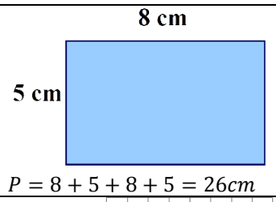
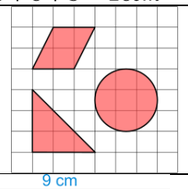
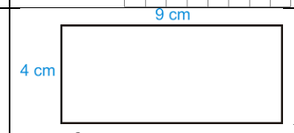
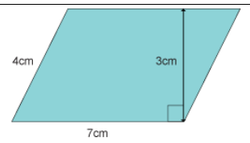
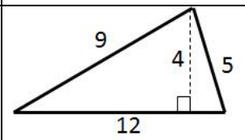
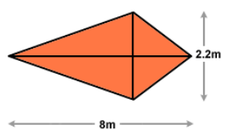
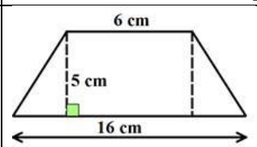
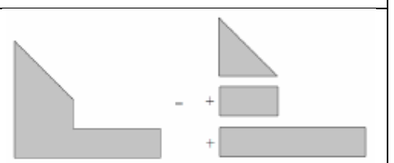
Maths *Knowledge Organiser*

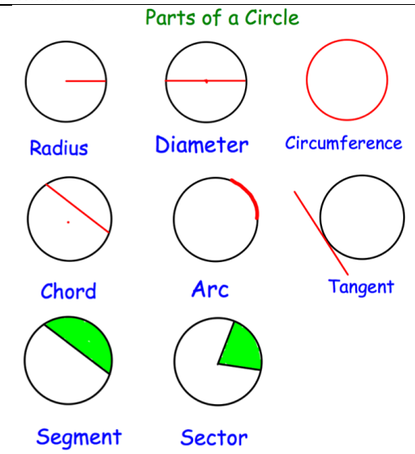
8B1d: **2D and 3D Shapes**

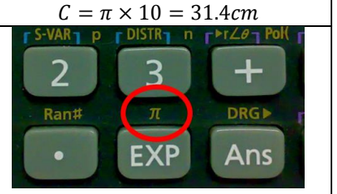
Area and Perimeter of Polygons

Perimeter	The **total distance** around the **outside** of a shape. Units include: mm, cm, m etc.	 $P = 8 + 5 + 8 + 5 = 26cm$
Area	The amount of **space inside** a shape. Units include: mm^2, cm^2, m^2	
Area of a Rectangle	**Length x Width**	 $A = 36cm^2$
Area of a Parallelogram	**Base x Perpendicular Height** Not the slant height.	 $A = 21cm^2$
Area of a Triangle	**Base x Height ÷ 2**	 $A = 24cm^2$
Area of a Kite	Split in to **two triangles** and use the method above.	 $A = 8.8m^2$
Area of a Trapezium	$\frac{(a+b)}{2} \times h$ "Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium"	 $A = 55cm^2$
Compound Shape	A shape made up of a **combination of other known shapes** put together.	

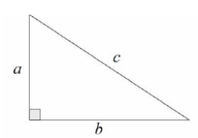
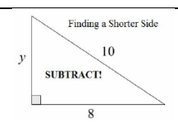
Circles

Parts of a Circle	**Radius** – the **distance** from the **centre** of a circle to the **edge** **Diameter** – the total **distance** across the **width** of a circle **through the centre**. **Circumference** – the **total distance** around the **outside** of a circle **Chord** – a **straight line** whose **end points lie on a circle** **Tangent** – a **straight line** which **touches** a circle at exactly **one point** **Arc** – a **part of the circumference** of a circle **Sector** – the **region** of a circle enclosed by **two radii** and their intercepted **arc** **Segment** – the **region** bounded by a **chord** and the **arc** created by the chord

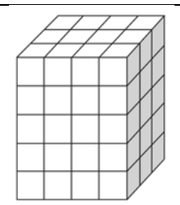
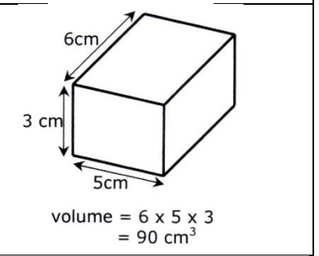
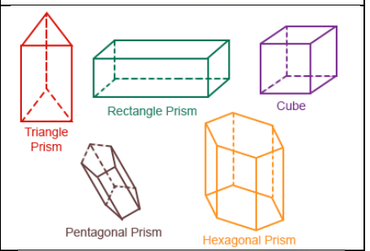
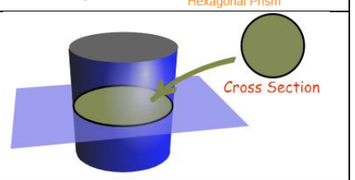
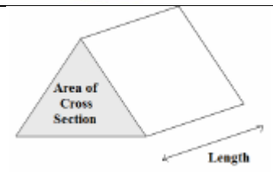
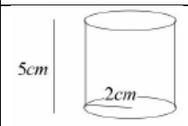


Area of a Circle	$A = \pi r^2$ which means 'pi x radius squared'.	If the radius was 5cm, then: $A = \pi \times 5^2 = 78.5cm^2$
Circumference of a Circle	$C = \pi d$ which means 'pi x diameter'	If the radius was 5cm, then: $C = \pi \times 10 = 31.4cm$
π ('pi')	Pi is the circumference of a circle divided by the diameter. $\pi \approx 3.14$	

Pythagoras' Theorem

Pythagoras' Theorem	For any **right angled triangle**: $a^2 + b^2 = c^2$  Used to find **missing lengths**. a and b are the shorter sides, c is the **hypotenuse** (**longest side**).	 $a = y,\ b = 8,\ c = 10$ $a^2 = c^2 - b^2$ $y^2 = 100 - 64$ $y^2 = 36$ $y = 6$

Volume and Surface Area

Volume	Volume is a measure of the amount of space inside a solid shape. Units: mm^3, cm^3, m^3 etc.	
Volume of a Cube/Cuboid	$\boldsymbol{V = Length \times Width \times Height}$ $\boldsymbol{V = L \times W \times H}$ You can also use the Volume of a Prism formula for a cube/cuboid.	 volume = 6 x 5 x 3 = 90 cm^3
Prism	A prism is a 3D shape whose **cross section is the same** throughout.	
Cross Section	The **cross section** is the **shape** that **continues** all the way **through the prism**.	
Volume of a Prism	$\boldsymbol{V = Area\ of\ Cross\ Section \times Length}$ $\boldsymbol{V = A \times L}$	
Volume of a Cylinder	$\boldsymbol{V = \pi r^2 h}$	 $V = \pi(4)(5)$ $= 62.8cm^3$