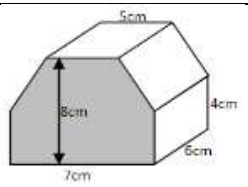
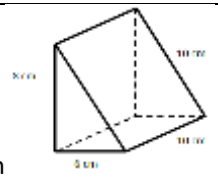
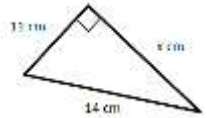
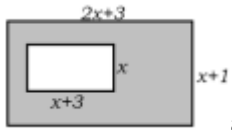
Year 9 – NUMBER - Sig. figs; Indices & Standard Form – Chapter 1

Level	I can... / I know…	Examples	MW clips	Start	End
6	Express one number as a power of another number	a) Write $\frac{36}{49}$ as a fraction raised to a power b) Write $\frac{8}{125}$ as a fraction raised to a power	*131; 154*		
	Calculate in standard form using written methods	Work out $(6 \times 10^5) \times (4 \times 10^7)$ without a calculator. Write your final answer in standard form.	*83*		
	Order numbers given in standard form	Put in ascending order $4.8\text{x}10^4$ $6.7\text{x}10^1$ $3.82\text{x}10^5$ $2.7\text{x}10^3$	*2; 83*		
5	Calculate with numbers written in standard form on a calculator	Work out $(6.3 \times 10^4) \times (2.04 \times 10^5)$ with a calculator. Write your final answer in standard form.	*83*		
	Estimate answers to calculations by rounding to 1sig. fig.	Estimate the answer to $\sqrt{\frac{207.3 \times 1.97}{0.987}}$. Show the values you used.	*91*		
4	Write numbers in standard form	Write 0.000045 in standard form Write 76201 in standard form	*83*		
	Use the simple laws of indices to include negative powers	a)Write 2^{-3} as a fraction b)Write $5^3 \times 5^{-2} \div 5^{-3}$ a) as a single powers b) as an integer/fraction	*131; 154*		
	Estimate answers to simple calculations by rounding to 1sig. fig.	Estimate the answer to $\frac{412 \times 5.904}{0.195}$. Show the values you used.	*91*		
3	Simplify powers	a) Simplify as a single power $5^4 \times 5^3$ b)Simplify and work out $\frac{3^2 \times 2^{11}}{2^9}$	*82; 131*		
	Multiply and divide numbers by powers of 10	a)5.6×10^3 b) $67.9 \div 10^2$	*30*		
	Round numbers to significant figure	Round 0.2067 to 2sig. figs. Round 2967.5 to 3sig.figs.	*90*		
2	Multiply and divide numbers by 10, 100, 1000	a) 3.567×100 b) $5.98 \div 10$	*30*		
	Round numbers to decimal places	Round 0.2067 to 2d.p. Round 23.9999 to 3d.p.	*32*		

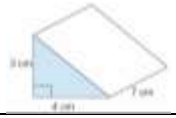
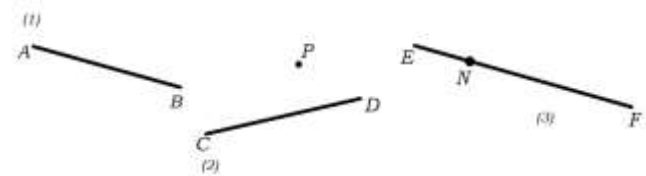
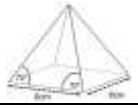
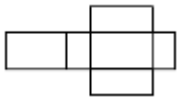
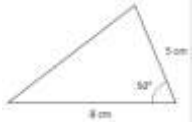
Year 9 – GEOMETRY - Area and volume – Chapter 2

Level	I can... / I know…	Example	MW clips	Start	End
6	Solve volume problems involving composite shapes	Find the volume of this solid 			
	Calculate the curved surface area and total surface area of a cylinder	Find the total surface area of a cylinder with radius of 5cm and a height of 10cm			
5	Calculate the volume of a cylinder	Find the volume of a cylinder with radius of 5cm and a height of 10cm			
	Calculate the surface area of cuboids, triangular prisms and trapezium based prisms	Find the surface area of the prism in the Grade 4 row	*114*		
	Solve simple problems using Pythagoras' theorem incl. co-ordinates)	If A(-3,-2) and B(5,4), find the length of line AB	*140*		
4	Calculate the volume of prisms (cuboids, triangular prisms, trapezium based prism)	Find the volume of this prism 	*115; 119*		
	Find the perimeter/area of shapes made from circles	Find the perimeter & area of this shape (2d.p) 	*117; 118*		
	Use Pythagoras' theorem to find a missing side	 Find the length of x	*140*		
3	Calculate the area and circumference of a circle including leaving answers in terms of π	Find the circumference and area of a circle with radius of 6cm	*117; 118*		
	Know the parts of a circle	Draw a circle and label a radius, an arc, the circumference & a diameter	*116*		

Year 9 – ALGEBRA – Quadratics & sequences - Chapter 3

Level	I can... / I know…	Examples	MW clips	Start	End
6	Construct and solve simple quadratic equations algebraically by factorising	The shaded region has an area of 18cm^2.  a) Show that $x^2 + 2x - 15 = 0$ b) Solve for x	*157*		
	Continue a geometric progression & find its term-to-term rule including negative, fraction & decimal terms	a) Find the next 2 terms of this geometric sequence: 2, 10, 50 …., … b) Write the term-to-term rule for the sequence in (a)	*163*		
	Recognise & use simple geometric progressions (r^n where n is an integer and r is a rational number > 0 or a surd)	Write the first five terms of these sequences a) first term= 3 common ratio= -2 b) first term= 2000 common ratio=$\frac{1}{10}$	*163*		
	Generate terms using the position-to-term (nth term) rule of a quadratic sequence	nth term of a sequence is $n^2 + 3$ write down the first five terms			
	Distinguish between linear, quadratic & geometric sequences	What type of sequences are the following: a) 3, 6, 12, 24, … b) 2, 5, 10, 17, … c) 10, 5, 0, -5, ...	*104; 163*		
5	Solve simple quadratic equations by factorising	1a) Factorise $x^2 + 6x + 8$ b) Hence solve $x^2 + 6x + 8$=0 2) Solve $x^2 + 3 = 52$ 3) Solve $x^2 + 5x = 14$	*157*		
	Factorise quadratics of the form $ax^2 \pm bx \pm c$ where $a = 1$, including quadratic identities	Factorise a) $x^2 + 2x + 1$ b) $x^2 - 9$ c) $x^2 - 5x + 6$	*157; 158*		
	Recognise the quadratic identities, perfect squares and difference of two squares	Which expressions are perfect squares a) $x^2 + 6x + 9$ b) $x^2 - 20$ c)$x^2 - 6x + 9$ d) $x^2 - 16$ e) $(x + 2)^2$	*158*		
	Expand and simplify the product of a pair of brackets	Expand and simplify a) (x + 3)(x - 2) b) (3a-2)(2a+5) c) $(y + 4)^2$	*134*		
	Find formula for the nth term of simple arithmetic sequences	Find the nth term for the sequence 1,3,5,7,9…	*103*		
4	Multiply an algebraic term over a bracket	Expand 4y(2y+3)	*93*		
3	Factorise linear expressions	Factorise 6p+10	*94*		
	Generate terms using the position-to-term (nth term) rule of an arithmetic (linear) sequence	nth term of a sequence is $4n + 3$ write down the first five terms	*102*		
	Generate terms of a sequence using a term-to-term rule	First term is 3. Rule is 'add 4'. Find the first 5 terms	*37*		
2	Continue an integer sequence	Add two more terms to the following sequences: a) 5, 9, 13, 17, … (add 4) b) 1,2,4,8,…(multiply by 2)			
	Recognise common sequences	odd, even, squares, multiples, powers, Fibonacci, ...	*104; 141*		

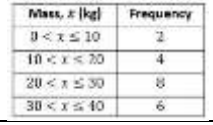
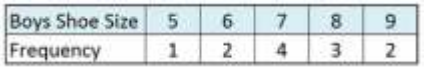
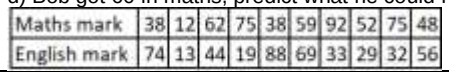
Year 9 – GEOMETRY - Constructions – Chapter 4

Level	I can... / I know…	Examples	MW clips	Start	End
5	Construct triangles and simple geometric figures to solve problems	...			
	Construct the net of a 3D shape using a compass and a ruler	Construct using a compass & ruler, the net of this prism 			
	Construct angles of $60^o, 90^o, 30^o$ and 45^o using a compass & straight edge	Construct a 45° angle using a compass and straight edge.	*145*		
4	Construct a perpendicular from a point **on a line** using a compass & a straight edge *(e.g. 3)*		*146*		
	Construct a perpendicular from a point **to a line** using a compass & a straight edge *(e.g. 2)*		*146*		
	Construct a perpendicular line bisector using a compass & a straight edge *(e.g.1)*		*146*		
	Construct an equilateral triangle using a compass & ruler	Construct an equilateral triangles with sides of 4cm	*147*		
3	Construct an angle bisector using a compass & straight edge	Draw an angle of 40° and bisect it using a compass and a straight edge	*145*		
	Construct a triangle accurately using a compass & ruler given all three sides (SSS)	Construct triangle CDE where CD = 7cm, DE = 4cm and EC = 10cm using a compass and rule	*147*		
	Construct the net of a 3D shape using a ruler and a protractor	Construct using a protractor & ruler, the net of this prism 			
2	Sketch 3D shapes from their nets & identify the nets of common 3D solids	Sketch the 3D solid of this net 	*43; 44;*		
	Construct a triangle accurately given two sides & included angle (SAS) or two angles & included side (ASA)	Construct this triangle accurately 	*46; 47;*		

Year 9 – ALGEBRA - Inequalities, equations & formulae – Chapter 5

Level	I can... / I know…	Examples	MW clips	Start	End
7	Rearrange simple formula where subject appears twice	Make *x* the subject of $ax + 5 = y - x$	*190*		
6	Rearrange more complex formulae including those involving roots	Make r the subject of $T = \sqrt{\frac{2\pi r}{L}}$			
		Make t the subject of $s = \frac{1}{2}(u + v)t$			
	Solve fractional equations of the form $\frac{ax \pm b}{c} = \frac{dx \pm e}{f}$ where $c$or $f \neq 1$	Solve $\frac{3x+2}{7} = \frac{x+2}{3}$			
	Use index laws with zero & negative powers	Simplify a) 5^0 b) $\frac{x^2}{x^6}$ c)$\frac{8n}{2x^4}$	*154*		
5	Solve linear inequalities	Solve $-21 < 2x + 3 < 12$	*139*		
	Rearrange simple formulae	Make a the subject of $v = u + at$	*136*		
4	Solve fractional equations of the form $\frac{ax \pm b}{c} = \frac{dx \pm e}{f}$ where $c$or $f$should be 1	Solve $\frac{4x-2}{3} = 3x - 11$	*135*		
	Solve equations with brackets	Solve a) 2(t+6)=8 b) $x + 20 = 2(x + 6)$	*135*		
	Multiply an algebraic term over a bracket	Expand 4y(2y+3)	*93*		
	Solve equations with unknowns on both sides	Solve 3x+5 = 6x+12	*135*		
	Factorise more complex expressions	Factorise i) $7y^2 - 21$ ii) $2pq+pq^2$	*94*		
	Substitute values into expressions & formulae involving powers, roots & brackets.	Given $s = ut + \frac{1}{2}at^2$ find *s* when $u = -5$ $a = 10$ $t = \frac{1}{2}$	*95*		
	Form and use more complex formulae from written information				
	Know that when inequalities are multiplied/divided by negative number, the inequality sign changes	Solve a) $-y \geq 4$ b) $-4n < 20$			
	Solve linear inequalities with one operation	Solve $x + 5 > 13$	*139*		
3	Represent solutions sets on a number line	Draw a suitable number line diagram to illustrate $-2 < x < 2$	*138*		
	Understand and use the symbols =, >, ≥, <, ≤ including double-ended inequalities	Write down the integers that satisfy this inequality $-2 < x \leq 3$			
	Solve equations with divisor lines	Solve a) $\frac{2x}{3} = 4$ b) $\frac{x-2}{3} = 4$	*135*		
	Solve linear multi step equations	Solve 3m + 15 = 9	*135*		

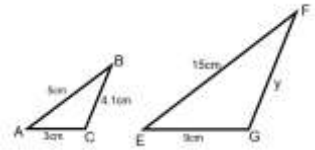
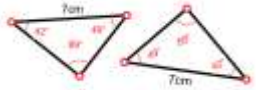
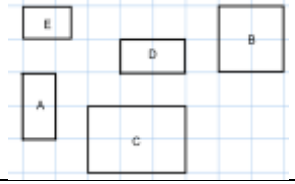
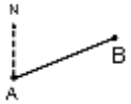
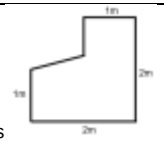
Year 9 – STATISTICS - Collecting and analysing data – Chapter 6

Level	I can... / I know…	Examples	MW clips	Start	End
4	Estimate the mean and range from a grouped frequency table	a) Find the estimated mean b) What is the modal interval? c) Which interval holds the median value? d) What is the estimated range? e) Draw a frequency polygon for this data  Mass, x (kg) / Frequency $0 < x \leq 10$ / 2 $10 < x < 20$ / 4 $20 < x \leq 30$ / 8 $30 < x \leq 40$ / 6	*130*		
	Find the class interval that holds the median from a grouped frequency table				
	Know the definition of random sampling.	Explain how to use random sampling to choose 10 students out of a class of 40	*152*		
	Understand how to reduce bias in sampling and questionnaires	-			
	Draw a line of best fit by eye, understand what they represent and use it to predict values.	*See Level 3 Qc & d*	*129*		
3	Find the mean from a frequency table	 Boys Shoe Size: 5 6 7 8 9 Frequency: 1 2 4 3 2 Find the mean size	*130*		
	Identify and explain anomalies (outliers) on a scatter graph.	a) Plot a scatter diagram and describe the correlation b) Are there any outliers? c) Draw a line of best fit. d) Bob got 60 in maths, predict what he could have gotten in English  Maths mark: 38 12 62 75 38 59 92 52 75 48 English mark: 74 13 44 19 88 69 33 29 32 56	*129*		
	Plot and use a scatter graph; Describe correlation				
	Understand how different sample sizes may not be representative of a whole population.	-			
	Construct and use frequency polygons to compare sets of data.	*See Level 4 Qe above*	*128*		
	Know the difference between primary and secondary data sources	When you get data from a questionnaire? Is that primary or secondary data?			
2	Find the modal class from a grouped frequency table	*See Level 4 Qb above*	*130*		
	Understand the difference between discrete and continuous data	Give an example of discrete data?	*63*		
	Design and use data collection sheet & tables	-			
	Design a simple questionnaire	Explain what is wrong with this question: *How old are you?* *☐0 -10 ☐10 - 20 ☐20 - 30 ☐30+*			

Year 9 – ALGEBRA & SSM - Multiplicative reasoning – Chapter 7

Level	I can... / I know…	Examples	MW clips	Start	End
6	Use percentages in real-life situations involving sharing into ratio, repeated percentage change, percentage profit and loss.	Q13 Pearson y9 textbook pg 158			
	Enlarge a 2D shape given a negative integer scale factor about any centre on a coordinate grid.	Q2 Pearson y9 textbook pg154	*181*		
5	Solve reverse percentage problems	A computer cost $420 after a 25% discount. How much was it originally?	*199*		
	Set up and use equations that show direct proportion ($y \propto x \Rightarrow y = kx$)	***t*** is directly proportional to ***m***. When ***t*** =19.2, ***m*** =3.2. Write the equation connecting ***t*** and ***m***	*110*		
4	Use algebraic methods to solve problems involving variables in direct proportion.	Use your equation in level 5 to find ***t*** when ***m*** = 4.5.	*199*		
	Describe an enlargement on a coordinate grid.	Q8c Pearson y9 textbook pg155	*148*		
	Find the scale factor for a given enlargement (fractional and/or positive integer)	Q5a,b Pearson y9 textbook pg154	*148*		
	Enlarge shapes with a fractional scale factor and a given any centre of enlargement on a coordinate grid	Q4 Pearson y9 textbook pg154	*148*		
	Enlarge a shape with positive integer scale factor about the origin on a coordinate grid	--	*148*		
	Understand that similar figures have corresponding lengths in the same ratio, but equal angles	Q6b Pearson y9 textbook pg155	*144*		
	Translate shapes with a translation vector	a) Point A is at (1,2) and B is at (-2,5). Give the vector to translate A to B b) Point B is translated by $\begin{pmatrix}3\\-2\end{pmatrix}$. What is the new coordinate?	*50*		
	Describe a translation using vectors		*50*		
3	Find the centre of enlargement on a square grid	--	*148*		
	Enlarge a shape by a positive integer on a square grid	Q2 Pearson y9 textbook pg149	*148*		
	Recognise data/graph that is in direct proportion	***g*** 2 4 5 ***d*** 9 18 22.5 a) Draw the graph of this data b) Are g and d directly proportional?	*42*		
	Use multiplier method to increase/decrease by %	a) Increase $34 by 12% using multipliers b) Decrease $500 by 23% using multiplier	*108*		
	Calculate percentage change (profit/ loss/ interest)	Bob bought a hat for $40 and sold it for $50. What is the percentage profit?	*108*		
2	Find the scale factor for a given enlargement (positive integer)	Q3 Pearson y9 textbook pg149	*148*		
	Translate a shape given word instructions	--	*50*		
	Understand the concept of ratio	--	*38*		

Year 9 – SSM - Scale drawings & measures – Chapter 8

Level	I can... / I know…	Examples	MW clips	Start	End
5	Use similarity to solve problems in 2D shapes (missing lengths)	These triangles are similar. Find the length of y. 	*144*		
4	Given the bearing of point A from point B, work out reverse the bearing of B from A (no drawing)	The bearing of C from D is 040º. What is the reverse bearing of D from C	*124*		
	Draw an accurate diagram given bearings and scale	A ship sails 10km from a port on a bearing 050º. It then turns and sails on a bearing of 210º for 16km. a) Use a scale of 1cm to 2km to make an accurate scale drawing of the journey. b) How far is the ship from the starting port? c) What bearing should the ship sail to return directly to the starting port?	*124*		
	Use the information given about the length of sides and sizes of angles to determine whether triangles are congruent or similar (SSS, SAS, ASA, AAA)	 Explain why these two triangles are congruent	*144; 166*		
	Understand that similar figures have corresponding lengths in the same ratio, but equal angles	a) Which two shapes are congruent? b) Which two shapes are similar 	*124*		
3	Understand concept of congruent shapes		*166*		
	Use and interpret maps, using proper map scales	A map has a scale of 1:25 000. What distance in metres does 6cm on the map represent?			
2	Measure the bearing between the points on a map or scale plan.	Measure the bearing of B from A	*46*		
	Understand and use the language associated with bearings.		*124*		
	Make accurate scale drawings	 Use a scale 1cm : 50cm to make an accurate drawing of this diagram			
	Use and interpret maps and scale drawings, using a variety of scales and units.	A line on a diagram is 4cm long. The scale of the diagram is 1 cm to 12cm. What is the real-life length of the line?			
	Convert metric linear units	Complete the following: a) 30 000 cm = ……m b) 200 000cm = ……km	*112*		

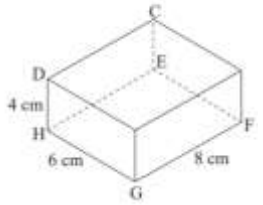
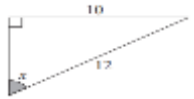
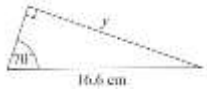
Year 9 – SSM & NUMBER - Accuracy & rates of change – Chapter 9

Level	I can... / I know…	Examples	MW clips	Start	End
6	Calculate the upper and lower bounds of 2D measurements involving addition and multiplication e.g. perimeter and area	A rectangle has length of 2.3m and width 1.5m both to 1dp. a) Find the upper bound of its perimeter b) Find the lower bound of its area	*132; 206*		
5	Identify the upper and lower bounds of a measurement to nearest 1 & decimal places	a) Find the lower & upper bound of 6kg if it has been rounded to the nearest 1 b) 3.56m has been rounded to 2dp. Find its lower & upper bounds	*132; 206*		
	Solve problems involving compound measures.	*page 199*			
4	Identify the upper and lower bounds of a measurement to the nearest 100 & 10	a) Find the lower & upper bound of 400ml if it has been rounded to the nearest 100 b) 210cm has been rounded to the nearest 10. Find its lower & upper bounds	*132*		
	Understand and use compound measures (density, speed, pressure)	A block has a mass of 72g and volume of $16cm^3$. Find its density.	*142*		
	Convert units with compound measures	Convert 20 km/h to m/s	*142*		
3	Understand the effect of rounding	---			
	Solve problems involving rates of change (e.g. average speed, distance-time graphs, conversions)	*pages 196 - 197*	*142; 143*		

Year 9 – ALGEBRA - Graphical solutions – Chapter 10

Level	I can... / I know…	Examples	MW clips	Start	End
7	Solve simultaneous equations graphically & algebraically (1 linear & 1 non-linear(simple quadratic or circle))	Solve $y = 11x - 2$ $y = 5x^2$			
	Find the equation of the line through two given points (via simultaneous equations)	Find the equation of the line through A(3,8) and B(5,2)			
	Set up and solve a pair of simultaneous equations in two variables.	3 cans of melonade and 2 cans of vanta cost $3.00 4 cans of melonade and 5 cans of vanta cost $5.75 What is the price of one can of melonade?			
6	Identify and interpret gradient from an equation in the form ax + by = c	Find the gradient and y intercept of a) 2x - y = 5 b) 6x + 5y = 10			
	Solve simple simultaneous equations algebraically (substitution)	Solve 5x + y = 46 y = 3x			
	Solve simple quadratic equations from their graphs (eg $x^2 - 2 = 3$)	Draw the graph of $x^2 - 2$ then using an appropriate line, find the approximate solutions to $x^2 - 2 = 3$			
	Solve more complex simultaneous equations algebraically (elimination)	Solve $2x + 3y = 17$ $3x - 5y = 35$			
5	Solve simple quadratic equations from their graphs (eg $x^2 - 2 = 0$)	Draw the graph of $x^2 - 2$ then find the approximate solutions to $x^2 - 2 = 0$			
	Identify quadratic graphs and know some of their features	Which of these functions are quadratic? a) y = 2x b) $y = 2x^2$ c) $y = 1 - x^2$ d) $y = 2x^3$			
	Solve simultaneous equations graphically (2 linear)	*Solve graphically* $2x + 3y = 6$ $x - y = 8$			
	Solve simple simultaneous equations algebraically (elimination)	Solve $4x + 2y = 24$ $2x + 2y = 14$ Solve $2a + 5b = 12$ $3a + b = 5$			
4	Plot graphs of simple quadratic functions	Plot the graph of $y = x^2 - 2$ on a coordinate grid			
	Identify parallel lines from their equations when they are in the form y = mx + c.	Which lines are parallel: a) y = -2x + 3 b) y = 2x - 3 c) y = -2x + 23			
	Plot straight lines of form ay±bx=c	Plot the graph of 3x - y = 2 on a coordinate grid			
	Rearrange a simple formula	Make y the subject in: a) 2y = 3x+1 b) 3x - 2y = 1 c) 7x - 3y + 2 = 0			
3	Plot straight lines of form y=mx + c	Draw coordinate axes using values of -8 to 8 on each axis Draw and label the lines $y = 5, y = x + 2, y = 6 - x$			

Year 9 – SSM - Trigonometry – Chapter 11

Level	I can... / I know…	Examples	MW clips	Start	End
7	Solve more complex problems using trigonometry and Pythagoras rule – including simple 3D problems	A rectangular box has a horizontal base EFGH. The corner D is vertically above H. Given that DH = 4 cm, HG = 6 cm and GF = 8 cm, calculate (a) $D\hat{G}H$, (b) the length of HF, (c) $D\hat{F}H$. 			
6	Use trigonometry to solve problems including use of bearings				
5	Use sin, cos and tan ratios to calculate angles in right-angled triangles	 Find the missing angle			
	Use sin, cos and tan ratios to calculate sides in right-angled triangles	 Find the length of y			
3	Use the conventions for name sides of right-angled triangle				
	Use a calculator to find the sine, cosine & tangent of any angle	1) Find a) sin 22 = b) cos 37 = c) tan 51 = 2) Find the angle a) sin x = 0.35 b) cos x = 0.781			

Year 9 – STATISTICS - Probability – Chapter 12

Level	I can... / I know…	Examples	MW clips	Start	End
6	Determine the probability that two or more events will occur	A fair coin is tossed four times. What is the probability of scoring four Heads?			
5	Use tree diagrams & other diagrams to work out probability that two independent events will occur	Two six-sided are thrown and the scores added together. What is the probability of throwing 11 or more			
	Use Venn diagrams to represent the elements of sets and solve simple problems and/or probabilities				
4	Construct a sample space and use it to find probabilities	A six-sided dice & a coin are thrown simultaneously. Construct a sample space and use it to find the probability that an 'even number' & a 'head' are thrown.			
	List all outcomes of two independent events	A six-sided dice & a coin are thrown simultaneously.List all possible outcomes.			
	Find the probability of an event **not** happening	The probability that it will **not** rain tomorrow is 0.95 What is the probability that it will rain tomorrow?			
	Know and recognise mutually exclusive event or independent events	A six-sided dice is thrown.Are the outcomes 'scoring an odd number' and 'scoring a number more than 4' *mutually exclusive*? Explain your answer			
	Use and understand the notation ∩ for the intersection of two sets				
	Use and understand the notation ∪ for the union of two sets				
	Use and understand the notation A' for the complement of the set A				
3	Estimate the probability from experimental data	A driving instructor notes that 20 students pass the exam and 5 students fail. Use this info to estimate the probability that a student passes the driving exam.			
	List elements of a set and use correct set notation symbols	$E = \{even\ numbers\}$ $E = \{2,4,6,8,10 \ldots\}$ $6 \in E$ whilst $7 \notin E$			
	Understand the concept of the universal set and the empty set and the symbols for these sets	Symbols for universal set U *or* ξ Empty set ∅			
2	Understand the definition of a set	Let *E* be the set of even numbers			