		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
YEAR 1		100	7	50	500	20	20
	CHAPTER 1 NUMBERS HOURS 30						
	Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens.						
	Given a number, identify one more and one less.						
	Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least.						
	Read and write numbers from 1 to 20 in numerals and words.						
	Addition and subtraction						
	Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.						
	Represent and use number bonds and related subtraction facts within 20.						
	Add and subtract one-digit and two-digit numbers to 20, including zero.						
	Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ___ - 9.						
	Multiplication and division						
	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.						
FRACTIONS	**M**						
	CHAPTER2 MEASUREMENTS						
	Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.						
	MEASUREMENTS						
	COMPARISON						
	lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]						
	mass/weight [for example, heavy/light, heavier than, lighter than]						
	capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]						
	time [for example, quicker, slower, earlier, later]						
	Measure and begin to record the following:						
	lengths and heights						
	capacity and volume						
	time (hours, minutes, seconds)						
	Recognise and know the value of different denominations of coins and notes.						
	Sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening].						
	Recognise and use language relating to dates, including days of the week, weeks, months and years.						
	Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.						
	Geometry						
	Properties of shapes						
	Recognise and name common 2-D and 3-D shapes, including:						
	2-D shapes [for example, rectangles (including squares), circles and triangles]						
	3-D shapes [for example, cuboids (including cubes), pyramids and spheres]						
	Position and direction						
	Describe position, direction and movement, including whole, half, quarter and three-quarter turns						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
YEAR 2		**110**	7	55	550	20	20

Number

Number and place value
Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward.
Recognise the place value of each digit in a two-digit number (tens, ones).
Identify, represent and estimate numbers using different representations, including the number line.
Compare and order numbers from 0 up to 100; use <, > and = signs.
Read and write numbers to at least 100 in numerals and in words.
Use place value and number facts to solve problems.
Addition and subtraction
Solve problems with addition and subtraction:
using concrete objects and pictorial representations, including those involving numbers, quantities and measures
applying their increasing knowledge of mental and written methods
Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.
Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
a two-digit number and ones
a two-digit number and tens
two two-digit numbers
adding three one-digit numbers
Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.
Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
Multiplication and division
Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs.
Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
Fractions
Recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity.
Write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2.

Measurement

Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels.
Compare and order lengths, mass, volume/capacity and record the results using >, < and =.
Find different combinations of coins that equal the same amounts of money.
Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.
Compare and sequence intervals of time.
Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.
Know the number of minutes in an hour and the number of hours in a day.

Geometry

Properties of shapes

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line.						
	Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.						
	Identify 2-D shapes on the surface of 3-D shapes [for example, a circle on a cylinder and a triangle on a pyramid].						
	Compare and sort common 2-D and 3-D shapes and everyday objects.						
	Position and direction						
	Order and arrange combinations of mathematical objects in patterns and sequences.						
	Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).						
	## Statistics						
	Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.						
	Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.						
	Ask and answer questions about totalling and comparing categorical data.						
YEAR 3		**110**	7	70	700	20	20
	## Number						
	Number and place value						
	Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.						
	Recognise the place value of each digit in a three-digit number (hundreds, tens, ones).						
	Compare and order numbers up to 1000.						
	Identify, represent and estimate numbers using different representations.						
	Read and write numbers up to 1000 in numerals and in words.						
	Solve number problems and practical problems involving these ideas.						
	Addition and subtraction						
	Add and subtract numbers mentally, including:						
	a three-digit number and ones						
	a three-digit number and tens						
	Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.						
	Estimate the answer to a calculation and use inverse operations to check answers.						
	Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.						
	Multiplication and division						
	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.						
	Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.						
	Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.						
	Fractions						
	Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.						
	Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.						
	Recognise and show, using diagrams, equivalent fractions with small denominators.						
	Add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7].						
	Compare and order unit fractions, and fractions with the same denominators.						
	Solve problems that involve all of the above.						

Measurement

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).						
	Measure the perimeter of simple 2-D shapes.						
	Add and subtract amounts of money to give change, using both £ and p in practical contexts.						
	Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks.						
	Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight.						
	Know the number of seconds in a minute and the number of days in each month, year and leap year.						
	Compare durations of events [for example to calculate the time taken by particular events or tasks].						

Geometry

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Properties of shapes						
	Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them.						
	Recognise angles as a property of shape or a description of a turn.						
	Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle.						
	Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.						

Statistics

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Interpret and present data using bar charts, pictograms and tables.						
	Solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.						
YEAR 4		**120**	7	75	750	20	20

Number

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Number and place value						
	Count in multiples of 6, 7, 9, 25 and 1000.						
	Find 1000 more or less than a given number.						
	Count backwards through zero to include negative numbers.						
	Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones).						
	Order and compare numbers beyond 1000.						
	Identify, represent and estimate numbers using different representations.						
	Round any number to the nearest 10, 100 or 1000.						
	Solve number and practical problems that involve all of the above and with increasingly large positive numbers.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.						
	Addition and subtraction						
	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.						
	Estimate and use inverse operations to check answers to a calculation.						
	Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.						
	Multiplication and division						
	Recall multiplication and division facts for multiplication tables up to 12 × 12.						
	Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.						
	Recognise and use factor pairs and commutativity in mental calculations.						
	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.						
	Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.						
	Fractions						
	Recognise and show, using diagrams, families of common equivalent fractions.						
	Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.						
	Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.						
	Add and subtract fractions with the same denominator.						
	Recognise and write decimal equivalents of any number of tenths or hundredths.						
	Recognise and write decimal equivalents to 1/4, 1/2, 3/4.						
	Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.						
	Round decimals with one decimal place to the nearest whole number.						
	Compare numbers with the same number of decimal places up to two decimal places.						
	Solve simple measure and money problems involving fractions and decimals to two decimal places.						

Measurement

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Convert between different units of measure [for example, kilometre to metre; hour to minute].						
	Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.						
	Find the area of rectilinear shapes by counting squares.						
	Estimate, compare and calculate different measures, including money in pounds and pence.						
	Read, write and convert time between analogue and digital 12- and 24-hour clocks.						
	Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.						

Geometry

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Properties of shapes						
	Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.						
	Identify acute and obtuse angles and compare and order angles up to two right angles by size.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Identify lines of symmetry in 2-D shapes presented in different orientations.						
	Complete a simple symmetric figure with respect to a specific line of symmetry.						
	Position and direction						
	Describe positions on a 2-D grid as coordinates in the first quadrant.						
	Describe movements between positions as translations of a given unit to the left/right and up/down.						
	Plot specified points and draw sides to complete a given polygon.						
	## Statistics						
	Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.						
	Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.						
YEAR 5		130	7	85	900	20	20
	## Number						
	Number and place value						
	Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.						
	Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.						
	Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.						
	Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.						
	Solve number problems and practical problems that involve all of the above.						
	Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.						
	Addition and subtraction						
	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).						
	Add and subtract numbers mentally with increasingly large numbers.						
	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.						
	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.						
	Multiplication and division						
	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.						
	Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.						
	Establish whether a number up to 100 is prime and recall prime numbers up to 19.						
	Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.						
	Multiply and divide numbers mentally drawing upon known facts.						
	Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.						
	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.						
	Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).						
	Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.						
	Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.						
	Fractions (including decimals and percentages)						
	Compare and order fractions whose denominators are all multiples of the same number.						
	Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, 2/5 + 4/5 = 6/5 = 1 1/5].						
	Add and subtract fractions with the same denominator and denominators that are multiples of the same number.						
	Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.						
	Read and write decimal numbers as fractions [for example, 0.71 = 71/100].						
	Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.						
	Round decimals with two decimal places to the nearest whole number and to one decimal place.						
	Read, write, order and compare numbers with up to three decimal places.						
	Solve problems involving number up to three decimal places.						
	Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.						
	Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25.						

Measurement

	Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre).						
	Understand and use approximate equivalences between metric un						
	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.						
	Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes.						
	Estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water].						
	Solve problems involving converting between units of time.						
	Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.						

Geometry

	Properties of shapes						
	Identify 3-D shapes, including cubes and other cuboids, from 2-D representations.						
	Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.						
	Draw given angles, and measure them in degrees (°).						
	Identify						
	angles at a point and one whole turn (total 360°)						
	angles at a point on a straight line and 1/2 a turn (total 180°)						
	other multiples of 90°						
	Use the properties of rectangles to deduce related facts and find missing lengths and angles.						
	Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.						
	Position and direction						
	Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.						

Statistics

	Solve comparison, sum and difference problems using information presented in a line graph.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Complete, read and interpret information in tables, including timetables.						
year 6		**150**	7	100	1100	20	20
	Number						
	Number and place value						
	Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.						
	Round any whole number to a required degree of accuracy.						
	Use negative numbers in context, and calculate intervals across zero.						
	Solve number and practical problems that involve all of the above.						
	Addition, subtraction, multiplication and division						
	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.						
	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.						
	Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.						
	Perform mental calculations, including with mixed operations and large numbers.						
	Identify common factors, common multiples and prime numbers.						
	Use their knowledge of the order of operations to carry out calculations involving the four operations.						
	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.						
	Solve problems involving addition, subtraction, multiplication and division.						
	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.						
	Fractions (including decimals and percentages)						
	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.						
	Compare and order fractions, including fractions > 1.						
	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.						
	Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example 1/4 × 1/2 = 1/8].						
	Divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6].						
	Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8].						
	Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.						
	Multiply one-digit numbers with up to two decimal places by whole numbers.						
	Use written division methods in cases where the answer has up to two decimal places.						
	Solve problems which require answers to be rounded to specified degrees of accuracy.						
	Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.						
	Ratio and proportion						
	Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.						
	Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison.						
	Solve problems involving similar shapes where the scale factor is known or can be found.						
	Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Algebra						
	Use simple formulae.						
	Generate and describe linear number sequences.						
	Express missing number problems algebraically.						
	Find pairs of numbers that satisfy an equation with two unknowns.						
	Enumerate possibilities of combinations of two variables.						
	Measurement						
	Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.						
	Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places.						
	Convert between miles and kilometres.						
	Recognise that shapes with the same areas can have different perimeters and vice versa						
	Recognise when it is possible to use formulae for area and volume of shapes						
	Calculate the area of parallelograms and triangles.						
	Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].						
	Geometry						
	Properties of shapes						
	Draw 2-D shapes using given dimensions and angles.						
	Recognise, describe and build simple 3-D shapes, including making nets.						
	Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.						
	Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.						
	Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.						
	Position and direction						
	Describe positions on the full coordinate grid (all four quadrants).						
	Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.						
	Statistics						
	Interpret and construct pie charts and line graphs and use these to solve problems.						
	Calculate and interpret the mean as an average.						
year 7		**170**	7	100	1100	30	30
	Working mathematically						
	Develop fluency						
	Consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots.						
	Select and use appropriate calculation strategies to solve increasingly complex problems.						
	Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships.						
	Substitute values in expressions, rearrange and simplify expressions, and solve equations.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs].						
	Develop algebraic and graphical fluency, including understanding linear and simple quadratic functions.						
	Use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics.						
	Reason mathematically						
	Extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations.						
	Extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically.						
	Identify variables and express relations between variables algebraically and graphically.						
	Make and test conjectures about patterns and relationships; look for proofs or counter-examples.						
	Begin to reason deductively in geometry, number and algebra, including using geometrical constructions.						
	Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning.						
	Explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.						
	Solve problems						
	Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.						
	Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics.						
	Begin to model situations mathematically and express the results using a range of formal mathematical representations.						
	Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.						
	Number						
	Understand and use place value for decimals, measures and integers of any size.						
	Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols $=, \neq, <, >, \leq, \geq$.						
	Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property.						
	Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.						
	Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals.						
	Recognise and use relationships between operations including inverse operations.						
	Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations.						
	Interpret and compare numbers in standard form A × 10n1≤A<10, where n is a positive or negative integer or zero.						
	Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8).						
	Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%.						
	Interpret fractions and percentages as operators.						
	Use standard units of mass, length, time, money and other measures, including with decimal quantities.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures].						
	Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation a<x≤b.						
	Use a calculator and other technologies to calculate results accurately and then interpret them appropriately.						
	Appreciate the infinite nature of the sets of integers, real and rational numbers.						

Algebra

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Use and interpret algebraic notation, including:						
	ab in place of a × b						
	3y in place of y + y + y and 3 × y						
	a2 in place of a × a, a3 in place of a × a × a; a2b in place of a × a × b						
	a/b in place of a ÷ b						
	coefficients written as fractions rather than as decimals						
	brackets						
	Substitute numerical values into formulae and expressions, including scientific formulae.						
	Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors.						
	Simplify and manipulate algebraic expressions to maintain equivalence by:						
	collecting like terms						
	multiplying a single term over a bracket						
	taking out common factors						
	expanding products of two or more binomials						
	Understand and use standard mathematical formulae; rearrange formulae to change the subject.						
	Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs.						
	Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement).						
	Work with coordinates in all four quadrants.						
	Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane.						
	Interpret mathematical relationships both algebraically and graphically.						
	Reduce a given linear equation in two variables to the standard form y = mx + c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically.						
	Use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations.						
	Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs.						
	Generate terms of a sequence from either a term-to-term or a position-to-term rule.						
	Recognise arithmetic sequences and find the nth term.						
	Recognise geometric sequences and appreciate other sequences that arise.						

Ratio, proportion and rates of change

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Change freely between related standard units [for example time, length, area, volume/capacity, mass].						
	Use scale factors, scale diagrams and maps.						
	Express one quantity as a fraction of another, where the fraction is less than one and greater than one.						
	Use ratio notation, including reduction to simplest form.						
	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.						
	Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions.						
	Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics.						
	Solve problems involving direct and inverse proportion, including graphical and algebraic representations.						
	Use compound units such as speed, unit pricing and density to solve problems.						

Geometry and measures

	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).						
	Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes.						
	Draw and measure line segments and angles in geometric figures, including interpreting scale drawings.						
	Derive and 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); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line.						
	Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric.						
	Use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles.						
	Derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies.						
	Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures.						
	Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids.						
	Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles.						
	Understand and use the relationship between parallel lines and alternate and corresponding angles.						
	Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons.						
	Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs.						
	Use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles.						
	Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D.						
	Interpret mathematical relationships both algebraically and geometrically.						

Probability

	Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale.						
	Understand that the probabilities of all possible outcomes sum to 1.						
	Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams.						
	Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.						

Statistics

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).						
	Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.						
	Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.						
year 8		**200**	7	125	1500	50	50
	Working mathematically						
	Develop fluency						
	Consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots.						
	Select and use appropriate calculation strategies to solve increasingly complex problems.						
	Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships.						
	Substitute values in expressions, rearrange and simplify expressions, and solve equations.						
	Move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs].						
	Develop algebraic and graphical fluency, including understanding linear and simple quadratic functions.						
	Use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics.						
	Reason mathematically						
	Extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations.						
	Extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically.						
	Identify variables and express relations between variables algebraically and graphically.						
	Make and test conjectures about patterns and relationships; look for proofs or counter-examples.						
	Begin to reason deductively in geometry, number and algebra, including using geometrical constructions.						
	Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning.						
	Explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.						
	Solve problems						
	Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.						
	Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics.						
	Begin to model situations mathematically and express the results using a range of formal mathematical representations.						
	Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.						
	Number						
	Understand and use place value for decimals, measures and integers of any size.						
	Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property.						
	Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.						
	Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals.						
	Recognise and use relationships between operations including inverse operations						
	Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations.						
	Interpret and compare numbers in standard form A × 10n1 ≤ A < 10, where n is a positive or negative integer or zero.						
	Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8).						
	Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%.						
	Interpret fractions and percentages as operators.						
	Use standard units of mass, length, time, money and other measures, including with decimal quantities.						
	Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures].						
	Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation a < x ≤ b.						
	Use a calculator and other technologies to calculate results accurately and then interpret them appropriately.						
	Appreciate the infinite nature of the sets of integers, real and rational numbers.						

Algebra

	Use and interpret algebraic notation, including:						
	ab in place of a × b						
	3y in place of y + y + y and 3 × y						
	a2 in place of a × a, a3 in place of a × a × a; a2b in place of a × a × b						
	a/b in place of a ÷ b						
	coefficients written as fractions rather than as decimals						
	brackets						
	Substitute numerical values into formulae and expressions, including scientific formulae.						
	Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors.						
	Simplify and manipulate algebraic expressions to maintain equivalence by:						
	collecting like terms						
	multiplying a single term over a bracket						
	taking out common factors						
	expanding products of two or more binomials						
	Understand and use standard mathematical formulae; rearrange formulae to change the subject.						
	Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs.						
	Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement).						
	Work with coordinates in all four quadrants.						
	Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane.						
	Interpret mathematical relationships both algebraically and graphically.						
	Reduce a given linear equation in two variables to the standard form y = mx + c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations.						
	Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs.						
	Generate terms of a sequence from either a term-to-term or a position-to-term rule.						
	Recognise arithmetic sequences and find the nth term.						
	Recognise geometric sequences and appreciate other sequences that arise.						

Ratio, proportion and rates of change

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Change freely between related standard units [for example time, length, area, volume/capacity, mass].						
	Use scale factors, scale diagrams and maps.						
	Express one quantity as a fraction of another, where the fraction is less than one and greater than one.						
	Use ratio notation, including reduction to simplest form.						
	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.						
	Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction.						
	Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions.						
	Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics.						
	Solve problems involving direct and inverse proportion, including graphical and algebraic representations.						
	Use compound units such as speed, unit pricing and density to solve problems.						

Geometry and measures

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).						
	Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes.						
	Draw and measure line segments and angles in geometric figures, including interpreting scale drawings.						
	Derive and 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); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line.						
	Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric.						
	Use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles.						
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	Understand and use the relationship between parallel lines and alternate and corresponding angles.						
	Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs.						
	Use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles.						
	Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D.						
	Interpret mathematical relationships both algebraically and geometrically.						
	## Probability						
	Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale.						
	Understand that the probabilities of all possible outcomes sum to 1.						
	Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams.						
	Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.						
	## Statistics						
	Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).						
	Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.						
	Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.						
year 9		**250**	8	180	1800	50	50
	## Working mathematically						
	Develop fluency						
	Consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots.						
	Select and use appropriate calculation strategies to solve increasingly complex problems.						
	Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships.						
	Substitute values in expressions, rearrange and simplify expressions, and solve equations.						
	Move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs].						
	Develop algebraic and graphical fluency, including understanding linear and simple quadratic functions.						
	Use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics.						
	Reason mathematically						
	Extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations.						
	Extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically.						
	Identify variables and express relations between variables algebraically and graphically.						
	Make and test conjectures about patterns and relationships; look for proofs or counter-examples.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Begin to reason deductively in geometry, number and algebra, including using geometrical constructions.						
	Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning.						
	Explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.						
	Solve problems						
	Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.						
	Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics.						
	Begin to model situations mathematically and express the results using a range of formal mathematical representations.						
	Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.						

Number

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Understand and use place value for decimals, measures and integers of any size.						
	Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥.						
	Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property.						
	Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.						
	Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals.						
	Recognise and use relationships between operations including inverse operations.						
	Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations.						
	Interpret and compare numbers in standard form A × 10n1 ≤ A < 10, where n is a positive or negative integer or zero.						
	Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8).						
	Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%.						
	Interpret fractions and percentages as operators.						
	Use standard units of mass, length, time, money and other measures, including with decimal quantities.						
	Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures].						
	Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation a < x ≤ b.						
	Use a calculator and other technologies to calculate results accurately and then interpret them appropriately.						
	Appreciate the infinite nature of the sets of integers, real and rational numbers.						

Algebra

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Use and interpret algebraic notation, including:						
	ab in place of a × b						
	3y in place of y + y + y and 3 × y						
	a2 in place of a × a, a3 in place of a × a × a; a2b in place of a × a × b						
	a/b in place of a ÷ b						
	coefficients written as fractions rather than as decimals						
	brackets						
	Substitute numerical values into formulae and expressions, including scientific formulae.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors.						
	Simplify and manipulate algebraic expressions to maintain equivalence by:						
	collecting like terms						
	multiplying a single term over a bracket						
	taking out common factors						
	expanding products of two or more binomials						
	Understand and use standard mathematical formulae; rearrange formulae to change the subject.						
	Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs.						
	Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement).						
	Work with coordinates in all four quadrants.						
	Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane.						
	Interpret mathematical relationships both algebraically and graphically.						
	Reduce a given linear equation in two variables to the standard form $y = mx + c$; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically.						
	Use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations.						
	Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs.						
	Generate terms of a sequence from either a term-to-term or a position-to-term rule.						
	Recognise arithmetic sequences and find the nth term.						
	Recognise geometric sequences and appreciate other sequences that arise.						

Ratio, proportion and rates of change

	Change freely between related standard units [for example time, length, area, volume/capacity, mass].						
	Use scale factors, scale diagrams and maps.						
	Express one quantity as a fraction of another, where the fraction is less than one and greater than one.						
	Use ratio notation, including reduction to simplest form.						
	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.						
	Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction.						
	Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions.						
	Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics.						
	Solve problems involving direct and inverse proportion, including graphical and algebraic representations.						
	Use compound units such as speed, unit pricing and density to solve problems.						

Geometry and measures

	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).						
	Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes.						
	Draw and measure line segments and angles in geometric figures, including interpreting scale drawings.						
	Derive and 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); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric.						
	Use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles.						
	Derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies.						
	Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures.						
	Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids.						
	Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles.						
	Understand and use the relationship between parallel lines and alternate and corresponding angles.						
	Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons.						
	Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs.						
	Use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles.						
	Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D.						
	Interpret mathematical relationships both algebraically and geometrically.						
	## Probability						
	Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale.						
	Understand that the probabilities of all possible outcomes sum to 1.						
	Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams.						
	Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.						
	## Statistics						
	Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).						
	Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.						
	Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.						
year 10		**250**	8	180	1800	50	50
	## Working mathematically						
	Develop fluency						
	Consolidate their numerical and mathematical capability from key stage 3 and extend their understanding of the number system to include powers, roots {and fractional indices}.						
	Select and use appropriate calculation strategies to solve increasingly complex problems, including exact calculations involving multiples of π {and surds}, use of standard form and application and interpretation of limits of accuracy.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions, {and expressions involving surds and algebraic fractions}.						
	Extend fluency with expressions and equations from key stage 3, to include quadratic equations, simultaneous equations and inequalities.						
	Move freely between different numerical, algebraic, graphical and diagrammatic representations, including of linear, quadratic, reciprocal, {exponential and trigonometric} functions.						
	Use mathematical language and properties precisely.						
	Reason mathematically						
	Extend and formalise their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphically.						
	Extend their ability to identify variables and express relations between variables algebraically and graphically.						
	Make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counter-examples; begin to use algebra to support and construct arguments {and proofs}.						
	Reason deductively in geometry, number and algebra, including using geometrical constructions.						
	Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning.						
	Explore what can and cannot be inferred in statistical and probabilistic settings, and express their arguments formally.						
	Assess the validity of an argument and the accuracy of a given way of presenting information.						
	Solve problems						
	Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.						
	Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts.						
	Make and use connections between different parts of mathematics to solve problems.						
	Model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions.						
	Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem.						
	Number						
	Apply systematic listing strategies, {including use of the product rule for counting}.						
	{Estimate powers and roots of any given positive number.}						
	Calculate with roots, and with integer {and fractional} indices.						
	Calculate exactly with fractions, {surds} and multiples of π {simplify surd expressions involving squares [for example $\sqrt{12} = \sqrt{(4 \times 3)} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$] and rationalise denominators}.						
	Calculate with numbers in standard form $A \times 10n$, where $1 \le A < 10$ and n is an integer.						
	{Change recurring decimals into their corresponding fractions and vice versa.}						
	Identify and work with fractions in ratio problems.						
	Apply and interpret limits of accuracy when rounding or truncating, {including upper and lower bounds}.						
	Algebra						
	Simplify and manipulate algebraic expressions (including those involving surds {and algebraic fractions}) by:						
	factorising quadratic expressions of the form x2 + bx + c, including the difference of two squares; {factorising quadratic expressions of the form ax2 + bx + c}						
	simplifying expressions involving sums, products and powers, including the laws of indices						
	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}.						
	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'}.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Use the form y = mx + c to identify parallel {and perpendicular} lines; find the equation of the line through two given points, or through one point with a given gradient.						
	Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically {and turning points by completing the square}.						
	Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function y = 1/x with x ≠ 0, {the exponential function 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}.						
	{Sketch translations and reflections of the graph of a given function.}						
	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.						
	{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.}						
	{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.}						
	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.						
	Solve two simultaneous equations in two variables (linear/linear {or linear/quadratic}) algebraically; find approximate solutions using a graph.						
	{Find approximate solutions to equations numerically using iteration.}						
	Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution.						
	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}.						
	Recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions (rn where n is an integer, and r is a positive rational number {or a surd}) {and other sequences}.						
	Deduce expressions to calculate the nth term of linear {and quadratic} sequences.						
	## Ratio, proportion and rates of change						
	Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios).						
	Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts.						
	Understand that X is inversely proportional to Y is equivalent to X is proportional to 1/Y; {construct and interpret equations that describe direct and inverse proportion.						
	Interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion.						
	{Interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of instantaneous and average rate of change (gradients of tangents and chords) in numerical, algebraic and graphical contexts.}						
	Set up, solve and interpret the answers in growth and decay problems, including compound interest {and work with general iterative processes}.						
	## Geometry and measures						
	Interpret and use fractional {and negative} scale factors for enlargements.						
	{Describe the changes and invariance achieved by combinations of rotations, reflections and translations.}						
	Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment.						
	{Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results.}						
	{Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results.}						
	Interpret and use bearings.						
	Calculate arc lengths, angles and areas of sectors of circles.						
	Calculate surface areas and volumes of spheres, pyramids, cones and composite solids.						

		hours	pound /hr	pound /month	pound /year	Q&A pdf /chapter	HW Help /chapter
	Apply the concepts of congruence and similarity, including the relationships between lengths, {areas and volumes} in similar figures.						
	Apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles {and, where possible, general triangles} in two {and three} dimensional figures.						
	Know the exact values of sin θ and cos θ for θ = 0°, 30°, 45°, 60° and 90°; know the exact value of tan θ for θ = 0°, 30°, 45° and 60°.						
	{Know and apply the sine rule, a/sin A = b/sin B = c/sin C, and cosine rule, a2 = b2 + c2 - 2bc cos A, to find unknown lengths and angles.}						
	{Know and apply Area = 1/2 ab sin C to calculate the area, sides or angles of any triangle.}						
	Describe translations as 2D vectors.						
	Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; {use vectors to construct geometric arguments and proofs}.						
	## Probability						
	Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one.						
	Use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size.						
	Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions.						
	{Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams.}						
	## Statistics						
	Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling.						
	Interpret and construct tables and line graphs for time series 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.}						
	Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:						
	appropriate graphical representation involving discrete, continuous and grouped data, {including box plots}						
	appropriate measures of central tendency (including modal class) and spread {including quartiles and inter-quartile range}						
	Apply statistics to describe a population.						
	Use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing.						