Beckfoot

Subject: Maths	Term: Half Term 1 - June	Year Group: 9

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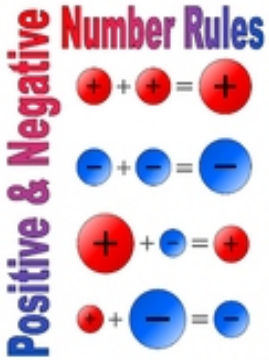
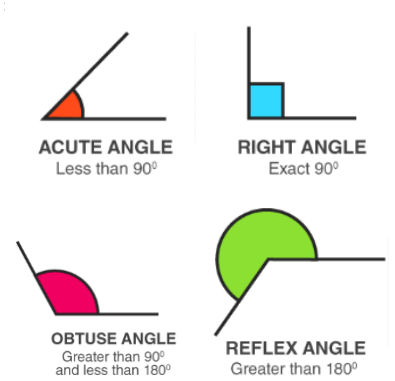
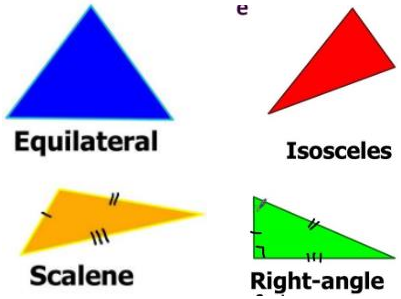
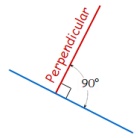
Number – Types of Number

1	BIDMAS • Brackets • Indices • Division • Multiplication • Addition • Subtraction	$3 + (12 \div 3) \times 4$ $= 3 + 4 \times 4$ $= 3 + 16$ $= 19$
2		

Geometry and Measure – Angles and Area

1	Types of angle	
2	Types of triangle	

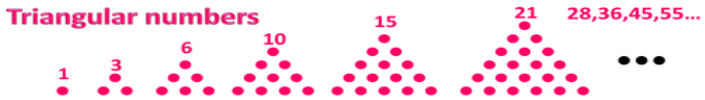
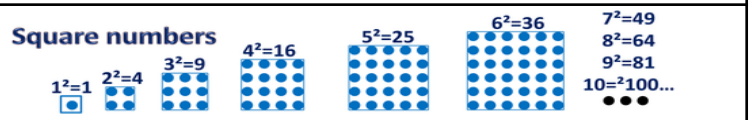
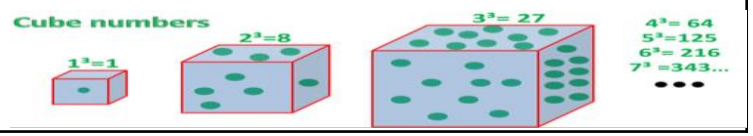
Key Vocabulary

1	Integer	A **whole number** that can be positive, negative or zero.
2	Factor	A number that **divides exactly** into another number without a remainder.
3	Multiple	The result of multiplying a number by an integer.
4	Parallel	Lines are parallel if they are always the same distance apart (called "equidistant"), and will never meet
5	Perpendicular	It just means **at right angles (90°) to**. The red line is perpendicular to the blue line: 

Number – LCM/HCF

1	HCF	Factors of 48 1 2 3 4 6 8 12 16 24 48 Factors of 30 1 2 3 5 6 10 15 30 The HCF is 6
2	LCM	Multiples of 3 3 … 18 21 24 … 39 42 Multiples of 7 7 14 21 28 35 42 The LCM is 21

Algebra - Sequences

1	Square number sequence	
2	Cube number sequence	
3	Triangular number sequence	

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Subject: Maths	Term: Half Term 2 - September	Year Group: 9

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Number – Fractions

1	Multiplying Fractions	$\frac{1}{2} \times \frac{1}{3} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$
2	Dividing Fractions	$\frac{2}{3} \div \frac{1}{2}$ $\frac{2}{3} \times \frac{2}{1}$ $= \frac{4}{3} = 1\frac{1}{3}$ Flip, KFC, Keep, Change
3	Convert Fractions Decimals Percent	$\frac{1}{2}$ Fraction; Divide Numerator by Denominator; 0.5 Decimal; Multiply by 100; 50% Percentage

Algebra – Working with symbols

1	Simplify	$4a + 3b - a + 2b$ $= 3a + 5b$
2	Expand and simplify	$9a - 2(3a - 4)$ $9a - 6a + 8$ $3a + 8$

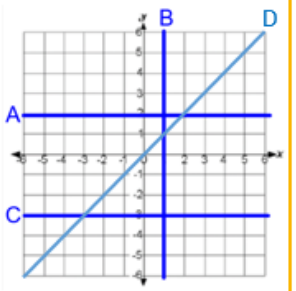
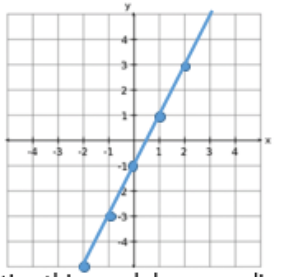
Key Vocabulary

1	Expression	A mathematical statement written using **symbols**, **numbers** or **letters**
2	Expand	To expand a bracket, **multiply** each term **in the bracket** by the expression **outside** the bracket.
3	Factorise	The **reverse** of **expanding**. Factorising is writing an expression as a product of terms by **'taking out' a common factor**.
4	Gradient	The Gradient (also called Slope) of a straight line shows **how steep** a straight line is.

Number - Decimals

1	Rounding	1 … 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 … 2 If the tenths digit is 1, 2, 3 or 4, we round down to the nearest whole number. If the tenths digit is 5, 6, 7, 8 or 9, we round up to the nearest whole number. 1.1 … 1.11 1.12 1.13 1.14 1.15 1.16 1.17 1.18 1.19 … 1.2 If the hundredths digit is 1, 2, 3 or 4, we round down to the nearest tenth. If the hundredths digit is 5, 6, 7, 8 or 9, we round up to the nearest tenth.
2	Multiplying decimals	3.4 × 3 = 10.2 3.21 × 3 = 9.63 Ones, tenths, hundredths

Algebra – Co-Ordinates and Linear Graphs

1	Straight line graphs	 A: y = 2 B: x = 1 C: y = -3 D: y = x Draw the graph of y = 2x - 1 X: -2 -1 0 1 2 Y: -5 -3 -1 1 3  Notice this graph has a gradient of 2 and a y-intercept of -1.

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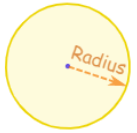
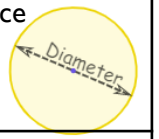
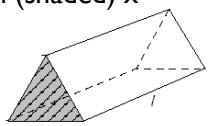
Number- Percentages

1	Percentage = out of 100	$80\% = \frac{80}{100} = \frac{4}{5}$
2	Increase/decrease by a Percentage	Increase 30 by 15% 30 x 1.15 = 34.5 Decrease 50 by 10% 50 x 0.9 = 45
3	Percentage change	$\frac{Change}{Original\ amount}\ x\ 100$
4	One quantity as a percentage of another	$\frac{one\ quantity}{another\ quantity}\ x\ 100$
5	Reverse percentage A jumper was priced at £48.60 after a 10% reduction. Find its original price.	Or $\frac{£48.60}{0.9} = £54$ 100% - 10% = 90% 90% = £48.60 1% = £0.54 100% = £5

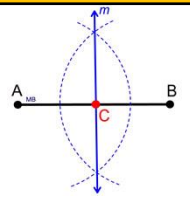
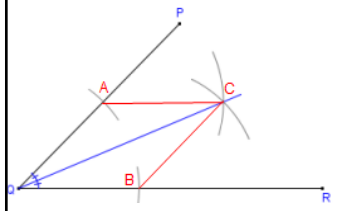
Geometry and Measure – Volume and Area

1	Circle (Area) $A = \pi r^2$ 	Circumference $C = \pi$ x d 
2	Area & perimeter of a semicircle	$A = \frac{\pi r^2}{2}$ $P = \frac{\pi d}{2}$ + diameter
3	Volume of any regular Prism	Area of the cross section (shaded) x length 
4	Area of a sector & arc length	$A = \frac{angle}{360} \times \pi r^2$ Arc length $= \frac{angle}{360} \times \pi d$

Key Vocabulary

1	congruent	Exactly the same in every way
2	prism	3D version of a 2D shape
3	Arc	A section of the circumference of a circle
5	sector	'Pizza slice' the area between 2 radiuses

Geometry and Measure - Construction

1	Bisect a line • Place compasses at either end and go over half way making a curve.	
2	Bisect an Angle • Using a compass, draw a curve to meet the two lines **(A and B)** • Use these points to find another meeting point, **C.** Draw a line through	
3	Congruent Triangles	SSS,SAS,ASA,AAS,RHS

Algebra – Equations and Inequalities

1	Solve an equation **Use inverse operations** on both sides of the equation (balancing method) until you find the value for the letter.	Unknown (One side) (+3) $2x - 3 = 7$ (÷ 2) $2x = 10$ $x = 5$	Unknown (both sides) (Eliminate smallest x) (-2x) 5x + 6 = 2x + 12 (-6) 3x +6 = 12 (÷3) 3x = 6 x = 2	Brackets Expand first $3(x + 7) = 3x + 21$ The solve using balancing method	Fractions Multiplying by the denominator eliminates the fraction (x3) $\frac{2x+6}{3} = 10$ → 2x + 6 = 30

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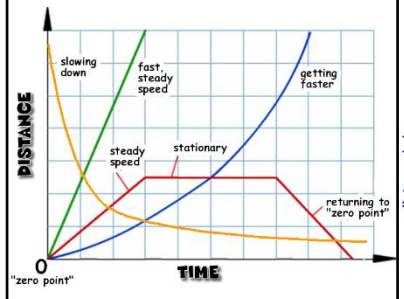
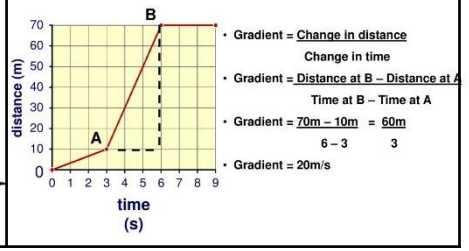
Algebra - Formulae

1	Writing Formulae (Derive) **Substitute letters for words** in the question.	Bob charges £3 per window and a £5 call out charge. $C = 3N + 5$ Where N=number of windows and C=cost
2	Expression, Equation, Identity, Formulae	An Expression: $4a+7b$ — An Equation: $4a+12=60$ — A Formula: $A = \pi r^2$ — An Identity: $(a+b)^2 = a^2+2ab+b^2$
3	Substitution: replacing letters with negative numbers	a = -3, b = 2 *and* c = 5. Find: 1. $2a$ = 2 × -3 = -6 2. $3a - 2b$ = (3 × - 3) − (2 × 2)= -13
4	Rearranging formulae: Use inverse operations on both sides of the formula (balancing method) until you find the expression for the letter.	Make x the subject of $y = \frac{2x-1}{z}$ Multiply both sides by z: $yz = 2x - 1$ Add 1 to both sides: $yz + 1 = 2x$ Divide by 2 on both sides: $\frac{yz+1}{2} = x$ We now have x as the subject.

Ratio, Proportion and rates of change – compound Measures

1		Calculating Speed from a distance-time graph – finding the gradient  • Gradient = Change in distance / Change in time • Gradient = Distance at B – Distance at A / Time at B – Time at A • Gradient = 70m – 10m / 6 – 3 = 60m / 3 • Gradient = 20m/s

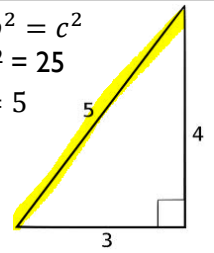
Number – Indices and Standard Form

1	Index Laws	Rule: $a^x \times a^y = a^{x+y}$ — Example: $a^3 \times a^2 = a^{3+2} = a^5$; Rule: $a^x \div a^y = a^{x-y}$ — Example: $a^6 \div a^2 = a^{6-2} = a^4$; Rule: $(a^x)^y = a^{xy}$ — Example: $(a^2)^3 = a^{2\times3} = a^6$
2	Multiplying-Standard form	$(1.2 \times 10^3) \times (4 \times 10^6) =$ 1.2 x 4 =4.8 $10^3 \times 10^6 = 10^9$ = 4.8 x 10^9
3	Dividing-Standard Form	$(4.5 \times 10^5) \div (3 \times 10^2) = 1.5 \times 10^3$
4	Add/subtract-Standard Form	$2.7 \times 10^4 + 4.6 \times 10^3$ $= 27000 + 4600 = 31600$

Key Vocabulary

1	Gradient	How steep the line is at a particular point
2	Substitution	Replacing a letter with a given number
3	squared	When a number is multiplied by itself
4	cubed	When a number is multiplied by itself then itself again.
5	Hypotenuse	Longest side of a right angled triangle

Geometry and Measure – Pythagoras Theorem

1	Finding the hypotenuse (longest side) $a^2 + b^2 = c^2$	$a^2 + b^2 = c^2$ $3^2 + 4^2 = 25$ $\sqrt{25} = 5$ 
2	Finding a shorter side	$a^2 = c^2 - b^2$
3	Proving with Pythagoras	If $a^2 + b^2 = c^2$ Then Triangle is RIGHT ANGLED

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Subject: Maths	Term: Half Term 5 - February	Year Group: 9F

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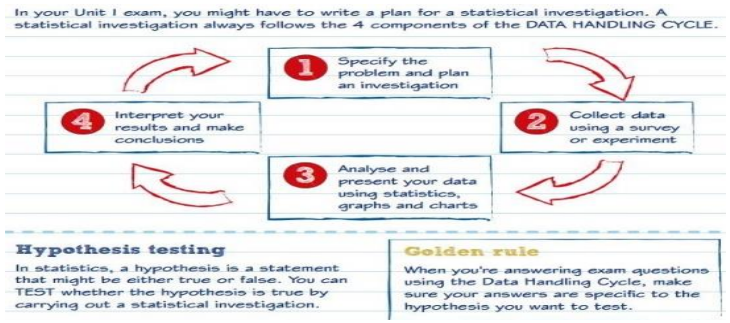
Statistic – Collecting Data

1 Handling Data Cycle



2

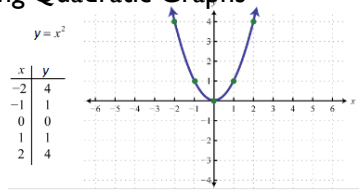
Quantitative(number) Data that is numbers Discrete or continuous	**Qualitative (worded)** Data that in word. Eg. people's favourite colour.

3

Discrete Data that can only take certain values.	**Continuous** Data that can take any value within a range. Eg. height.

Algebra - Quadratics

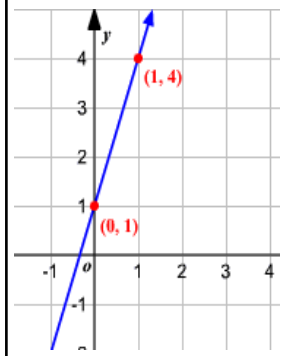
1 Plotting Quadratic Graphs



2 Finding the equation of a line

- $\frac{Change\ in\ y}{Change\ in\ x}$
- $\frac{3}{1} = 3$
- Gradient is 3
- Y intercept is 1
- Equation of the line:

y = 3x + 1



Key Vocabulary

1	Factorise	Put in to brackets with the HCF outside the bracket
2	Reciprocal	1 divided by the number in question. Reciprocal of 9 = $\frac{1}{9}$
3	Square Root	a number when multiplied by itself equals the number in question √9 = 3
4	Cube Root	a number when multiplied by itself 3 times equals the number in question 3√27 = 3

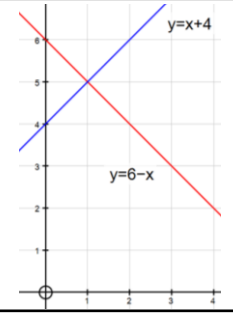
Algebra – Simultaneous Equations

1

Derive simultaneous Equation 3 pumps and 2 tyres cost =£60 2 pumps and 3 tyres cost = £65	Convert to equation and solve 3p + 2t = 60 2p +3t = 65

2 Solving Simultaneous Equations Graphically

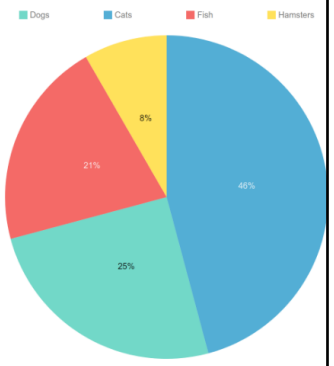
- Look for where they meet
- Meets at **(1, 5)**
- So **x = 1 and y = 5**



Statistics – Representing Data

Pie Chart

- Total Frequency ÷ 360 = angle per data
- Multiplying by frequency = angle per group
- Check angles add to 360°.



Histogram

- Frequency Density = frequency /class width
- Plot Frequency Density on Y axis
- Area of the Bar =frequency

Drawing a histogram

Test Scores	Frequency	Group Width	FD
0-10	7	10	0.7
10-30	11	20	11÷20=0.55
30-50	14	20	
50-60	16	10	
60-80	20	20	
80-100	9	20	
100-120	3	20	

Subject: Maths	Term: Half Term 6 - April	Year Group:9F

Statistics – Statistical Measure

1	Mean from a frequency table	
2	Estimating the mean	

Numbers of sports played	Frequency	Number of sports × frequency	
0	20	0 × 20	= 0
1	17	1 × 17	= 17
2	15	2 × 15	= 30
3	10	3 × 10	= 30
4	9	4 × 9	= 36
5	3	5 × 3	= 15
6	2	6 × 2	= 12
TOTAL	76		140

Mean = 140 ÷ 76 = **2 sports** (to the nearest whole number)

Estimated mean · grouped data so the mean is estimated.

Time (seconds)	Frequency	Mid-point	Mid-point × Frequency
$10 < t \leq 20$	0	15	0
$20 < t \leq 30$	2	25	50
$30 < t \leq 40$	2	35	70
$40 < t \leq 50$	9	45	405
$50 < t \leq 60$	13	55	715
$60 < t \leq 70$	17	65	1105
$70 < t \leq 80$	3	75	225
$80 < t \leq 90$	2	85	170
$90 < t \leq 100$	2	95	190
Total	50		2930

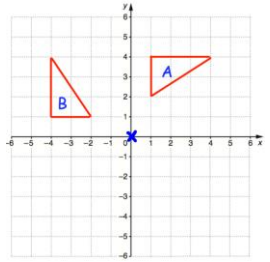
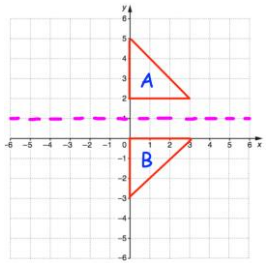
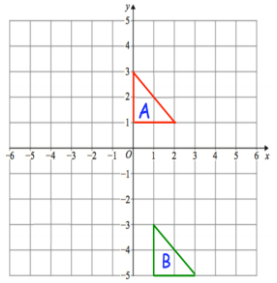
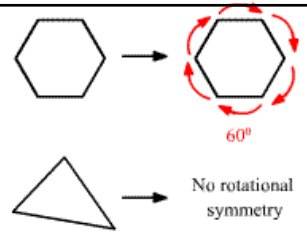
Estimated mean = sum of mid-point x freq / total frequencies = 2930 / 50 = 58.6 seconds

Geometry and Measure - Trigonometry

1

Sine	$\sin\theta = \frac{O}{H}$	$\theta = \sin^{-1}\frac{O}{H}$	O / S x H
Cosine	$\cos\theta = \frac{A}{H}$	$\theta = \cos^{-1}\frac{A}{H}$	A / C x H
Tangent	$\tan\theta = \frac{O}{A}$	$\theta = \tan^{-1}\frac{O}{A}$	O / T x A

Geometry and Measure – Reflect, Rotate, Translate

1	Rotation: need the degrees turned, direction (clockwise or anti-clockwise) and the **centre of rotation**.	
2	Reflection: need the line that the shape has been reflected in. This shape has been reflected in $y = 1$.	
3	Translation: need the direction and how far the shape has travelled. Can be given as a column vector. Example: $\begin{pmatrix}1\\-6\end{pmatrix}$ This means 1 right and 6 down.	
4	Rotational Symmetry The number of times a shape looks the same when spun 360	

Key Vocabulary

1	Frequency	How many
2	Symmetry	Line where a shape looks the same on both sides
3	Outlier	A result that doesn't fit
4	Elevation	The angle upwards from horizontal
5	Depression	The angle downwards from Horizontal

Ratio, Proportion and rate of Change – Ratio and Proportion

1	Sharing an amount • Add • Divide • And Multiply	Share £30 in the ratio 3 : 7 • 3 + 7 = 10 • £30 ÷ 10 = £3 3 x £3 =£9 **and** 7 x £3=£21
2	Simplify unitary ratio. • Make one side of the ratio 1.	Put 2 : 4 in the form n : 1 ÷4 2 : 4 ÷4 0.5 : 1
3	Ratio Red :Blue 5: 3	Fraction Red: 5/8 Blue: 3/8