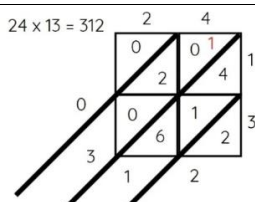


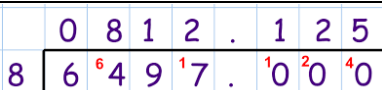
Number properties and calculations

1.	Addition	To find the sum or total of two or more numbers.
2.	Subtraction	To find the difference between two numbers.
3.	Multiplication	Repeated addition of a number. Also called 'product'
4.	Division	The process of calculating the number of times one number is contained in another.
5.	Divisible	Can be divided by a number without a remainder.

Multiplication methods

6.	Lattice	24 x 13 = 312 												
7.	Grid	Eg) 574 x 29 <table><tr><td></td><td>500</td><td>70</td><td>4</td></tr><tr><td>20</td><td>10000</td><td>1400</td><td>80</td></tr><tr><td>9</td><td>4500</td><td>630</td><td>36</td></tr></table> 11480 + 5166 16646 Finished!		500	70	4	20	10000	1400	80	9	4500	630	36
	500	70	4											
20	10000	1400	80											
9	4500	630	36											
8.	Column	× 36 15 30 60 150 300 540 30 60 150 300 (6 × 5) (6 × 10) (30 × 5) (30 × 10) 30 10 6 5 × 5												

Division Methods

9.	Short	e.g. $6497 \div 8$ 
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10.	Long	e.g. $13032 \div 24$	543 1 - 24 2 - 48 3 - 72 4 - 96 5 - 120 6 - 144 7 - 168 8 - 192 9 - 216 24 $\overline{)13032}$ - 120 103 - 96 72 - 72 00
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Times Tables

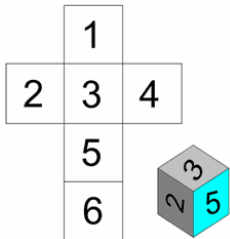
×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

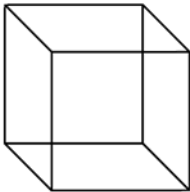
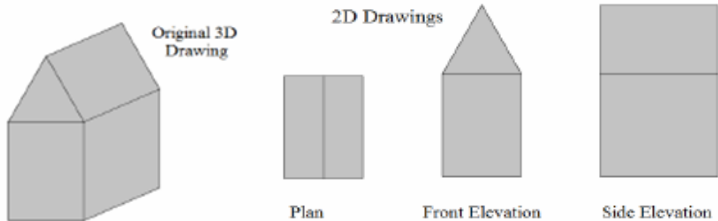
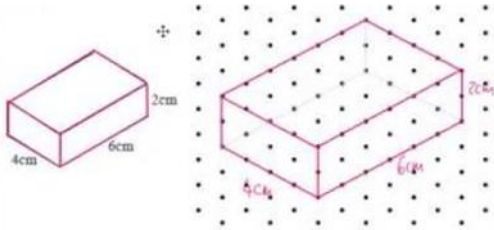
Divisibility Rules

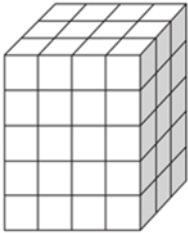
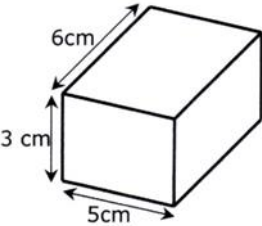
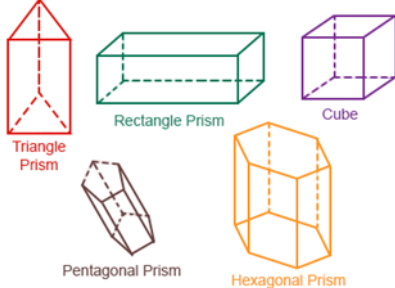
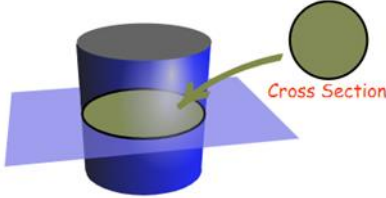
11.	A number is divisible		
	by:	if:	
	2	The last digit is divisible by 2	
	3	The sum of the digits is divisible by 3	
	4	The number made by the last two digits is divisible by 4	
	5	The last digit is 5 or 0	
	6	The number is divisible by 2 and 3	
	8	The number made by the last 3 digits is divisible by 8	
	9	The sum of its digits is divisible by 9	
	10	The last digit is 0.	
12.	Operations	Symbols and words to show how to combine numbers.	
		×	Multiply
		÷	Divide
13.	Inverse Operations	The operation used to reverse the original operation	
		+ and – are inverse	×
		Finding the square root is the inverse of finding the square of a number.	
		Finding the cube root is the inverse of finding the cube of a number.	

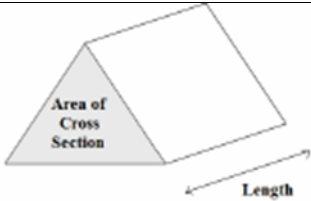
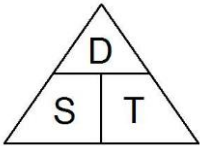
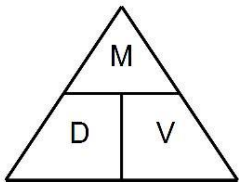
14.	Order of operations	The order in which operations should be done.	B I DM AS	Brackets Indices Divide and Multiply Add and Subtract
15.	Negative number	A number that is less than zero.		
16.	Ascending order	A set of numbers arranged from smallest to biggest.		
17.	Descending order	A set of numbers arranged from biggest to smallest.		
18.	Ratio	Ratio compares the size of one part to another part . Written using the ':' symbol. 3 : 1 		
19.	Simplifying Ratios	Divide all parts of the ratio by a common factor . 5 : 10 = 1 : 2 (divide both by 5) 14 : 21 = 2 : 3 (divide both by 7)		
20.	Best Buys	Find the unit cost by dividing the price by the quantity . The lowest number is the best value. 8 cakes for £1.28 → 16p each (÷by 8) 13 cakes for £2.05 → 15.8p each (÷by 13) Pack of 13 cakes is best value.		

Shapes and measures in 3D

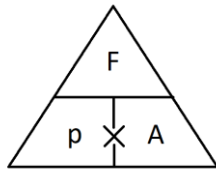
1.	Net	A pattern that you can cut and fold to make a model of a 3D shape . 
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2.	Properties of Solids	Faces = flat surfaces Edges = sides/lengths Vertices = corners A cube has 6 faces, 12 edges and 8 vertices. 
3.	Plans and Elevations	This takes 3D drawings and produces 2D drawings. Plan View: from above Side Elevation: from the side Front Elevation: from the front 
4.	Isometric Drawing	A method for visually representing 3D objects in 2D. 
5.	Volume	Volume is a measure of the amount of space inside a solid shape. Units: mm^3, cm^3, m^3 etc.

		
6.	Volume of a Cube/Cuboid	$V = \textit{Length} \times \textit{Width} \times \textit{Height}$ $V = L \times W \times H$ You can also use the Volume of a Prism formula for a cube/cuboid.  volume = $6 \times 5 \times 3$ = 90 cm^3
7.	Prism	A prism is a 3D shape whose cross section is the same throughout. 
8.	Cross Section	The cross section is the shape that continues all the way through the prism. 
9.	Volume of a Prism	$V = \textit{Area of Cross Section} \times \textit{Length}$ $V = A \times L$

		
10.	Speed, Distance, Time	Speed = Distance ÷ Time Distance = Speed × Time Time = Distance ÷ Speed  <i>Remember the correct units.</i> Speed = 4mph Time = 2 hours Find the Distance. $D = S \times T = 4 \times 2 = 8 \text{ miles}$
11.	Density, Mass, Volume	Density = Mass ÷ Volume Mass = Density × Volume Volume = Mass ÷ Density  <i>Remember the correct units.</i> Density = 8kg/m³ Mass = 2000g Find the Volume. $V = M \div D = 2 \div 8 = 0.25m^3$
12.	Pressure, Force, Area	Pressure = Force ÷ Area

Force = Pressure $\times$ Area
Area = Force $\div$ Pressure



Remember the correct units.

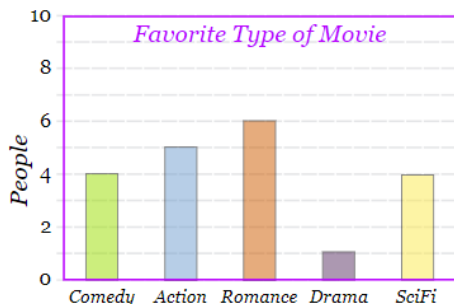
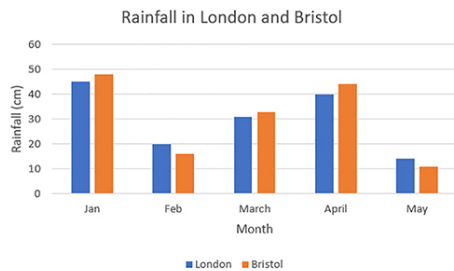
Pressure = 10 Pascals

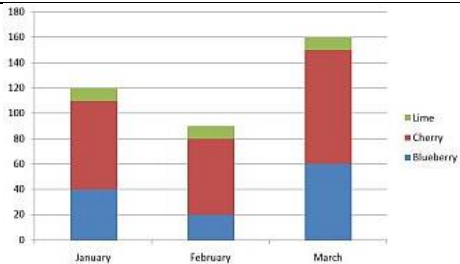
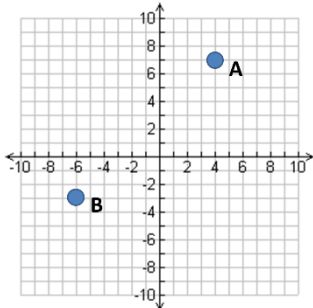
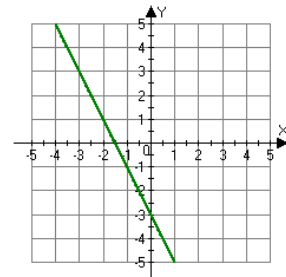
Area = 6cm²

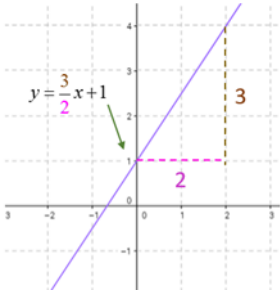
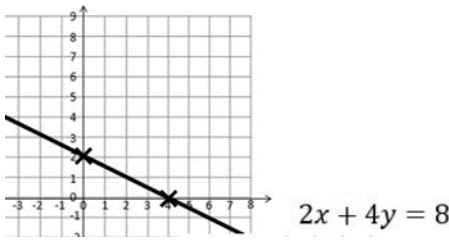
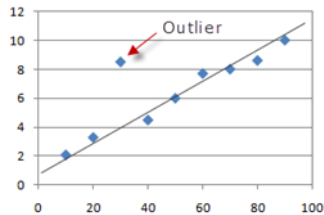
Find the Force

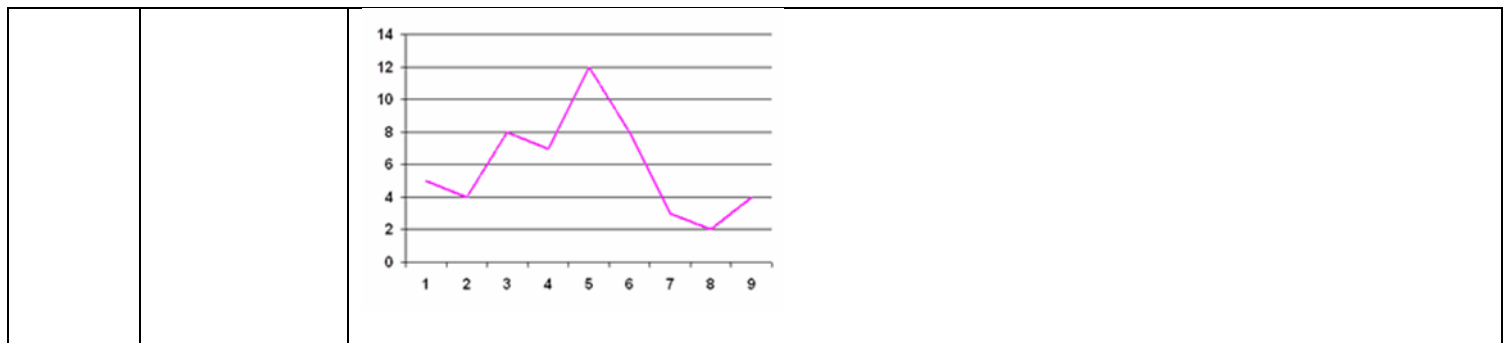
$$F = P \times A = 10 \times 6 = 60 \text{ N}$$

Statistics

1.	Qualitative data	Data described by words.																		
2.	Quantitative data	Data that is in number form that can be discrete or continuous.																		
3.	Discrete data	Data that can be counted and has a finite number of possible values.																		
4.	Continuous data	Data that can be measured and has an infinite number of possible values within a range.																		
5.	Bar chart	A chart to display discrete data where the height of the bar shows the frequency.  <table><caption>Favorite Type of Movie</caption><thead><tr><th>Movie Type</th><th>Frequency (People)</th></tr></thead><tbody><tr><td>Comedy</td><td>4</td></tr><tr><td>Action</td><td>5</td></tr><tr><td>Romance</td><td>6</td></tr><tr><td>Drama</td><td>1</td></tr><tr><td>SciFi</td><td>4</td></tr></tbody></table>	Movie Type	Frequency (People)	Comedy	4	Action	5	Romance	6	Drama	1	SciFi	4						
Movie Type	Frequency (People)																			
Comedy	4																			
Action	5																			
Romance	6																			
Drama	1																			
SciFi	4																			
6.	Dual bar chart	A bar chart used to compare data sets where bars are drawn next to each other to compare heights.  <table><caption>Rainfall in London and Bristol</caption><thead><tr><th>Month</th><th>London (cm)</th><th>Bristol (cm)</th></tr></thead><tbody><tr><td>Jan</td><td>45</td><td>50</td></tr><tr><td>Feb</td><td>20</td><td>15</td></tr><tr><td>March</td><td>30</td><td>35</td></tr><tr><td>April</td><td>40</td><td>45</td></tr><tr><td>May</td><td>15</td><td>10</td></tr></tbody></table>	Month	London (cm)	Bristol (cm)	Jan	45	50	Feb	20	15	March	30	35	April	40	45	May	15	10
Month	London (cm)	Bristol (cm)																		
Jan	45	50																		
Feb	20	15																		
March	30	35																		
April	40	45																		
May	15	10																		
7.	Composite bar chart	A bar chart where bars are split to show the different quantities within each bar.																		

		 <table><caption>Stacked Bar Chart Data</caption><thead><tr><th>Month</th><th>Blueberry</th><th>Cherry</th><th>Lime</th><th>Total</th></tr></thead><tbody><tr><td>January</td><td>40</td><td>70</td><td>10</td><td>120</td></tr><tr><td>February</td><td>20</td><td>60</td><td>10</td><td>90</td></tr><tr><td>March</td><td>60</td><td>90</td><td>10</td><td>160</td></tr></tbody></table>	Month	Blueberry	Cherry	Lime	Total	January	40	70	10	120	February	20	60	10	90	March	60	90	10	160
Month	Blueberry	Cherry	Lime	Total																		
January	40	70	10	120																		
February	20	60	10	90																		
March	60	90	10	160																		
8.	Coordinates	Written in pairs. The first term is the x-coordinate (movement across). The second term is the y-coordinate (movement up or down)  A: (4,7) B: (-6,-3)																				
9.	Linear Graph	Straight line graph. The general equation of a linear graph is $y = mx + c$ where m is the gradient and c is the y-intercept. The equation of a linear graph can contain an x-term, a y-term and a number. Example:  Other examples: $x = y$ $y = 4$ $x = -2$ $y = 2x - 7$ $y + x = 10$ $2y - 4x = 12$																				
10.	Plotting Linear Graphs	Method 1: Table of Values Construct a table of values to calculate coordinates. <table><tr><td>x</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y= x +3</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>	x	-3	-2	-1	0	1	2	3	y= x +3	0	1	2	3	4	5	6				
x	-3	-2	-1	0	1	2	3															
y= x +3	0	1	2	3	4	5	6															

		Method 2: Gradient-Intercept Method (use when the equation is in the form $y = mx + c$) 1. Plots the y-intercept 2. Using the gradient, plot a second point. 3. Draw a line through the two points plotted.  Method 3: Cover-Up Method (use when the equation is in the form $ax + by = c$) 1. Cover the x term and solve the resulting equation. Plot this on the $x - axis$. 2. Cover the y term and solve the resulting equation. Plot this on the $y - axis$. 3. Draw a line through the two points plotted. 
11.	Outlier	A value that 'lies outside' most of the other values in a set of data. An outlier is much smaller or much larger than the other values in a set of data. 
12.	Line Graph	A graph that uses points connected by straight lines to show how data changes in values. This can be used for time series data, which is a series of data points spaced over uniform time intervals in time order.



13.	Time-Series graph	A time-series graph plots frequencies (vertical) axis against time (horizontal). It is used to spot trends over time. Time could be: weeks, months, quarters (3 months), years.
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Expressions and equations

1.	Expression	A mathematical statement written using symbols, numbers or letters. $3x + 2$ or $5y^2$
2.	Simplifying Expressions	Collect 'like terms'. Be careful with negatives. x^2 and x are not like terms. $2x + 3y + 4x - 5y + 3 = 6x - 2y + 3$ $3x + 4 - x^2 + 2x - 1 = 5x - x^2 + 3$
3.	x times x	The answer is x^2 not $2x$. Squaring is multiplying by itself, not by 2.
4.	$p \times p \times p$	The answer is p^3 not $3p$ If $p=2$, then $p^3=2 \times 2 \times 2=8$, not $2 \times 3=6$

5.	$p + p + p$	The answer is $3p$ not p^3 If $p=2$, then $2+2+2=6$, not $2^3 = 8$
6.	Equation	A statement showing that two expressions are equal $2y - 17 = 15$
7.	Expand	To expand a bracket, multiply each term in the bracket by the expression outside the bracket. $3(m + 7) = 3m + 21$
8.	Solve	To find the answer/value of something Use inverse operations on both sides of the equation (balancing method) until you find the value for the letter. Solve $2x - 3 = 7$ Add 3 on both sides $2x = 10$ Divide by 2 on both sides $x = 5$
9.	Inverse	Opposite The inverse of addition is subtraction. The inverse of multiplication is division.
10.	Substitution	Replace letters with numbers. Be careful of $5x^2$. You need to square first, then multiply by 5. $a = 3, b = 2$ and $c = 5$. Find: $2a = 2 \times 3 = 6$ $3a - 2b = 3 \times 3 - 2 \times 2 = 5$ $7b^2 - 5 = 7 \times 2^2 - 5 = 23$