
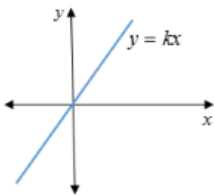
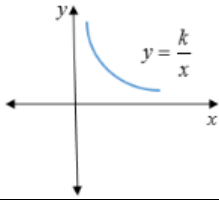


Ratio definitions

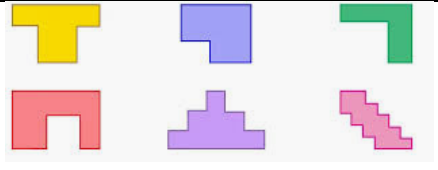
1.	Ratio	A relationship between two or more quantities	
2.	Unit ratio	Used to compare ratios, one of the parts is 1	
		The only time it is permissible to have a decimal in a ratio	
3.	Equivalent	Ratios that have the same simplified form are said to be equivalent	
4.	Scale	A ratio that represents the relationship between a length on a drawing or a map and the actual length	
5.	Share	Splitting into parts as defined by a ratio	
6.	Unitary method	Finding the value of 1 item then using this to find the value of any number of that item	
		Use to work out which products give the best value for money	

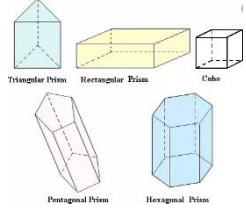
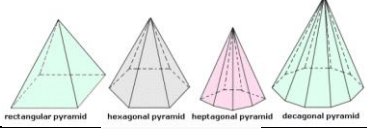
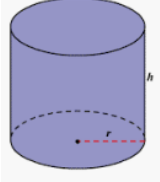
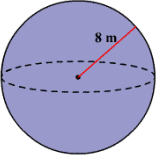
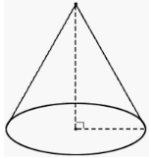
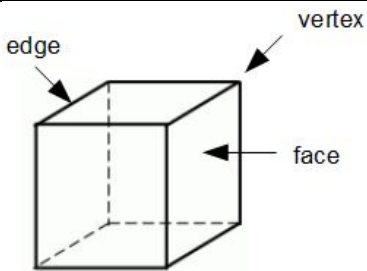
Working with ratios

7.	Simplifying ratio	Divide all parts by the highest common factor	e.g. 12:4 simplifies to 3:1 (divided by HCF of 4)
		All parts in the simplified version must be integers	
8.	Divide in a given ratio	Divide an amount so the ratio of the final values simplifies to the given ratio	<p>share £20 in the ratio 3:2</p> <p style="text-align: center;">←————— £20 —————→</p> 
9.	Proportion	Compares a part with a whole	
10	Direct proportion	Two quantities increase at the same rate	$y \propto x$ $y = kx$ for a constant k 
		Graph is a straight line that goes through the origin	

11.	Inverse/indirect proportion	One variable increases at a constant rate as the second variable decreases	$y \propto \frac{1}{x}$ $y = \frac{k}{x} \text{ for a constant } k$ 
12.	Proportional	A change in one is always accompanied by a change in the other	

2D and 3D shapes: definitions

13.	Dimension	The size of something in a particular direction e.g. height, depth, length, width	
14.	2D shape	A shape that has length/height and a width but no depth	
15.	3D shape	A shape that depth as well as length/height and width	
16.	Polygon	A 2D shape with straight lines only	
17.	Regular polygon	A polygon where:	
		All sides are the same length All angles are the same size	
18.	Compound shape	A shape made up of two or more simple shapes	
19.	Rectilinear shape	A shape where all of its sides meet at right angles	
20.	Perimeter	The distance around the outside of a 2D shape	
21.	Area	The space inside a 2D shape	
22.	Surface area	The total area of all the faces of a 3D shape	
23.	Volume	The space inside a 3D shape	
24.	Capacity	The amount of fluid a 3D object can hold	
25.	S.I. Units	Standard units of measurement used by scientists across the world	
26.	Metric units	Standard units of measurement that vary by powers of 10	
27.	Imperial units	Older units of measurement, some of which are still common e.g. miles, gallons	
28.	Cross section	The shape we get when cutting straight through a 3D shape	

29.	Prism	A 3D shape that has a constant cross section through its length	
30.	Pyramid	A 3D shape with a polygon as its base and triangular sides that meet at the top	
31	Cylinder	A prism with two circular ends connected by a curved surface	
32.	Sphere	A 3D shape where all points on the surface are the same distance from the centre	
33.	Spherical	Means in the shape of a sphere	
34.	Cone	A 2D shape that has a circular base joined to a point by a curved side	
35.	Face	A flat surface of a 3D shape (can be curved)	
36.	Edge	A line segment where two faces meet	
37.	Vertex	A point where two or more edges meet	
38.	Vertices	Plural of vertex	

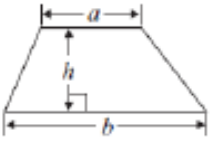
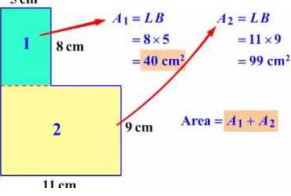

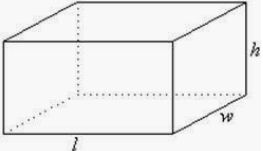
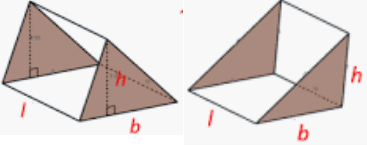
Measures

39.	Units of time	Standard units of time are seconds, minutes, hours, days, years			
		60 seconds = 1 minute	60 minutes = 1 hour	24 hours = 1 day	365 days = 1 year
40.	Units of mass	Metric units of mass are milligrams, grams, kilograms and tonnes			
		1000mg = 1g	1000g = 1kg	1000kg = 1 tonne	
41.	Units of length	Metric units of length are millimetres, centimetres, metres and kilometres			


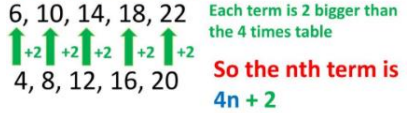
		10mm = 1cm	100cm = 1m	1000m = 1km
42.	Units of area	Metric units of length are millimetres ² , centimetres ² , metres ² and kilometres ²		
		1cm ² = 100mm ²		
		1m ² = 10000cm ²		
43.	Units of volume	Metric units of length are millimetres ³ , centimetres ³ , metres ³ and kilometres ³		
		1cm ³ = 1000mm ³		
		1m ³ = 1000000cm ³		
44.	Units of capacity	Metric units of capacity are millilitres, centilitres and litres		
		10ml = 1cl	1000ml = 100cl = 1l	
45.	Capacity and volume conversions	1cm ³ = 1ml	1000cm ³ = 1l	

2D Shapes

46.	Square	Area = $l \times w$ or l^2 as length and width are equal	
47.		Perimeter = $l + l + l + l$ or $4l$	
48.	Rectangle	Area = $l \times w$	
49.		Perimeter = $l + l + w + w$ or $2l + 2w$	
50.	Parallelogram	Area = $b \times h$	
51.	Triangle	Area = $\frac{b \times h}{2}$ or $\frac{1}{2} \times b \times h$	

52.	Trapezium	$\text{Area} = \frac{a+b}{2} \times h \quad \text{or} \quad \frac{1}{2} (a + b) \times h$	
53.	Compound shape	<p>To find the area, split up into simple shapes, find each area and add together.</p> <p>To find the perimeter, find any missing sides then add all the sides together.</p>	
3D shapes: volume			
54.	Prism	$\text{Volume} = \text{area of cross section} \times \text{length}$	
55.	Cuboid	$\text{Volume} = \text{area of cross section} \times \text{length}$ $\text{Volume} = \text{length} \times \text{width} \times \text{height}$	
56.	Triangular prism	$\text{Volume} = \text{area of cross section} \times \text{length}$ $\text{Volume} = \frac{1}{2} \times \text{base} \times \text{height} \times \text{length}$	

Sequences

1.	Sequence	An order pattern of numbers or diagrams
2.	Term	One of the numbers or diagrams in a sequence
3.	Term to term rule	The rule for moving from one term to the next in a sequence
4.	Formula	A rule written to describe a relationship between two quantities
5.	Arithmetic sequence	A sequence where the term to term rule is to add or subtract the same amount each time
6.	Quadratic sequence	A sequence where the term to term rule is changing by the same amount each time
		The second difference is a constant amount.
7.	Geometric sequence	A sequence where the term to term rule is to multiply by the same amount each time
8.	Common ratio	The value a geometric sequence is multiplied by from one term to the next
		Denoted by the letter r
9.	Position to term rule	The rule for finding any value of a sequence
10.	nth term rule for an arithmetic sequence	The rule to find any term in a sequence of numbers
		<ul style="list-style-type: none"> Find the common difference between the terms This becomes your coefficient of n (this is the times table the sequence is linked to) The number you need to add or subtract to get to the second term becomes the second term in the nth term rule <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>6, 10, 14, 18, 22</p>  <p>The sequence increases by 4, so the nth term starts with $4n$</p> </div> <div style="text-align: center;"> <p>Now compare the sequence to the 4 times table</p> <p>6, 10, 14, 18, 22</p>  <p>Each term is 2 bigger than the 4 times table So the nth term is $4n + 2$</p> </div> </div>
11.	nth term for a geometric sequence	<ul style="list-style-type: none"> Divide the second sequence by the first to find the common ratio, r The nth term is ar^{n-1} where a is the first term and n is the term position in the sequence
12.	Ascending	Increases
13.	Descending	Decreases
14.	Linear function	An arithmetic sequence that can be represented by a straight line graph

Special Sequences			
15.	Square numbers	1, 4, 9, 16, 25, 36, 49, 64, 81, 100	
16.	Cube numbers	1, 8, 27, 64, 125	
17.	Triangular numbers	1, 3, 6, 10, 15, 21, 28	
18.	Fibonacci sequence	A sequence where each term is the sum of the two previous terms	
		e.g. 1, 1, 2, 3, 5, 8, 13, 21...	
Graphs and coordinates			
19.	Axis	A reference line on a graph	
20.	Axes	Plural of axis	
21.	Quadrant	A quarter of a graph separated by a axes	
22.	Coordinate	Used to show a position on a coordinate plane, (x, y)	
		First coordinate is the horizontal position, (x axis) and the second is the vertical position (y axis)	
23.	Origin	The point $(0,0)$ on a set of axes	
24.	Plot	Mark a position or positions on a graph	
24.	y intercept	The y value where a graph crosses the y axis	where $x=0$
26.	x intercept	The x value where a graph crosses the x axis	where $y=0$
27.	“ $y=$ ” graph	Constant y coordinate	
		Will be parallel to the x axis	
28.	“ $x=$ ” graph	Constant x coordinate	
		Will be parallel to the y axis	