

Week	7	8	9	10
1	Written and mental methods of calculation	Numerical problem solving (including written decimal calculations)	apply the four operations, including formal written methods, to integers, decimals – all both positive and negative. Include dividing by decimals and focus on worded problem solving questions.	know and apply formulae to calculate: area of triangles, parallelograms, trapezia;
1	Including calculating with positive and negative numbers	Square numbers and square roots	use the symbols =, ≠, <, >, ≤, ≥	know the formulae: circumference of a circle = $2\pi r = \pi d$
1		Negative numbers	Introduction to surds	area of a circle = πr^2
1				calculate perimeters of 2D shapes, including circles
1				areas of circles and composite shapes
2	Letters used to represent unknowns - introduction to algebra	Simplifying algebraic expressions by collecting like terms	simplify and manipulate algebraic expressions (including those involving surds and algebraic fractions) by:	calculate exactly with multiples of π
2	Simplifying expressions (positives and negatives)	Expanding and Factorising	collecting like terms	surface area and volume of spheres, pyramids, cones and composite solids
2			multiplying a single term over a bracket	
2			taking out common factors	

3	Square numbers	Calculating with powers	simplifying expressions involving sums, products and powers, including the laws of indices	use inequality notation to specify simple error intervals due to truncation or rounding
3	Cube numbers	simplifying powers	Include fractional and negative indices	apply and interpret limits of accuracy
3	Square roots			including upper and lower bounds
4	Types of angles, language of angles	Calculating angles in triangles, at points, in straight lines. Including isosceles triangles	apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles	expanding products of two binomials
4	Angle calculations	Angles in parallel lines	understand and use alternate and corresponding angles on parallel lines	expanding products of two or more binomials
4			apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results	
5	Probability scale - worded and numerical	Probability games, including the idea of repetition and estimation.	record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees	factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares
5	Knowing probabilities add up to 1	Sample space diagrams to show outcomes from 2 events	Find expected frequency	factorising quadratic expressions of the form $ax^2 + bx + c$

5			relate relative expected frequencies to theoretical probability, using appropriate language and the 0 to 1 probability scale	
5	Practical probability experiments		construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities	
5			calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions	
6	Revision and test	Revision and test	Revision and test	Revision and test
7	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving
8	Bar charts, Pie charts, tally tables.	Bar charts, Pie charts, tally tables.	interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, and know their appropriate use	interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively

8	Questionnaires	Mini stats project		express one quantity as a percentage of another
8				compare two quantities using percentages
8				solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics
9	Mean, median, mode, range	Time series graphs, Frequency polygons, frequency diagrams for grouped data	construct and interpret diagrams for grouped discrete data and continuous data, ie histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use	set up, solve and interpret the answers in growth and decay problems, including compound interest
9	Stats project		including box plots	and work with general iterative processes
9			including quartiles and inter-quartile range	
10	Shading fractions of shapes	Fractions of amounts	apply the four operations, including formal written methods, to simple fractions (proper and improper), and mixed numbers – all both positive and negative	use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)

10	Simplifying fractions	Comparing fractions by finding common denominators		apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs
10	Add and subtract fractions	Add and subtract fractions		draw diagrams from written description
11	Using a protractor	Angle calculations in quadrilaterals and other polygons	derive and use the sum of angles in a triangle (eg to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)	identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement
11	Investigating angle sums in polygons through measurement			including negative scale factors
11				describe the changes and invariance achieved by combinations of rotations, reflections and translations

12	Venn Diagrams	Venn Diagrams	enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams	Averages and range (including from frequency tables, grouped data and consideration of outliers informally)
12	Calculating probabilities in both fractions and decimals	Calculating probabilities in both fractions and decimals	Dependent and independent events and probabilities. Problem solving.	including quartiles and inter-quartile range
13	Revision and test	Revision and test	Revision and test	Revision and test
14	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving
15	Simple proportion problems	Ratio notation	use ratio notation, including reduction to simplest form	use and interpret scatter graphs of bivariate data
15	Ratio notation	Writing ratios from worded descriptions	divide a given quantity into two parts in a given part : part or part : whole ratio	recognise correlation
15	Writing ratios from worded descriptions	simplifying ratios	express the division of a quantity into two parts as a ratio	know that it does not indicate causation
15	simplifying ratios	Dividing amounts by a ratio	apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations) Best buy, better value problems	draw estimated lines of best fit
15	Dividing amounts by a ratio	Recipe/proportion problem solving		interpolate and extrapolate apparent trends whilst knowing the dangers of so doing

16	Problem solving week	Problem solving week	Direct and inverse proportion	derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus
16				and triangles and other plane figures using appropriate language
16				use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)
				Recap Circle theorems
17	Generating sequences using term to term rules	Generating sequences using term to term rules	deduce expressions to calculate the n th term of linear sequences	compare lengths, areas and volumes using ratio notation
17	Generating sequences using a formula for n th term	Generating sequences using a formula for n th term	including Fibonacci-type sequences, quadratic sequences, and simple geometric progressions (r^n where n is an integer and r is a rational number > 0)	
17	Sequences from patterns and the n th term	Sequences from patterns and the n th term	including other sequences	relate ratios to fractions and to linear functions
17		Unusual sequences, including fibonacci and gemoetric	including where r is a surd	use compound units such as speed, rates of pay, unit pricing
17			including quadratic sequences	

18	Substitution and formulae	Substitution and formulae	deduce expressions to calculate the n th term of linear sequences	solve problems involving direct and inverse proportion, including graphical and algebraic representations
18			including Fibonacci-type sequences, quadratic sequences, and simple geometric progressions (r^n where n is an integer and r is a rational number > 0)	construct and interpret equations that describe direct and inverse proportion
19	Calculating from a formula in words	Using simple formulae. Both written and algebraically	substitute numerical values into formulae and expressions, including scientific formulae and apply in context	solve linear equations in one unknown algebraically
19	Substituting into expressions	Write a formula from a description	understand and use the concepts and vocabulary of expressions, equations, formulae, inequalities, terms and factors	including those with the unknown on both sides of the equation
19		Know the difference between an expression and a formula and an equation	to include identities	solve quadratic equations algebraically by factorising
19				including those that require rearrangement
19				including completing the square and by using the quadratic formula
20	Revision and Test	Revision and Test	Revision and Test	Revision and Test
21	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving

22	Place value	Calculating with powers of 10 and place value	use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5	solve two simultaneous equations in two variables (linear/linear) algebraically
22	Rounding	using powers, and square and cube roots	estimate powers and roots of any given positive number	find approximate solutions using a graph
22	Estimation	Estimating answers to square root problems	calculate with roots, and with integer indices	including linear/quadratic
22		Rounding	calculate with fractional indices	
22			calculate exactly with surds	
23	Problem solving week	Problem solving week	simplify surd expressions involving squares (eg $12\sqrt{3} = 4 \times 3\sqrt{3}$, $\sqrt{16} = 4$, $\sqrt{12} \times 3 = 3\sqrt{12}$, $\sqrt{23} = \sqrt{23}$) and rationalise denominators	interpret equations that describe direct and inverse proportion
23				recognise and interpret graphs that illustrate direct and inverse proportion
24	Drawing lines and angles from a description	Drawing angles accurately. Constructing ASA, SAS triangles	measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings	interpret the gradient at a point on a curve as the instantaneous rate of change

24	Using a map to find real life distances	Drawing and measuring bearings	use scale factors, scale diagrams and maps	apply the concepts of average and instantaneous rate of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts
25	Enlargement of shapes and scale drawings	Drawing simple enlargements of shapes. Using scale drawings	including the relationships between lengths, areas and volumes in similar figures	find approximate solutions to equations numerically using iteration
26	Revision and Test	Revision and Test	Revision and Test	Revision and Test
27	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving
28	Using formulae in context (area, perimeter etc)	Using formulae in context (area, perimeter etc)	Pythagoras and trigonometry	know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°
28	Solving simple equations	Solving linear equations	apply them to find angles and lengths in right-angled triangles and, where possible, general triangles in two and three dimensional figures	know the exact value of $\tan\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$
28				know and apply the sine rule, $a \sin A = b \sin B = c \sin C$
28				$a^2 = b^2 + c^2 - 2bc \cos A$
28				$Area = \frac{1}{2} ab \sin C$
29	Problem Solving Week	Basic pythagoras	understand and use standard mathematical formulae including use of formulae from other subjects in words and using symbols.	Applying sine and cosine rule

29			rearrange formulae to change the subject Including with algebraic fractions	Probability review
30	Factors, multiples, factor pairs, prime numbers	HCF, LCM, factor trees	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 USE FACTOR TREES FOR HCF AND LCM	Charts and graphs recap/review
31	Converting between fractions, decimals and percentages	Converting between fractions, decimals and percentages, including calculator methods	work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $\frac{7}{2}$ or 0.375 and $\frac{3}{8}$)	calculate with and interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer
31			Ordering fractions and decimals	
			change recurring decimals into their corresponding fractions and vice versa	
32	Revision and Test	Revision and Test	Revision and Test	Revision and Test
33	Plotting coordinates	Plotting coordinates	plot graphs of equations that correspond to straight-line graphs in the coordinate plane	apply systematic listing strategies

33	Drawing horizontal and vertical lines	Drawing horizontal and vertical lines	identify and interpret gradients and intercepts of linear functions graphically and algebraically	including use of the product rule for counting
33	Drawing linear graphs using a table of values	Drawing linear graphs using a table of values	use the form $y=mx+c$ to identify parallel lines	calculate exactly with fractions
33	Real life graphs	Simple Real life graphs	find the equation of the line through two given points, or through one point with a given gradient	interpret fractions and percentages as operators
34	Calculating percentages of amounts using fraction equivalents	Calculating percentages of amounts, calc and non calc	use the form $y=mx+c$ to identify perpendicular lines	Recap upper/lower bounds including problem solving
34	Increase/decrease by percentages	Increase/decrease by percentages, Including calculator methods		
35	Area and perimeter	Area and perimeter	Compound measures. Speed, density, unit conversions	simplify and manipulate algebraic expressions (including those involving surds and algebraic fractions) by:
36	Plans and elevations, using isometric paper	Plans and elevations, using isometric paper	interpret plans and elevations of 3D shapes	recognise, sketch and interpret graphs of quadratic functions
36			construct and interpret plans and elevations of 3D shapes	identify and interpret roots, intercepts and turning points of quadratic functions graphically
36			Volume and surface area of cones and spheres	deduce roots algebraically Including completing the square

37	Design a game - probability in practice	Problem solving/investigation week	apply the property that the probabilities of an exhaustive set of outcomes sum to 1	including simple cubic functions and the reciprocal function $y=1/x$ with $x \neq 0$
				including exponential functions $y=k^x$ 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
37			understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size	plot and interpret 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
37			calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams	including reciprocal and exponential graphs
38	Revision and test	Revision and test	Revision and test	Revision and test
39	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving	Feedback and problem solving









sketch translations and reflections of a given function

solve linear inequalities in one variable

represent the solution set on a number line

solve linear inequalities in one or two variable(s), and quadratic inequalities in one variable

represent the solution set on a number line, using set notation and on a graph

derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution

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

calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts

use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle)

use these to construct given figures and solve loci problems

know that the perpendicular distance from a point to a line is the shortest distance to the line

Revision and test

Feedback and problem solving

Algebraic proofs

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'
Area revision including calculate arc lengths, angles and areas of sectors of circles

calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams

Similarity

