

What do I need to be able to do?

By the end of this unit you should be able to:

- Recognise and label parts of a circle
- Calculate fractional parts of a circle
- Calculate the length of an arc
- Calculate the area of a sector
- Understand and use volume of a cone, cylinder and sphere.
- Understand and use surface area of a cone, cylinder and sphere.

Keywords

Circumference: the length around the outside of the circle – the perimeter

Area: the size of the 2D surface

Diameter: the distance from one side of a circle to another through the centre

Radius: the distance from the centre to the circumference of the circle

Tangent: a straight line that touches the circumference of a circle

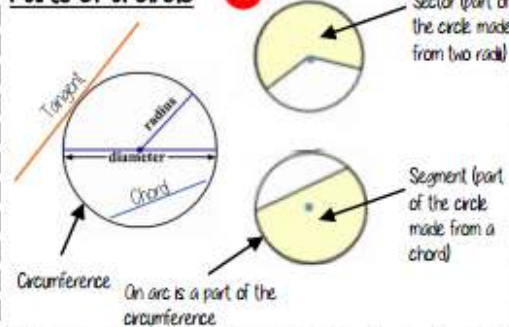
Chord: a line segment connecting two points on the curve

Frustum: a pyramid or cone with the top cut off

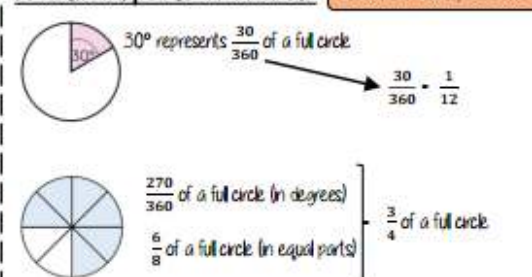
Hemisphere: half a sphere

Surface area: the total area of the surface of a 3D shape.

Parts of a circle



Fractional parts of a circle



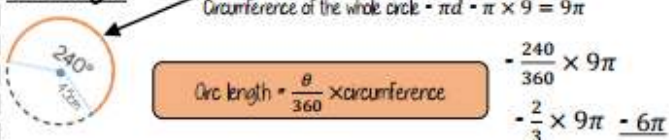
A circle is made up of 360°

Formula to remember:
Area of a circle = πr^2
Circumference of a circle = πd or $2\pi r$

The fraction of the circle is as $\frac{\theta}{360}$

θ represents the degrees in the sector

Arc length

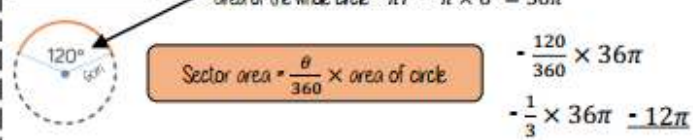


Perimeter

Perimeter is the length around the outside of the shape. This includes the arc length and the radii that enclose the shape.

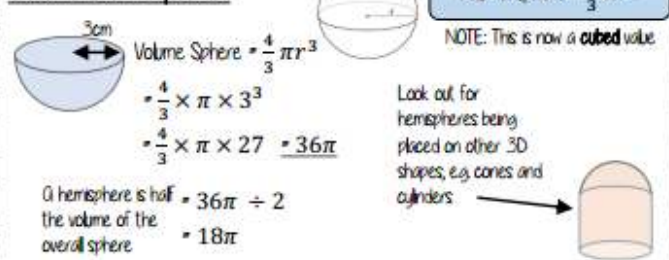
Perimeter = $\frac{\theta}{360} \times \text{circumference} + 2r = 12\pi + 18$

Sector area



Sector area = $\frac{\theta}{360} \times \text{area of circle} = \frac{120}{360} \times 36\pi = \frac{1}{3} \times 36\pi = 12\pi$

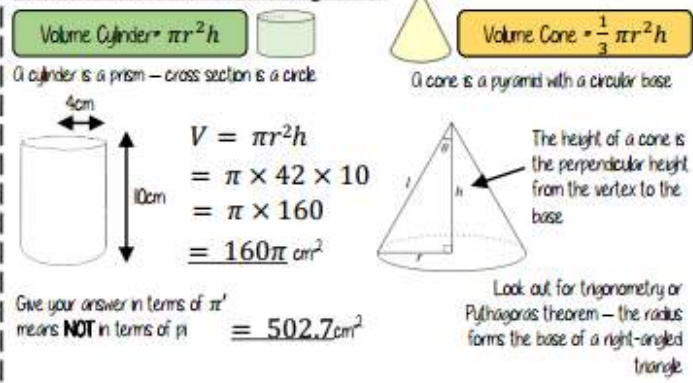
Volume of a sphere



Volume Sphere = $\frac{4}{3} \pi r^3$

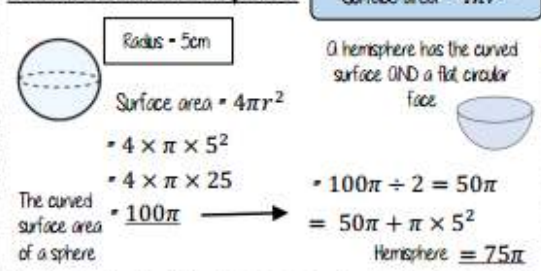
NOTE: This is now a cubed value.

Volume of a cone and a cylinder



Give your answer in terms of π means NOT in terms of pi $\approx 502.7 \text{ cm}^2$

Surface area of a sphere



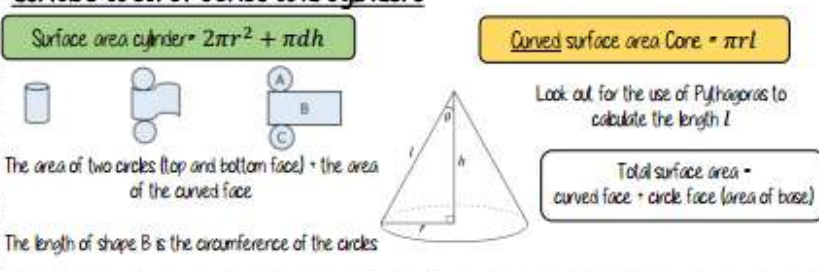
Surface area = $4\pi r^2$

A hemisphere has the curved surface AND a flat circular face

The curved surface area of a sphere = 100π

Hemisphere = $50\pi + \pi \times 5^2 = 75\pi$

Surface area of cones and cylinders



Surface area cylinder = $2\pi r^2 + \pi d h$

Curved surface area Cone = $\pi r l$

Total surface area = curved face + circle face (area of base)