification notes
A16	<ul style="list-style-type: none"> 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. 	

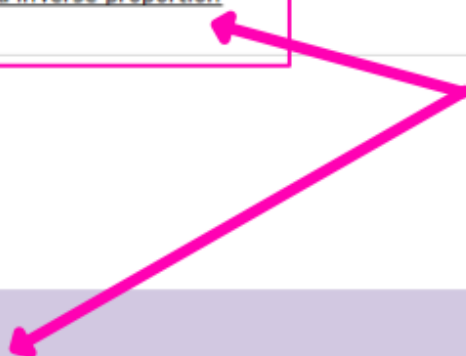
Direct and inverse proportion

	Specification content	Specification notes
R10	<ul style="list-style-type: none"> Solve problems involving direct and inverse proportion, including graphical and algebraic representations 	
R13	<ul style="list-style-type: none"> <u>Understand that x is inversely proportional to y is equivalent to x is proportional to $\frac{1}{y}$</u> Construct and <u>interpret equations that describe direct and inverse proportion</u> 	
R14	<ul style="list-style-type: none"> <u>Recognise and interpret graphs that illustrate direct and inverse proportion</u> 	

Growth and decay

	Specification content	Specification notes
R16	<ul style="list-style-type: none"> <u>Set up, solve and interpret the answers in growth and decay problems, including compound interest and work with general iterative processes</u> 	

NEW



Sine and cosine rules

	Specification content	Specification notes
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>	Must learn these formulae
G23	<p>• Know and apply $= \frac{1}{2} ab \sin C$ to calculate the area, sides or angles of any triangle</p>	

Gradients and rate of change

	Specification content	Specification notes
R15	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Interpret the gradient of a straight-line graph as a rate of change 	

NEW

Pre-calculus and area under a curve

	Specification content	Specification notes
A15	<ul style="list-style-type: none"> 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 	

Sketching graphs

NEW

	Specification content	Specification notes
A12	<ul style="list-style-type: none"> Recognise, sketch and interpret graphs of linear functions, quadratic functions, <u>simple cubic functions</u> and the <u>reciprocal function</u> $y = \frac{1}{x}$ with $x \neq 0$, exponential functions $y = kx$ for positive values of k, and the trigonometric functions (with arguments in degrees) $y = \sin x$, $y = \cos x$ and $y = \tan x$ for angles of any size 	

Numerical methods

NEW

	Specification content	Specification notes
A20	<ul style="list-style-type: none"> Find approximate solutions to equations numerically using iteration 	<ul style="list-style-type: none"> including the use of suffix notation in recursive formulae

Transforming functions

	Specification content	Specification notes
A13	<ul style="list-style-type: none">• Sketch translations and reflections of a given function	

Vectors

	Specification content	Specification notes
G25	<ul style="list-style-type: none">• <u>Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors</u>• Use vectors to construct geometric arguments and proofs	

Circle theorems

	Specification content	Specification notes
G10	<ul style="list-style-type: none"> • Apply and prove the standard circle theorems concerning angles, radii, tangents and chords and use them to prove related results 	<ul style="list-style-type: none"> • 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