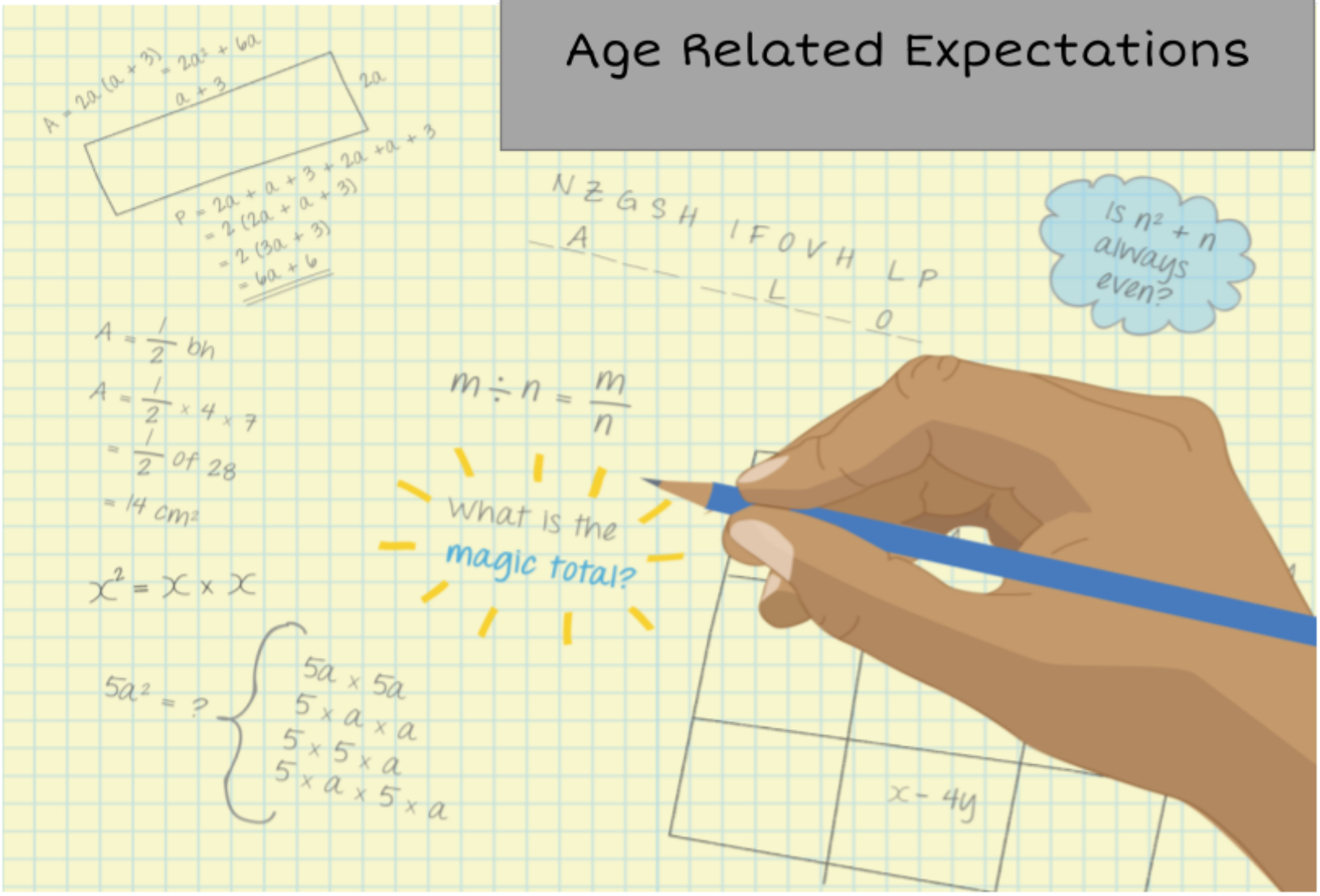
Age Related Expectations



Age Related Expectations-

Age-related expectations identify what is expected of our learners by a specified age, stage or year group. Our curriculum defines these as a set standard of expectations which are defined either as exemplars, descriptors or questions.

Y7 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
understand and use place value for decimals, measures and integers of any size	use and interpret algebraic notation, including: ab in place of $a \times b$ $3y$ in place of $y+y+y$ and $3 \times y$ a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$; $a^2 b$ in place of $a \times a \times b$ $^a/_b$ in place of $a \div b$ brackets	change freely between related standard units, for example: time (4hours=4×360 secs), length (7mm = 7 × 0.1 cm), area ($9m^2$=9 × 10000 cm^2), volume/capacity (3 mm^3 = 3 x 0.001 cm^3), mass (5 kg = 5 × 1000 g)	draw and measure line segments and angles in geometric figures; calculate lengths represented by line segments in scale drawings given scale factors as ratios in the form 1 : n, and understand that the lengths are approximate	record and describe the frequency of outcomes of simple probability experiments; try to explain their findings using their own ideas about randomness and possible outcomes; make and explain their own judgments about the fairness of situations; understand that the probability of an impossible event is 0, and of a certain event is 1, and begin to use the 0-1 probability scale
order positive and negative integers, decimals and fractions	substitute positive integer values into formulae and expressions, including scientific formulae	express one quantity as a whole-number multiple of another, and by reversing the expression of the same relationship express one quantity as a unit fraction of another	derive and apply formulae to undertake calculations and solve problems involving perimeter and area of rectangles	enumerate sets systematically, devising their own diagrams
use the number line as a model for ordering integers, decimals and fractions	understand the correct and incorrect use of '='; understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors	understand that a multiplicative relationship between two quantities that can be expressed as a ratio of the form 1 : n where n is an integer can also be expressed as the unit fraction $^1/_n$	describe, sketch and draw: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric; use conventional terms and notations, such as using 'dashes' to indicate equal lengths and (multiple) arrows to indicate parallel lines	describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, including grouped, data; and appropriate measures of central tendency (mean, mode, median) and spread (range)
use the symbols =, ≠, <, >, ≤, ≥ to make order statements about positive and negative integers, decimals and fractions	simplify and manipulate algebraic expressions to maintain equivalence by: - collecting like terms - multiplying a single term over a bracket	use ratio notation, including reduction to simplest form	use the standard conventions for labelling the sides and angles of triangle ABC	construct and interpret frequency tables, bar charts, pie charts, and pictograms for simple categorical data,
define percentage as 'number of parts per hundred', and know their decimal and fraction equivalents	understand and use standard mathematical formulae	use scale factors of scale diagrams and maps in everyday contexts	derive and illustrate properties [for example, equal lengths and angles] of	
appreciate the infinite nature of the set of integers	use algebraic methods to solve linear equations in one variable	relate the language of ratios and the associated calculations to the arithmetic of fractions		
use standard units of mass, length, time, money and other measures, including with decimal quantities	work with coordinates in all			
round numbers and measures to different degrees of accuracy, for example to the nearest whole number or to one decimal place				
use the four operations, including formal written				

Y7 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
	four quadrants			and vertical line (or bar)

Y7 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability

Y7 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
methods, applied to integers and decimals; multiply proper and improper	fractions, and mixed numbers, all both positive and negative	use conventional notation for the priority of operations, including brackets	recognise and use relationships between the operations +, –, ×, ÷,	including inverse operations use the concepts and vocabulary of prime numbers, factors (or

Y7 Age-Related Expectations - Mathematics

Number

divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple

use square, cube, square root and cube root

work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $^{7}/_{2}$ or 0.375 and $^{3}/_{8}$)

round numbers and measures to an appropriate degree of accuracy, for example to the nearest

Algebra

model simple situations or procedures involving two variables by translating them into linear algebraic expressions or formulae and by using graphs

produce graphs of linear functions of one variable with appropriate scaling, using equations in *x* and *y* and the Cartesian plane

interpret simple linear mathematical relationships, such as *y equals 5 times x* or *p is 3 more than twice q*, both algebraically and graphically

use linear graphs to estimate values of *y* for given values of *x* and vice versa

from given linear graphs find approximate answers to simple contextual questions

generate terms of a sequence with a simple linear position-to-term rule (such as 'an expression for the value of the *n*th term is n + 2') from either the term- to-term or the position-to- term rule

Ratio & Proportion

relate dividing a given quantity into two parts in a given part:whole ratio to finding a fraction of a quantity; relate part:part ratios of quantities to the corresponding part:whole ratios

use the idea of compound units (A 'per' B), as in unit pricing, to solve problems

Geometry & Measures

triangles, quadrilaterals, and other plane figures using appropriate language and technologies

apply translations, rotations and reflections to given figures, and identify examples of translations, rotations and reflections (for example, be able to pick out from a group of shapes those that are translations, rotations or reflections of a given shape)

apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles

interpret mathematical relationships both algebraically and geometrically

Statistics & Probability

charts for small sets of ungrouped numerical data and numerical data grouped into a small number of groups

describe mathematical relationships between two variables that are easily visible in the data derived from experiments or observations

Y7 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
whole number or to one decimal place				
use approximation, through rounding to the nearest whole number or to one decimal place, to estimate answers				
use a calculator and other technologies to calculate results accurately and then interpret them appropriately				

Y8 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
state the multiplicative relationship between the numbers represented by any two digits in any number	use and interpret algebraic notation, including: ab in place of $a \times b$ $3y$ in place of $y+y+y$ and $3 \times y$ a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$; a^2b in place of $a \times a \times b$ a/b in place of $a \div b$ brackets	change freely between related standard units, for example speed (m per sec to km per hour and vice-versa)	draw and measure line segments and angles in geometric figures; calculate lengths represented by line segments in scale drawings given scale factors as ratios in any form, and understand implications of the accuracy of the measurements for the accuracy of the calculated lengths	record and describe the frequency of outcomes of simple probability experiments; in the light of experience begin to refine their own ideas about causal connections between aspects of experiments that involve randomness and equally and unequally likely outcomes and the properties of data distributions; make better informed judgments about the fairness of situations; begin to allocate probabilities to particular outcomes by considering all possible outcomes
order positive and negative integers, decimals, fractions and numbers given in the form $\sqrt{n}$	substitute integer values into formulae and expressions, including scientific formulae	express one quantity as a fraction of another, where the fraction is less than 1 and where it is greater than 1	derive and apply formulae to undertake calculations and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders)	understand why, when there are only two possible outcomes, the probabilities of the two possible outcomes sum to 1
use the number line as a model for ordering integers, decimals, fractions and numbers given in the form $\sqrt{n}$	understand and use the concepts and vocabulary of expressions, equations, inequalities, terms, factors and correlation / covariation	understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction	describe, sketch and draw: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric; use conventional terms and notations, such as *complementary* to describe angles with a sum of 90˚ and *supplementary* to describe angles with a sum of 180˚	enumerate sets systematically making use of tables and grids
use the symbols =, ≠, <, >, ≤, ≥ to make order statements about integers, decimals, fractions and numbers given in the form $\sqrt{n}$	simplify and manipulate algebraic expressions to maintain equivalence by: -taking out common factors -expanding products of two or more binomials	use ratio notation, including deriving the fraction A / (A + B) from the ratio A : B in appropriate contexts		record and describe the frequency of outcomes of simple probability experiments; in the light of experience begin to refine their own ideas about causal connections between
relate percentages to decimals and fractions by showing their relative positions on a number line	rearrange formulae to change the subject	use scale factors when constructing similar shapes by enlargement		
appreciate the infinite nature of the sets of integers and rational numbers	use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement)	relate the language of ratios and the associated calculations to gradients		
use standard units of mass, length, time, money and other measures, including with decimal and fractional quantities	understand how the position of a point changes	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		
round numbers and measures to different		solve problems involving percentage change, including: percentage		

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Y8 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
	if one or both of its		derive and use the standard	aspects of experiments that

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Y8 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
degrees of accuracy, for example, to the nearest whole number or to one or two decimal places	coordinates are multiplied by $^{-}1$	increase, decrease and original value problems	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	involve randomness and equally and unequally likely outcomes and the properties of data distributions; make better informed judgments about the fairness of situations; begin to allocate probabilities to particular outcomes by considering all possible outcomes
multiply and divide a whole number by a fraction, whether positive and negative	model situations or procedures by translating them into algebraic expressions or formulae and by using graphs		classify quadrilaterals by their geometric properties, and provide convincing arguments to support classification decisions	understand why, when there are only two possible outcomes, the probabilities of the two possible outcomes sum to 1
use conventional notation for the priority of operations, including brackets and powers,	recognise, sketch and produce graphs of linear functions of one variable with appropriate scaling, using equations in *x* and *y* and the Cartesian plane		know that translations, rotations and reflections map shapes onto congruent shapes; understand that the relation 'is congruent to' implies that there exists a translation, rotation or reflection that takes one shape to another	
recognise and use relationships between the operations +, –, ×, ÷, squaring and finding the square root, including inverse operations	interpret linear mathematical relationships, such as *A plus 7 is 6 less than half of B* or *three-quarters of x is 3 times one more than half y*, both algebraically and graphically			
interpret fractions and percentages as operators	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 prime factorisation				
use integer powers				
work interchangeably with terminating decimals their corresponding fractions and percentages (such as 3.5, $^{7}/_{2}$, and 350% or 0.375, $^{3}/_{8}$, and 37.5%)				

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Y8 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
use a calculator and other technologies to calculate results accurately and then interpret them appropriately	use linear and quadratic graphs to estimate values of *y* for given values of *x* and vice versa and to find approximate solutions of			

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
	simultaneous linear equations when at least one equation is of the form $y = k$ or $x = k$			
	from given linear graphs find approximate solutions to contextual problems			

Y9 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
state in the form $A \times 10^n$ (n any positive or negative integer) the multiplicative relationship between the numbers represented by any two digits in any number	use and interpret algebraic notation, including coefficients written as fractions rather than as decimals	change freely between related standard units, for example: time (4hours=4×360 secs), length (7mm = 7 × 0.1 cm), area ($9m^2$=9 × 10000 cm^2), volume/capacity ($3\ mm^3 = 3 \times 0.001\ cm^3$), mass (5 kg = 5 × 1000 g)	draw and measure line segments and angles in geometric figures, including interpreting scale drawings	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; begin to notice the same patterns in different situations
order positive and negative integers, decimals, fractions and numbers given in the standard form $A \times 10^n$ $1 \leq A < 10$, where n is a positive or negative integer or zero	substitute numerical values into formulae and expressions, including scientific formulae	express one quantity as a whole-number multiple of another, and by reversing the expression of the same relationship express one quantity as a unit fraction of another	undertake calculations and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes	understand that the probabilities of all possible outcomes sum to 1
use the number line as a model for ordering of the real numbers	understand and use the concepts and vocabulary of expressions, equations, inequalities, terms, factors, correlation / covariation and parameters	understand that a multiplicative relationship between two quantities that can be expressed as a ratio of the form 1 : n where n is an integer can also be expressed as the unit fraction $^1/_n$	use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles	enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams
use the symbols =, ≠, <, >, ≤, ≥ to make order statements about real numbers	think about relational meanings before acting on expressions, such as recognise situations in which different ways of seeing the situation lead to equivalent expressions, and use manipulation and simplification to show that the expressions are equivalent (e.g. sequences of "dot patterns")	use ratio notation, including reduction to simplest form	describe, sketch and draw: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric; use conventional terms and notations, such as *definition*, *derived property* and *convention*	generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.
relate percentages to decimals and fractions, moving efficiently between the different forms in any context	recognise situations in which it is helpful to rearrange formulae to change the subject, and explain why it is helpful	use scale factors of scale diagrams and maps in everyday contexts	use construction methods to: investigate what happens (for example to the angle bisectors, or perpendicular bisectors of sides, of triangles) in changing situations; explore derived shapes, such as circumcircles and inscribed circles of	record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language
appreciate the infinite nature of the sets of integers, real and rational numbers	use algebraic methods to solve linear equations in	relate the language of ratios and the associated calculations to the arithmetic of fractions		
use standard units of mass, length, time, money and other measures, including with decimal quantities and quantities given in the				

Y9 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
			triangles, and other polygons	

Y9 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability

n

standard form A x 10

Y9 Age-Related Expectations - Mathematics

Number

$1 \leq A < 10$, where n is a positive or negative integer or zero

round numbers and measures to different degrees of accuracy, for example, to a number of decimal places or significant figures

use the four operations applied to real numbers, whether positive or negative

use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals

recognise and use relationships between any operations including inverse operations

use $A = {}^{1}/_{n}$ of B implies $B = nA$, and $A = n\%$ of B implies $B = {}^{(100A)}/_{n}$

use prime factorisation, including using product notation and the unique factorisation property

use integer powers and associated real roots

Algebra

one variable (including all forms that require rearrangement) that express facts observed in situations, and interpret the solution

know the relationship between the coordinates of two points when each point is the reflection of the other in the *y*-axis, the *x*-axis, the line $y = x$ or the line $y = -x$ relate changes in situations or procedures to changes in algebraic expressions, formulae or graphs 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 linear and quadratic mathematical relationships, such as *(P subtract 1) halved is 6 times Q plus 10* or *A equals the positive-square-root of (B plus 1)*, both algebraically and graphically

reduce a linear equation that expresses a

Ratio & Proportion

relate dividing a given quantity into two parts in a given part: whole ratio to finding a fraction of a quantity; relate part: part ratios of quantities to the corresponding part: whole ratios

use the idea of compound units (A 'per' B), as in unit pricing, to solve problems

Geometry & Measures

(where possible)

know and use the criteria for congruence of triangles

derive and illustrate properties of circles

identify properties of, and describe the results of, translations, rotations and reflections applied to given figures; know that any reasoning using these transformations could be replaced by reasoning using congruence criteria, and be familiar with some examples

identify and construct congruent triangles, with and without coordinate grids use the sum of angles in a triangle 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

Statistics & Probability

and the 0-1 probability scale; begin to notice the same patterns in different situations

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

Y9 Age-Related Expectations - Mathematics

Number	Algebra	Ratio & Proportion	Geometry & Measures	Statistics & Probability
mathematical relationships between two variables (bivariate data) in observational and experimental contexts				
use a scatter graph to				

(square, cube and higher), recognise powers of 2, 3, 4, 5	relationship between two variables in a situation to the standard form $y = mx + c$; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically, algebraically and in the situation	use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D	illustrate simple mathematical relationships between two variables
distinguish between exact representations of roots and their decimal approximations	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	interpret mathematical relationships both algebraically and geometrically	
use a calculator and other technologies to calculate results accurately and then interpret them appropriately	find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs		