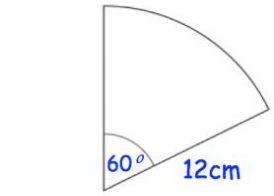
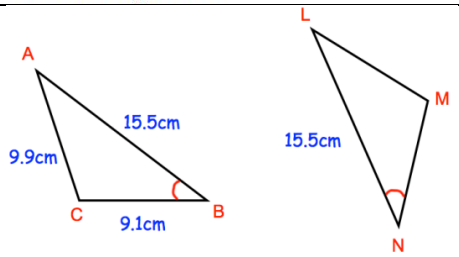
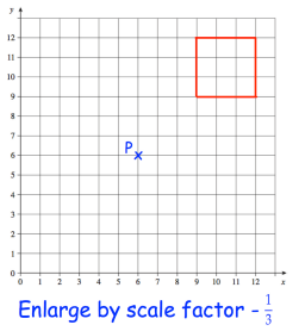
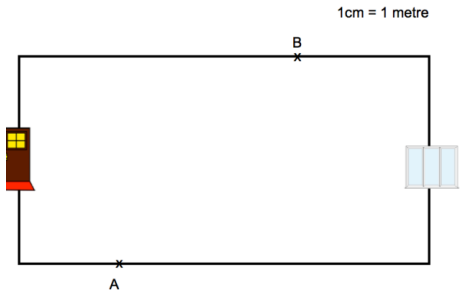
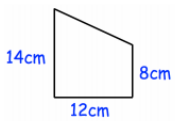
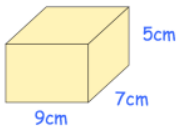
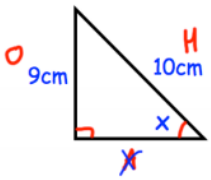
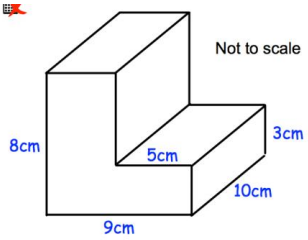
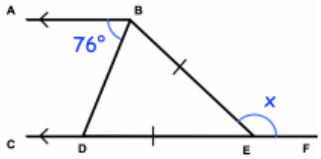
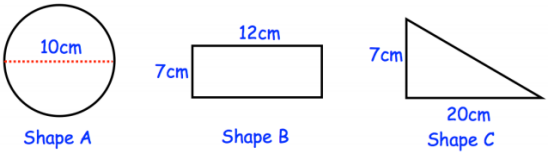
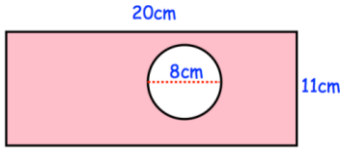
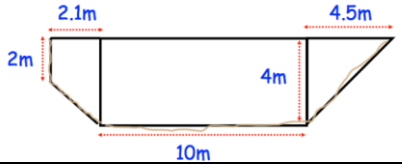
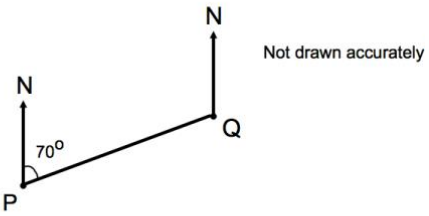
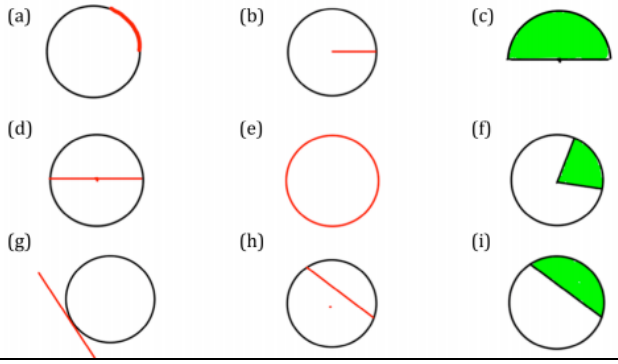
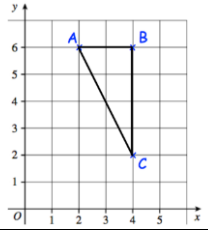
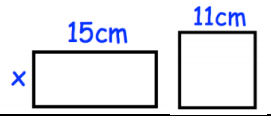
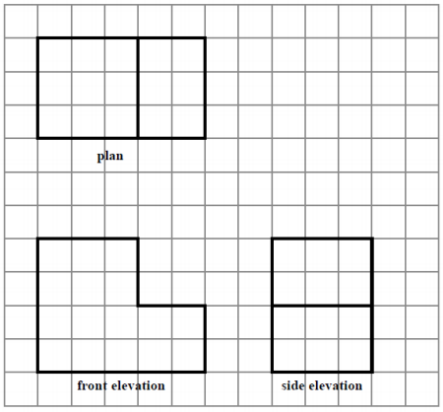
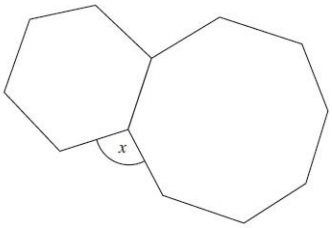
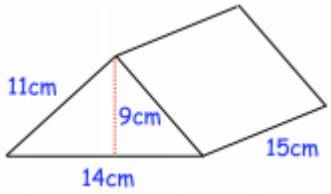
GCSE 9-1 FOUNDATION Revision Checklist

GEOMETRY & MEASURES

Title	Grade		I can do this
Arc lengths and sectors	5	Shown is a sector of a circle.  Calculate the length of the arc.	
Derive triangle results	5	 (a) Calculate the length of MN (b) Explain why angle A = angle L	
Enlargements and negative SF	5	 • Understand the effect of enlarging a shape by a negative scale factor • Understand how to enlarge a shape by a negative scale factor	
Loci	5	Below is a diagram of a hall. There is a front door at one end of the hall and a patio door at the other. There are two burglar alarm sensors, one at A and one at B. The range of each sensor is 4m  The alarm is switched on. Is it possible to walk from the front door to the patio door without setting off the alarm?	
Pythagoras	5	• Prove whether or not a triangle is right-angled • Calculate the longest side (hypotenuse) • Calculate a shorter side • Solve problems  A frame is made from wire. The frame is a trapezium. Calculate the total amount of wire needed to make the frame. Give your answer to 1 decimal place.	

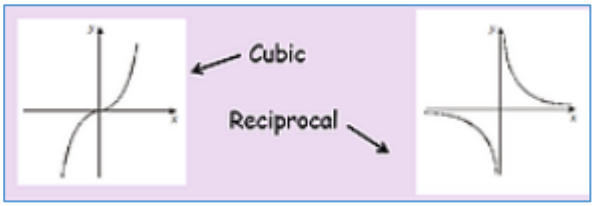
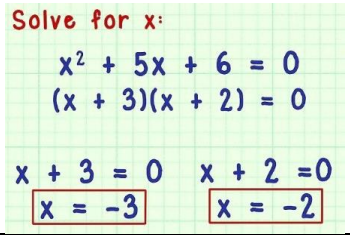
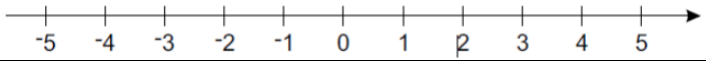
Similarity and Congruence	5	• Understand what it means when two shapes are congruent • Identify pairs of congruent shapes • Understand that when two shapes are similar that one is an EXACT enlargement of the other • Calculate missing sides and angles on similar shapes	
Standard constructions	5	• Construct angle bisectors • Construct perpendicular bisectors	
Surface Area	5	• Calculate surface areas of shapes • Calculate missing lengths given the surface area Jamie is trying to work out the surface area of the cuboid below. Can you spot any mistakes? $9 \times 5 = 45$ $7 \times 5 = 35$ $9 \times 7 = 63$ $45 + 35 + 63 = 143cm^3$ 	
Trigonometric ratios	5	• Know exact trig values • Understand how to label a triangle to solve trig problems • Decide which trig ratio to use to solve a problem • Calculate missing sides • Calculate missing angles Spot the mistakes: Find the size of the angle x.  $\sin x = \frac{9}{10}$ $\sin x = 0.9$ $x = \sin 0.9$ $x = 0.016°$	
Volume	5	• Understand how to calculate volumes of cubes and cuboids • Understand how to calculate volumes of prisms • Understand how to calculate volumes of cones and spheres  Work out the volume of the prism.	
Alternate and corresponding angles	4	• Know that alternate angles are in a Z shape and corresponding angles are in an F shape • Calculate missing angles on parallel lines 	
Area of a circle	4	• Know the formula for area of a circle • Solve problems involving area of a circle <u>Example</u>: which shape has the greatest area? 	
Areas of composite shapes	4	The diagram shows a rectangle with a circle cut out. The rectangle has length 20cm and width 11cm.	

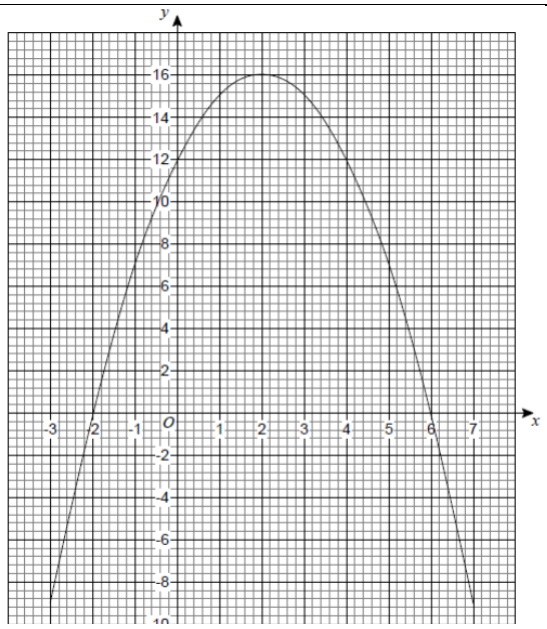
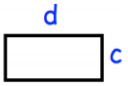
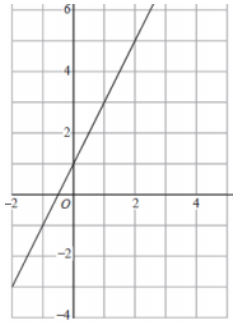
		The circle has diameter 8cm. Work out the shaded area. Give your answer correct to 2 decimal places. 	
Areas of triangles, trapezia and parallelograms	4	Shown is a cross-section of a river. Calculate an estimate of the area of the cross section by considering the trapezium, rectangle and triangle. 	
Bearings	4	• Understand that a bearing is an angle measured clockwise from North and written using 3 figures • Calculate bearings using angle facts The diagram shows the position of two airplanes, P and Q.  The bearing of Q from P is 070°. Calculate the bearing of P from Q.	
Circle terminology	4	Know the names of different parts of a circle 	
Circumference of a circle	4	• Know the formula for circumference of a circle • Solve problems involving perimeters of shapes made from circles  <u>Example</u> James has a bicycle. Each wheel has diameter 45cm. James cycles his bicycle in a straight line in the playground. The front wheel makes 15 complete revolutions. How far does the bicycle travel? Give your answer in metres.	
Enlargements and fractional SF	4	 Triangle ABC is drawn on the grid. Enlarge triangle ABC with scale factor ½ and centre (0,0)	

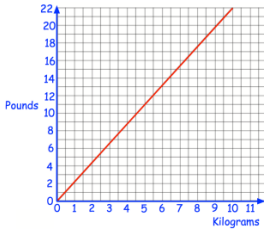
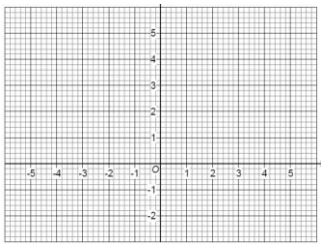
Perimeter of 2D shapes	4	• Understand what is meant by perimeter The perimeter of the rectangle and the square are the same. Calculate the width of the rectangle, x. 	
Plans and elevations	4	• Draw and use 2D representations of 3D shapes. The plan, front elevation and side elevation of a solid prism are drawn on a centimetre grid. In the space below, draw a sketch of the solid prism. Write the dimensions of the prism on your sketch. 	
Polygons	4	• Know the sum of angles in different polygons • Be able to calculate missing angles in polygons • Calculate how many sides a polygon has given an interior OR exterior angle (know that exterior angles sum to 360° and interior + exterior angle = 180°)	
Solve geometrical problems	4	• Calculate missing angles and give reasons for my answers 	
Vector arithmetic	4	• Add, subtract and multiply vectors	
Volume of prisms	4	Calculate the volume of the triangular prism. 	
3-D Shapes	3	• Know the names of different 3D shapes • Be able to work out how many edges; faces; vertices a 3D shape has	
Congruent and similar shapes	3	• Identify pairs of congruent shapes • Know that if two shapes are similar then one is the EXACT enlargement of the other • Work out the scale factor of enlargement between 2 shapes	
Geometrical terminology and diagrams	3	• Understand 3 letter angle notation (e.g. angle ABC) • Be able to identify - Parallel lines - Isosceles and equilateral triangles - Right angles by their notation	

Measuring lines and angles	3	• Measure angles and lines accurately to the nearest degree or mm	
Properties of quadrilaterals	3	• Identify quadrilaterals by their properties - Opposite angles equal in parallelograms - Trapezium has one pair of parallel sides - Opposite angles equal in a kite - Acute + obtuse angle in a parallelogram = 180° etc	
Properties of triangles	3	• Use properties of triangles to calculate missing angles and sides, e.g. base angles in an isosceles are equal	
Translations and vectors	3	• Translate (move) shapes using a translation vector - Top number = number of squares across - Bottom number = number of squares up or down	
Using standard units	3	• Understand that area is measured in square units (e.g. cm^2) • Volume – cubic units, e.g. cm^3 • Speed – mph, kmh, ms etc. • Density – g/cm^3 etc	

ALGEBRA

Title	Grade	What it looks like	I can do this
Algebraic terminology	5	• Know the difference between 'equation' 'expression' and 'formula' • Understand what it means when I see the words 'simplify' or 'solve'	
Cubic and Reciprocal graphs	5	• Know shapes of cubic and reciprocal graphs 	
Deduce quadratic roots algebraically	5	• Solve quadratic equations by factorising and understand that the solutions are where the graph crosses the x-axis (roots) 	
Derive an equation	5	Fiona is x years old. Thomas is 3 years older than Fiona. Cara is twice as old as Fiona. The sum of their ages is 51. (a) Form an equation in terms of x (b) Solve the equation and work out Fiona's, Thomas's and Cara's ages.	
Equation of a line	5	• Understand that straight line graphs have equations of the form y=mx + c • Understand that parallel lines have the same gradient • Rearrange equations to find gradients and intercepts	
Expand the product of two binomials	5	Expand and simplify (x + 2)(x – 5)	
Factorising quadratic expressions	5	Factorise $x^2 + 7x + 10$	
Fibonacci, quadratic and simple geometric sequences	5	Here are the first six terms of a Fibonacci sequence. 1 1 2 3 5 8 The rule to continue a Fibonacci sequence is: the next term in the sequence is the sum of the two previous terms. Find the 9th term of this sequence.	
Graphical solution to equations	5		
Inequalities on number lines	5	(a) Solve the inequality $3x - 2 \leq 10$ (b) Represent your solution to part (a) on the number line. 	
Linear equations	5	Solve the following: • 2x = 18 • x + 2 = 5 • $\frac{x}{3} = 15$ • $5x = 2x + 18$	
Quadratic graphs	5	The graph $y = a + bx - x^2$ is shown.	

		 Circle the coordinates of the turning point of the curve. (-2, 0) (0, 12) (2, 16) (6, 0) (b) Circle the value of a. -2 12 16 6 (c) Circle the two roots of a + bx – x^2 = 0 -2 and 6 2 and -6 2 and 6 -2 and -6	
Reciprocal real-life graphs	5	•	
Simplify indices	5	• $m^2 \times m^3$ • $n^7 \div n^5$ • $(y^4)^3$ • $(2x^3)^4$	
Simplify surds	5	Simplify $\sqrt{75}$	
Solve linear inequalities in one variable	5	Solve the inequality $4x + 7 < 11$	
Writing formulae and expressions	5	An orange costs y pence and a banana costs z pence. Write an expression for the total cost of 2 bananas and 3 oranges.	
Changing the subject	4	The circumference of a circle is given as $c = 2\pi r$ Make the radius, r, the subject of the formula.	
Collecting like terms	4	Simplify $6m - 2s + 11s + m$	
Expressions	4	Write an expression for the perimeter of the shape below: 	
Factorise single bracket	4	Factorise the following: • $25y - 35z$ • $8x^2 + 20$	
Finding the equation of a line	4	Find the equation of the line below: 	

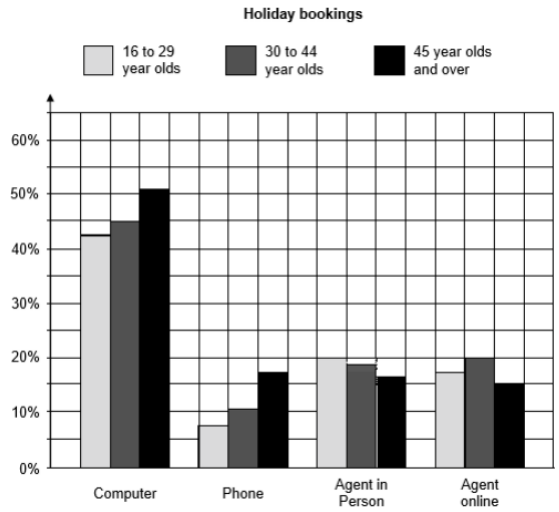
Graphs of linear functions	4	• Understand that equations of the form y=mx +c correspond to straight line graphs • Plot straight line graphs given their equation, e.g. 'plot the graph of y = 2x – 3 for values of x between -2 and 2	
Graphs of quadratic functions	4	• Know what quadratic graphs look like • Be able to plot quadratic graphs, e.g. 'plot the graph of y = x^2 – 2x for values of x between -2 and 3	
Multiplying single brackets	4	Expand 5x(x + 7)	
Real life graphs	4	Jenny's weight is 65kg. 1 stone = 14 pounds. What is Jenny's weight in stones and pounds? 	
nth term of a linear sequence	4	Find the nth term of the sequence 3 7 11 15 19	
Number machines	4	Here is a number machine:  (a) Work out the output when the input is 4 (b) Work out the input when the output is 11 (c) Show that there is a value of the input for which the input and the output have the same value	
Substitution	4	f = 5x + 2y x = 3 and y = –2 Find the value of f.	
Using "y = mx + c"	4	A line has the equation y = 4x – 5 a) What is the gradient of the line? b) What is the y-intercept of the line?	
Coordinates in four quadrants	3	The points (-1, 0) and (1, 4) are the diagonally opposite corners of a square.  Work out the coordinates of the other two corners of the square.	
Position to term rules	3	The nth term of a sequence is given by $2n^2 + 1$. Write down the first three terms of this sequence	
Sequences of square, triangular and cube numbers	3	Know square, cube and triangular numbers.	
Using Formulae	3	A company has bikes for hire. The cost, £C, to hire a bike for n days is given by the formula $C = 12 + \frac{27}{4}(n - 1)$. Work out the cost of hiring the bike for 5 days.	
Sequences and Rules	2	The first three terms of a number pattern are 1 2 4 Hester says the first five terms of this number pattern are 1 2 4 8 16 Write down the rule Hester could have used to get the 4th and 5th terms.	

NUMBER

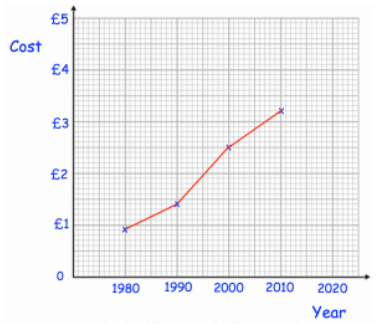
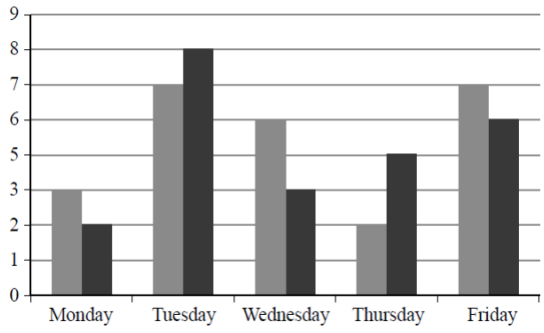
Title	Grade		I can do this
Calculating with fractions	5	• Add, subtract, multiply and divide fractions and mixed numbers	
Error intervals	5	• Use inequalities to express upper and lower bounds The mass of a coin is 8 grams to the nearest gram. Complete the error interval for the mass of the coin ..... g ≤ mass < ..... g	
Index Laws	5	• Know and use the laws of indices to simplify expressions	
Limits of accuracy	5	A rectangular football pitch has a width of 72m, measured to the nearest metre. The length of the pitch is 105m, measured to the nearest 5 metres. Work out the lower bound for the perimeter of the pitch.	
Adding and subtracting fractions	4	• Add and subtract fractions and mixed numbers - Grid method - X factor smiley face (cross multiply) - Make denominators the same	
Checking calculations	4	Does your answer seem reasonable?	
Compound measures	4	• Know and use the formulae for - Speed, distance, time - Mass, density volume - Pressure, force, area	
Converting metric units	4	Mary runs 600m every day. Work out how far Mary runs in one week. Give your answer in kilometres.	
Estimation	4	• Estimate answers to calculations by rounding all the numbers in the problem to 1 significant figure	
Fractions, ratio and percentages problems	4	On Thursday, some adults and children were at the theatre. The ratio of the number of adults to children was 2:4. Each person had a seat in the Circle or had a seat in the Stalls. $^3/_4$ of the children had seats in the Stalls. 120 children had seats in the Circle. There are exactly 1300 seats in the theatre. On this particular Thursday, were there people on more than 70% of the seats? You must show how you get your answer.	
Interpret calculator displays	4	Write the correct degree of accuracy, e.g. decimal places.	
LCM and HCF	4	The lowest common multiple of two numbers is 60. Only one of the numbers is a multiple of 4. Write down two possible numbers.	
Multiples and factors	4	Mary has 26 sweets and is able to share them evenly between her friends. Mary has more than 1 friend. Write down how many friends Mary might have.	
Multiplying fractions	4	$\frac{2}{3} \times 3\frac{4}{9}$	
Operations	4	Perform all four operations.	
Order of operations	4	• Use BIDMAS to work out the answer to a calculation • Be able to spot when an answer in incorrect because BIDMAS has not been used	
Powers	4	Know difference between 4^3 and 4 x 3	
Rounding	4	Round numbers to	

		- Nearest 10, 100, 1000 - 1, 2, or 3 decimal places - 1, 2 or 3 significant figures	
Standard Form	4	The distance between London and New York is 5,567,000 metres. Write this number in standard form.	
Terminating decimals and fractions	4	Write 0.23 as a fraction.	
Decimals	3	• Perform the four operations with decimals.	
Listing outcomes	3		
Prime numbers	3	Find three different prime numbers that have a sum of 40.	
Using standard units	3	What units are used to measure: a) A pencil? b) A road? c) An insect?	
Add and Subtract integers	2	436 + 378	
Dividing integers	2	• Use the bus stop method to solve simple division problems involving whole numbers	
Multiplying integers	2	• Multiply whole numbers without a calculator - Grid method - Partitioning - Chinese/ lattice multiplication	
Ordering numbers	2	Put this numbers in order from smallest to largest: 4 -10 6 -7 0	
Place value	2	• Be able to state the value of an underlined digit in a number	

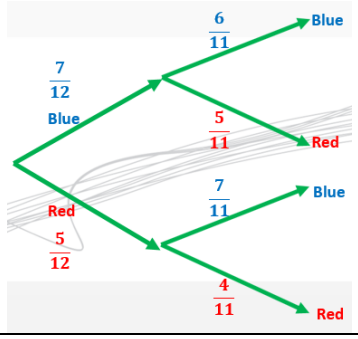
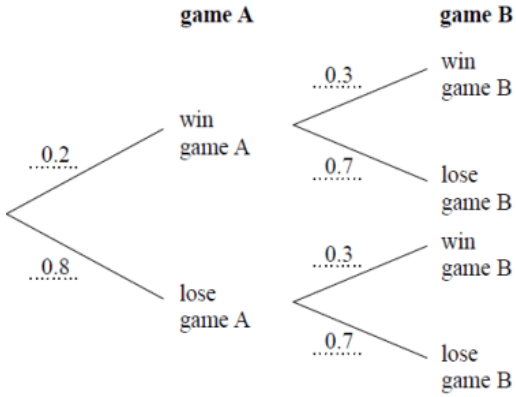
STATISTICS

<table>
<tr><th>Title</th><th>Grade</th><th>What it looks like</th><th>I can do this</th></tr>
<tr><td>Scatter graphs</td><td>5</td><td>• Describe correlation
• Draw a line of best fit
• Estimate values
• Understand that extrapolation is unreliable</td><td></td></tr>
<tr><td>Averages from a table</td><td>5</td><td>Calculate the mean from a frequency table
Example 1: Ross rolled a dice 30 times and recorded the score. Explain why the mean score cannot be 8.
<table><tr><th>Score</th><th>Frequency</th></tr><tr><td>1</td><td>7</td></tr><tr><td>2</td><td>5</td></tr><tr><td>3</td><td>4</td></tr><tr><td>4</td><td>4</td></tr><tr><td>5</td><td>6</td></tr><tr><td>6</td><td>4</td></tr></table>
Example 2:
(a) Write down the modal class interval
(b) Calculate the mean footlength
<table><tr><th>Foot length (f cm)</th><th>Number of adults</th></tr><tr><td>$16 \leqslant f < 18$</td><td>3</td></tr><tr><td>$18 \leqslant f < 20$</td><td>6</td></tr><tr><td>$20 \leqslant f < 22$</td><td>10</td></tr><tr><td>$22 \leqslant f < 24$</td><td>12</td></tr><tr><td>$24 \leqslant f < 26$</td><td>9</td></tr></table></td><td></td></tr>
<tr><td>Comparing data using graphs</td><td>4</td><td>The bar chart shows how people in different age groups book their holidays.
 

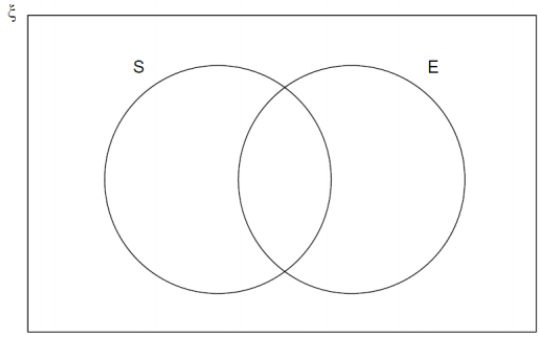
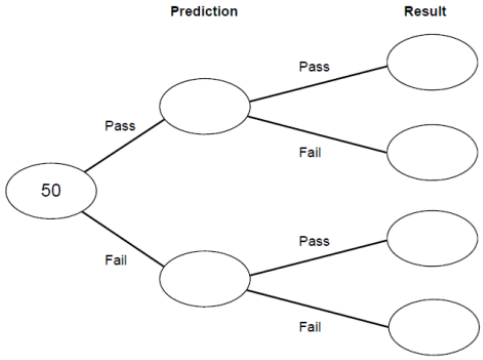
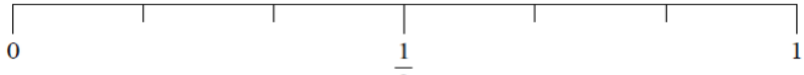
Compare the bookings for 30 to 44 year olds with the bookings for 45 year olds and over.</td><td></td></tr>
<tr><td>Comparing Distributions</td><td>4</td><td>Use averages to compare data sets
- Compare medians
- Compare ranges (consistency of data)</td><td></td></tr>
<tr><td>Population</td><td>4</td><td>Know the difference between a census and a sample</td><td></td></tr>
<tr><td>Sampling</td><td>4</td><td>Know what is meant by a random sample</td><td></td></tr>
</table>

Time series	4	The time series graph shows the price of coffee in a shop over 30 years.  Carlos says that the price of a coffee will be £3.60 by 2020. Do you agree with Carlos? Explain your answer.	
Misleading Diagrams	4	Sam and Max work in a shop from Monday to Friday. Sam draws a graph to show the number of TVs they each sell. Write down three things that are wrong with this graph.  	
Charts and Diagrams	3	• Draw and interpret pictograms; bar charts; vertical line graphs; dual bar charts; composite (stacked) bar charts; frequency polygons	
Pie Charts	3	• Draw pie charts • Work out how many people are represented by an angle	
Types of data	3	Know the difference between discrete and continuous data	
Averages	3	Calculate the mean, mode, median and range	

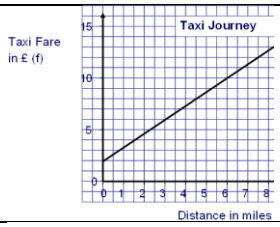
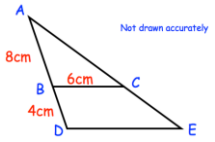
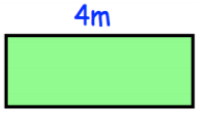
PROBABILITY

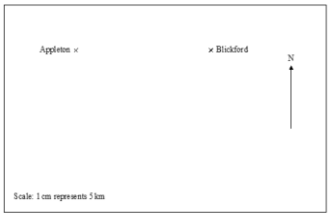
Title	Grade	What it looks like	I can do this
Probability of dependent events	5	In a bag there are 7 blue and 5 red sweets. 2 sweets are taken out of the back, one after the other WITHOUT REPLACEMENT. Explain why the tree diagram looks like the one shown below.  	
Probability of independent events	5	• Two events are independent if the outcome of one does not affect the outcome of the other. • For independent events: p(A AND B) = p(A) x p(B) Example: Here is a probability tree diagram. Calculate the probability that Joe wins game A **and** game B.  	
Mutually exclusive sum	4	• Two events are mutually exclusive if they **cannot** happen at the same time. • For mutually exclusive events ADD the probabilities. Example: Finn has some sweets in a bag. 5 of the sweets are lemon flavoured. 7 of the sweets are strawberry flavoured. The rest of the sweets are mint flavoured. Work out the probability that a sweet picked at random is lemon or mint flavoured.	
Relative Frequency	4	A spinner lands of white, black, red or orange. The relative frequencies after 300 spins are shown in the table below. Work out how many times the spinner landed on Red.	
Tables and Grids	4	Complete the table. Work out the probability that a student picked at random has blue eyes.	

Colour	White	Black	Red	Orange
Relative Frequency	0.25	0.4	0.2	0.15

		<table><tr><th></th><th>blue eyes</th><th>brown eyes</th><th>green eyes</th><th>total</th></tr><tr><td>boys</td><td>5</td><td></td><td>4</td><td>12</td></tr><tr><td>girls</td><td></td><td>7</td><td></td><td></td></tr><tr><td>total</td><td></td><td></td><td>9</td><td>30</td></tr></table>	
Listing outcomes	4	Three friends, Ann (A), Bob (B) and Carol (C), go on holiday together. They book a row of three seats on the plane. When they arrive at the plane they sit in a random order. List all the different orders they could sit on the three seats. The first one has been done for you. <table><tr><th>Seat 1</th><th>Seat 2</th><th>Seat 3</th></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	
Venn Diagrams	4	$\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$ S = square numbers E = even numbers Complete the Venn diagram.  One of the numbers is chosen at random. Write down P (S ∩ E).	
Frequency Trees	3	50 people took a test. Before the test, they predicted whether they would pass or fail. 30 people predicted they would pass. 26 of the people who predicted they would pass did pass. 37 people passed altogether. Complete the frequency tree. 	
Probability of equally likely outcomes	3	Evelyn has 80 pens in a drawer. 15 pens are black and the other pens are blue. Evelyn picks a pen at random from the drawer. What is the probability that Evelyn picks a black pen?	
The probability scale	3	Mark on the probability scale the probability that a fair dice will land on a number less than 5. 	

RATIO & PROPORTION

Title	Grade	What it looks like	I can do this
Gradient & the rate of change	5	 Find the gradient of the line. What does the gradient represent?	
Growth and decay	5	Becky invests £5000 for 2 years in a bank account. She gets compound interest at a rate of 3% per year. Work out the total amount of interest Becky gets by the end of 2 years.	
Percentage change	5	In 2005 the population of Redpool was 11546. In 2015 it was 13671. Write down the increase in population as a percentage.	
Problems with compound units	5	Philip runs at an average speed of 4 m/s. How long will it take Philip to complete a 10 kilometre race Give your answer in minutes and seconds.	
Scale factors and similarity	5	 Work out the length of DE	
Simple Interest and Financial Maths	5	Becky invests £5000 for 2 years in a bank account. She gets simple interest at a rate of 3% per year. Work out the total amount of interest Becky gets by the end of the 2 years.	
Compare Fractions, Decimals and Percentages	4	Arrange these numbers from smallest to largest $\frac{1}{4}$ 0.19 0.3 26% $\frac{1}{5}$	
Compare lengths, area, volume	4	 Work out the area in m^2. Work out the area in cm^2.	
Express one quantity as a % of another	4	There are 25 red balls, 20 blue balls and 5 yellow balls in a bag. What percentage of the balls are blue?	
Percentage change	4	Riddington and Grenwick are two small villages. The population of Riddington has increased from 80 people to 120 people. The population of Grenwick has decreased from 200 people to 120 people. Show that Riddington has had the greater percentage change in its population. You must show all your working.	
Problems involving ratio	4	In a tin of baked beans, Weight of beans : weight of tomatoes : weight of other ingredients = 3 : 2 : 1 There are 150 g of tomatoes in the tin. Work out the weight of the beans.	
Proportion and ratio	4	**8 Scones** 200g flour 30g caster sugar 50g butter 140ml milk 1 egg How much of each ingredient would be needed to make: (a) 16 scones? (b) 4 scones? (c) 24 scones? (d) 40 scones? (e) 80 scones? (f) 2 scones?	

Ratio and fractions	4	Only blue vans and white vans are made in a factory. The ratio of the number of blue vans to the number of white vans is 4 : 3 (*a*) Write down the fraction of vans that are blue.	
Ratio Sharing	4	Divide 63ml in the ratio 2:3:4	
Convert standard units	3	John is 1.83m tall. Kerry is 6cm taller. How tall is Kerry? How many ml in 3.7 litres?	
Express one quantity as a fraction of another	3	There are 30 red balls, 20 blue balls and 10 yellow balls in a bag. Write the number of blue balls as a fraction of all the balls in the bag.	
Use ratio notation	3	Daisy mixes 50 ml of orange juice with 200 ml of water. Write down the ratio of orange juice to water. Give your answer in its simplest form.	
Use scale factors, diagrams and maps	3	Here is part of an accurately drawn map showing two towns, Appleton and Blickford.  (*a*) Find, in kilometres, the real distance between Appleton and Blickford. Cookwood is a town 22 km due South of Blickford. (*b*) On the map, mark with a cross (×) the position of Cookwood.	