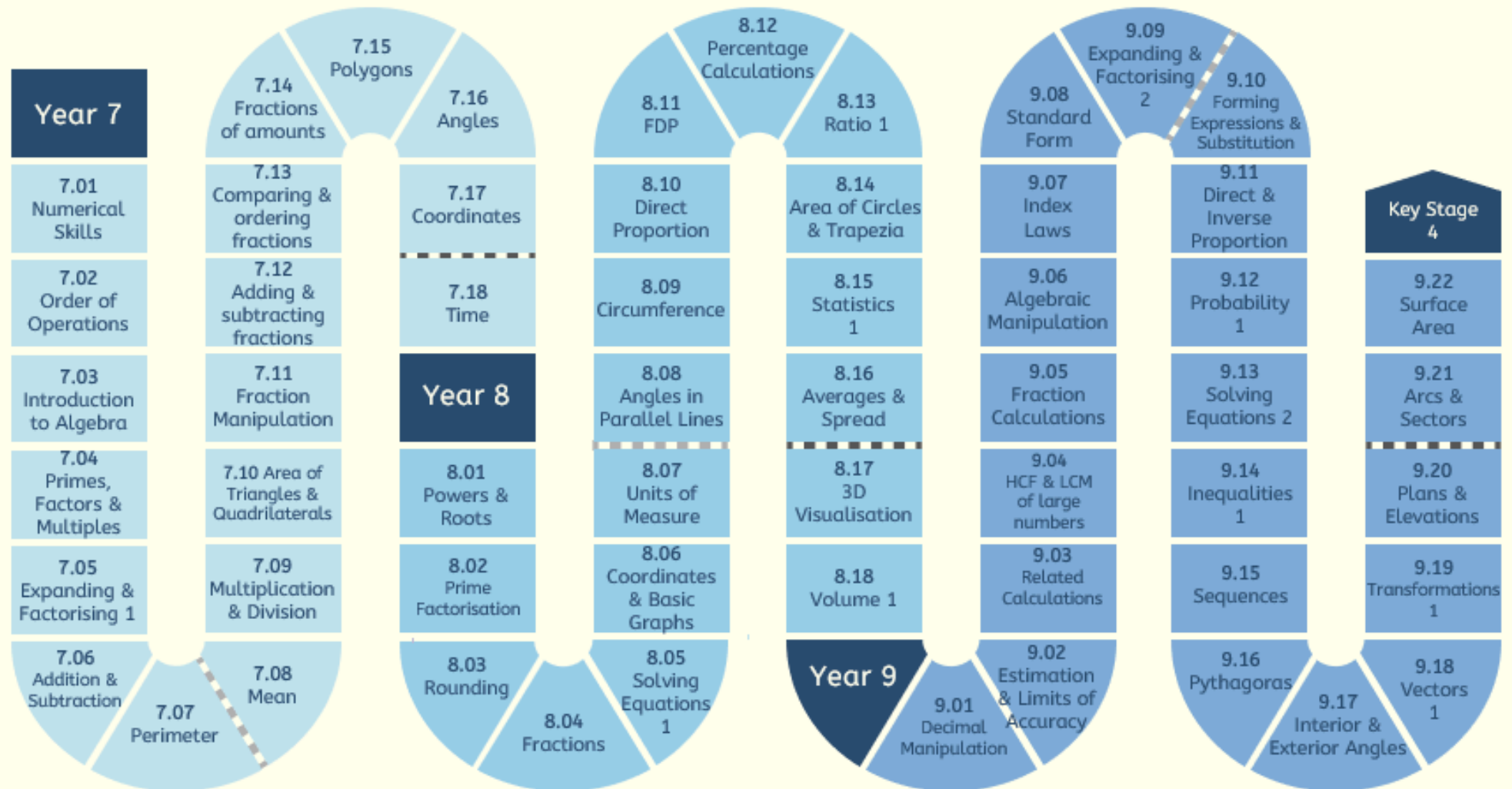


KS3 Maths Roadmap



9.01 Decimal Manipulation (3 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Addition & subtraction of decimals	U478	7.02, 7.06, 7.08 (four operations and order of operations)	Apply all four operations using non calculator methods when working with decimals, this includes both dividing a decimal by an integer and dividing a number by a decimal.	- Adding, subtracting, multiplying and dividing integers and decimals - Manipulation of Decimals e.g. $2.54 \div 4$, using one calculation to perform another, ordering decimals (including use of inequality symbols) - Calculations involving money and correct use of units - Order of operations (BIDMAS): use conventional notation for priority of	
Multiplying decimals	U293				
Dividing decimals by integers	U453				
Dividing by a decimal	U868				
9.02 Estimation and Limits of Accuracy (4 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Truncation	U108	8.03 (rounding)	Use rounding in order to complete estimations (rounding to both one significant figure and applying sensible rounding), using inequality notation to write error intervals from both rounding and truncation.	- Rounding number to the nearest 10, 100, 1000, and to a given number of decimal places - Rounding to significant figures - Estimate answers to one or two step calculations - Apply sensible rounding depending on the calculation - Error intervals using inequalities	- Apply and interpret limits of accuracy - Use inequality notation to specify an error interval due to truncation or rounding
Estimation	M878				
Estimating roots	U299				
Estimating sensibly	U225				
Error intervals	U657				
9.03 Related Calculations (3 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Related calculations 1	U735	7.02 (order of operations) 7.08 (multiplication and	Recognise and use relationships between operations in order to write down the answer to a related calculation from a given	- Recognise and use relationships between operations	
Related calculations 2	U735				
9.04 HCF and LCM of Large Numbers (3 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Prime factor decomposition	U236/ U739	7.04, 8.02 (factors and multiples, prime factorisation)	Use prime factor decomposition and Venn diagrams in order to find the HCF and LCM of large values.	- Prime numbers, prime factor decomposition, LCM, HCF (of large numbers)	
Using prime factor decomposition	U739				
Find HCF using PFD	U250				
Find LCM using PFD	U250				
9.05 Fraction Calculations (4 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Adding and subtracting mixed numbers	U793	7.11, 7.12, 7.13, 7.14 (fraction manipulation, adding and subtracting, comparing and ordering, fractions of amounts) 8.04 (operations with	Apply all four operations using non calculator methods when working with fractions and mixed numbers involving different denominators, finding the fraction of an amount, writing one number as a fraction of another and to find the reciprocal of an integer.	- Add and subtract fractions and mixed numbers with different denominators - Multiply and divide fractions and mixed numbers. Simplify calculations by cancelling first - Fraction of an amount - Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1	- Identify and work with fractions in ratio problems
Multiplying mixed numbers	U224				
Fractions of amounts	U881/ U916				
Dividing fractions and mixed numbers	U544/ U538				
Writing one number as a fraction of another	U163				
9.06 Algebraic Manipulation (3 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Identity symbol		7.03 (introduction to algebra)	Collecting like terms and simplifying expressions involving all four operations, the identity symbol, adding fractions with algebraic numerators, multiplying and dividing simple algebraic fractions.	- Collect like terms - Multiply together two simple algebraic expressions - Simplify expressions by cancelling	- Add and subtract fractions with an algebraic numerator including with powers - Multiply, divide and simplify algebraic fractions including with powers - Simplify and manipulate algebraic expressions (including those involving surds)
Algebraic terminology	M830/ U613				
Simplifying expressions	U105				
Simplifying involving algebraic (numerators) fractions	U103				
9.07 Index Laws (4 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Multiplication and division	U235/ U694	8.06, 9.04, 9.08 (linear equations, indices, powers, root and manipulating / calculating with fractions)	Working with the laws of indices, this includes negative and fractional indices, using index notation for integer powers of 10, including negative powers.	- Simple laws of indices - Use index notation when multiplying or dividing algebraic terms - Use index notation for integer powers of 10, including negative powers - Simplify and calculate the value of numerical expressions involving multiplication and division of integer powers, negative powers and powers of a power - Understand the term reciprocal	- Fractional indices - Estimate powers and roots of any given positive number by considering the values it must lie between, e.g. the square root of 42 must be between 6 and 7
Indices to a power and power of zero	U235/ U694				
Negative powers	U235/ U694				
Unit fractional powers	U985				
Non-unit fractional powers	U772				
Converting powers to a different base					

9.08 Standard form (5 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Writing numbers in standard form	U330/ U534	7.06, 7.08, 9.01, 9.07	Converting between ordinary numbers and standard form. Calculating with standard form including multiplication, division, addition and subtraction.	Calculate with and interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer	
Multiplying in standard form	U264				
Dividing with standard form	U264				
Adding and subtracting with standard form	U290				
Using a calculator with standard form	U161				
9.09 Expanding and factorising 2 (6 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Expanding and simplifying	U179	(8.06 Solving equations 1)	Expanding double brackets, factorising quadratics (where the coefficient of x^2 is 1), difference of two squares.	- Expand single brackets - Factorise single brackets - Expanding double brackets - Factorising quadratics of the form $x^2 + bx + c$ - Difference of two squares eg, $x^2 - 4$	- Expanding double brackets (area) - Difference of two squares eg, $25x^2 - 81$
Factorising an expression	U365				
Expanding double brackets	U768				
Expanding double brackets - area	U768				
Factorising quadratics	U178/U858				
Difference of two squares	U963				
9.10 Forming expressions and substitution (4 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Forming expressions - function machines		7.03, 8.01 (substitution & indices)	Substitution into algebraic formulae, basic functions - inputs and outputs, use algebra to show expressions are equivalence, know the difference between an equation and an identity.	- Functions - inputs and outputs - Substitute numerical values into formulae and expressions, including scientific formulae - Derive a simple formula, including those with squares, cubes and roots	- Use algebra to show expressions are equivalent - 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
Forming expressions - statements					
Forming expressions - area and perimeter					
Substitution - function machines	M175/ M428				
Substitution - integers, decimals and algebra	U201				
Substitution - fractions	U201				
Substitution - BIDMAS					
Substitution into formulae	U585/U144				
9.11 Direct and inverse proportion (6 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Direct proportion, unitary method (use your preferred method)	U721	7.03, 8.05, 8.11 (substitution, linear equations, units of measure and proportional reasoning)	Use proportion to answer problems involving exchange rates and best buys. Introduction to inverse proportion, interpret conversion graphs.	- Best buy - Unitary method - Exchange rates - Use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate - Solve problems involving direct and inverse proportion	- Solve problems involving direct and inverse proportion, including graphical and algebraic representations - Interpret equations and graphs that describe direct and inverse proportion
Best buys	M681				
Recipes	M478				
Exchange rates	U610				
Inverse proportion	U357				
Conversion graphs	U638				
9.12 Probability 1 (8 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Probability scale	U803	9.01, 9.05 (calculations with decimals and fractions)	Describe probability using the probability scale, calculate expected outcomes, mutually exclusive outcomes, experimental probabilities, probability from two way tables, sample spaces, samples, set notation and Venn diagrams. Product rule for counting.	- Apply systematic listing strategies - Describe probability using the probability scale, tables and frequency trees - Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments - Calculate expected outcomes - Mutually exclusive events sum to 1 - Experimental and theoretical probability - Venn diagrams and appropriate notation - Possibility spaces/sample spaces - Find a missing probability from a list or table including algebraic terms	- Unbiased samples and effects of increasing sample size - Sets and combinations of sets using Venn diagrams - Product rule for counting
Systematic listing					
Product rule for counting (higher only)	U369				
Single event probability	U403				
Relative frequency	U580				
Expected outcomes	U166				
Frequency trees	U280				
Sample space	U104				
Venn diagrams (1)	U476				
Venn Diagrams (2) (VD in context)	U748				

9.13 Solving equations 2 (6 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
One-step equations	U755	7.03, 8.05, 8.08, 9.05 (substitution, solving equations 1, operations with fractions)	Solve linear equations which contain brackets, fractional coefficients, negative signs, negative solutions. Solving linear equations in one unknown with unknowns on both sides, solving equations that require fraction manipulation.	- Solve linear equations in one unknown algebraically, with unknowns on one side e.g. $5x - 7 = 18$ - Solve linear equations which contain brackets, fractional coefficients, negative signs, negative solutions - Substitute into a formula, and solve the resulting equation - Solve linear equations in one unknown algebraically, with unknowns on both sides	- Form and solve algebraic equations and interpret the solution - Solving linear equations that require algebraic fraction manipulation
Two-step equations	U325				
Subject in the denominator	U505				
Negative unknown	U325				
Multistep	U325				
Brackets and fractions	M902/ M647/ M401				
Unknowns on both sides	U870	7.01, 9.01, 9.13 (use of inequality signs and solving equations 2)	Solve linear inequalities in one variable, represent and interpret solution sets on a number line, solve two inequalities in one variable and compare to see which value(s) satisfy both.	- Solve linear inequalities in one variable e.g. $5x - 7 > 18$ - Represent and interpret solution sets to inequalities on a number line - Solve two inequalities in x, find the solution sets and compare them to see which value of x satisfies both	
Substituting and solving	U585/ U144				
9.14 Inequalities 1 (5 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Drawing an inequality on a number line	U509	7.01, 9.01, 9.13 (use of inequality signs and solving equations 2)	Solve linear inequalities in one variable, represent and interpret solution sets on a number line, solve two inequalities in one variable and compare to see which value(s) satisfy both.	- Solve linear inequalities in one variable e.g. $5x - 7 > 18$ - Represent and interpret solution sets to inequalities on a number line - Solve two inequalities in x, find the solution sets and compare them to see which value of x satisfies both	
Writing an inequality from a number line	U509				
Integer solutions to an inequality	U509				
Solving inequalities	U759				
Solving inequalities (negative)	U759				
Solving inequalities with multiple unknowns	U738				
Solving compound inequalities	U145	9.13 (solving equations 2)	Recognise and use the sequence of triangular, square and cube numbers. Generate terms of a term-to-term sequence. Find the nth term of a linear sequence, use the nth term of a linear sequence to determine whether a given number is in that sequence.	- Generate terms of a sequence from either a term-to-term or a position-to-term rule - Write the term-to-term definition of a sequence in words - Find the nth term of a linear sequence e.g. 3, 5, 7, 9... - Recognise and use sequences of triangular, square and cube numbers - Use the nth term of an arithmetic sequence to decide if a given number is a	- Fibonacci sequences and simple geometric progressions (r^n where n is an integer, and r is a rational number > 0) - Continue a geometric progression and find the term-to-term rule, including negatives, fraction and decimal terms - Use finite/infinite and ascending/descending to describe sequences - Recognise and use simple geometric progressions
9.15 Sequences (3 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Unique sequences	U680	9.13 (solving equations 2)	Recognise and use the sequence of triangular, square and cube numbers. Generate terms of a term-to-term sequence. Find the nth term of a linear sequence, use the nth term of a linear sequence to determine whether a given number is in that sequence.	- Generate terms of a sequence from either a term-to-term or a position-to-term rule - Write the term-to-term definition of a sequence in words - Find the nth term of a linear sequence e.g. 3, 5, 7, 9... - Recognise and use sequences of triangular, square and cube numbers - Use the nth term of an arithmetic sequence to decide if a given number is a	- Fibonacci sequences and simple geometric progressions (r^n where n is an integer, and r is a rational number > 0) - Continue a geometric progression and find the term-to-term rule, including negatives, fraction and decimal terms - Use finite/infinite and ascending/descending to describe sequences - Recognise and use simple geometric progressions
Term to term rule	U213/ M241				
Term to term rule - geometric	U958				
Finding terms in a linear sequence	U530/ U498				
Finding the Nth terms of a linear sequence	U498				
9.16 Pythagoras (4 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Finding the hypotenuse	U385	7.03, 7.17, 8.01, 8.03, 9.13 (substitution, coordinates, squares, square roots and rounding)	Use Pythagoras' Theorem to find missing sides in a right-angled triangle and to find the distance between two points. Justify whether a triangle with three given sides in right-angled or not.	- Calculate with roots, and with integer indices - Pythagoras' theorem - Leave answers in surd form - Given 3 sides of a triangle, justify if it is right-angled or not	- Apply Pythagoras' Theorem with a triangle drawn on a coordinate grid - Calculate the length of a line segment AB given pairs of points
Finding the shorter side	U385				
Is this triangle right-angled	U385				
Isosceles triangles	U385				
Pythagoras in context	U828				
Multistep Pythagoras	U828				
		7.16, 8.08 (angles, angles in parallel lines)	To calculate interior and exterior angles of (regular) polygons, find the total angle sum of a given polygon.	- Interior and exterior angles, angle sums - Understand a proof that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices	- Explain why some polygons fit together and others do not
9.17 Interior and exterior angles (4 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Angles in triangles	U628	7.16, 8.08 (angles, angles in parallel lines)	To calculate interior and exterior angles of (regular) polygons, find the total angle sum of a given polygon.	- Interior and exterior angles, angle sums - Understand a proof that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices	- Explain why some polygons fit together and others do not
Angles in quadrilaterals	U732				
Interior and exterior angles - regular polygons	U427				
Interior angles - formula	U427				
Interior and exterior angles - algebraic	U427				
Tessellation					

9.18 Vectors 1 (3 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Writing a vector from a line segment	U632	7.06 (addition and subtraction), 7.01 (negative number manipulation)	To use column vectors, addition and subtraction of column vectors and interpretation of diagrammatic vectors. To identify whether a pair of column vectors are equal or not.	- Describe translations as 2D vectors - Translate a given shape by a vector - Addition and subtraction of vectors	- Addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors - Be able to represent information graphically given column vectors - Identify two column vectors which are parallel
Adding and subtracting vectors	U903				
Multiplying vectors	U564				
Drawing resultant vectors					
Parallel vectors	U660				
9.19 Transformations 1 (6 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Reflection	U799	8.06 (coordinates and basic graphs)	Reflection and rotational symmetry, understand all 4 Transformations - rotation, reflection, translation, enlargement (with a positive scale factor), identify the equation of a line of symmetry.	- Reflection and rotation symmetry - Transformations - rotation, reflection, translation, enlargement (with a positive integer scale factor) - Identify the equation of a line of symmetry - Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides, simple integer scale factors	- Fractional enlargements - Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides, simple fractional scale factors - Combined transformations
Rotation	U696				
Finding the centre of rotation	U696				
Translation	U196				
Enlargement (positive SF with and without centre)	U519				
Enlargement (fractional)	U134				
Combined transformations	U766				
9.20 Plans and elevations (2 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Plans and elevations of typical 3D shapes	U743	8.17 (3D visualisation)	Construct plans and elevations of 3D shapes, draw sketches of 3D solids from plans and elevations.	- Identify properties of the faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres - Draw sketches of 3D solids - Interpret plans and elevations of 3D shapes	- Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid
Plans and elevations of irregular 3D shapes	U743				
Sketching 3D shapes from plans and elevations	U743				
9.21 Arcs and sectors (4 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Circumference and arc length	U604/ U221	8.10, 8.14 (circumference and area of circles)	Define all parts of a circle and know key definitions including, tangent, arc, sector and segment. Use the formula for area and circumference of a circle to find the area of circle and sectors and calculate the circumference and arc lengths of circles.	- Circle definitions - centre, radius, chord, diameter, circumference, tangent, arc, sector and segment - Use Circumference of a circle = $2\pi r = \pi d$ and area of a circle = πr^2 - Arc lengths, angles and areas of sectors of circles - Calculate exactly with multiples of π	- Compound perimeter - Compound area - Use rearranging to calculate missing lengths given the area or circumference
Compound perimeter	U351				
Area of circles and sectors	U950/ U373				
Compound area	U970				
Problem solving sectors	U373				
9.22 Surface area (5 hours)	Sparx	Prior Knowledge	Content Overview	Core	Extension
Cubes and cuboids	U929	8.17 (3D visualisation)	Sketch the nets of cuboids and prisms. Find the surface areas of cuboids, pyramids, spheres, cones and composite solids.	- Estimate surface areas by rounding measurements to 1 significant figure - Sketch nets of cuboids and prisms - Surface area of cubes, cuboids, prism and cylinders	- Surface area of spheres, pyramids, cones and composite solids (hemispheres, frustums)
Prism	U259				
Cylinders	U464				
Cones	U523				
Spheres	U893				

