SHAPE 2

Spring Term

Shape 2

Topics

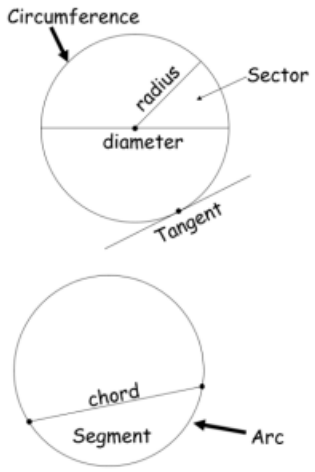
- Parts of a circle
- Area/circumference
- Area of a sector
- Arc length
- Area of compound shapes

What do I need to be able to do?

- Name the parts of a circle
- Find the area/circumference/arc length of a circle
- Find the area of a compound shape

Key Vocabulary

Circle	A 2D shape made by drawing a curve that is always the same distance from a centre
Radius	The distance from the centre of the circle outwards
Diameter	The distance across the circle, through the centre
Area	The size of a surface
Circumference	The distance around the circle
Sector	A "pie slice" part of a circle
Segment	The part of a circle made when it is cut by a line
Tangent	A line that just touches a curve at a point
Chord	A line segment connecting two points on a curve
Arc	Part of the circumference of a circle
Compound	Made up of more than one shape

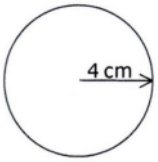


Career Links

Being able to confidently work with shape is a great skill to have and has lots of links with a number of careers such as:

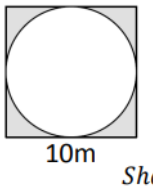
- Architecture
- Landscaping
- Engineering
- Construction
- Carpenter

Find the area and circumference to 2dp.

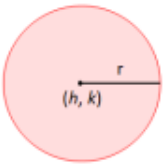


$$Circumference = \pi \times d$$
$$= \pi \times 8 = 25.13cm$$
$$Area = \pi \times r^2$$
$$= \pi \times 4^2 = 50.27cm^2$$

Find shaded area to 2dp.



$$Square\ area = 10 \times 10$$
$$= 100m^2$$
$$Circle\ area = \pi \times r^2$$
$$= \pi \times 5^2$$
$$= 78.54\ m^2$$
$$Shaded\ area = 100 - 78.54 = 21.46m^2$$

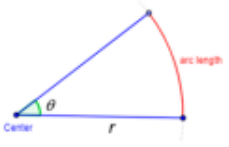


area of circle $= \pi r^2$

circumference $= 2\pi r$

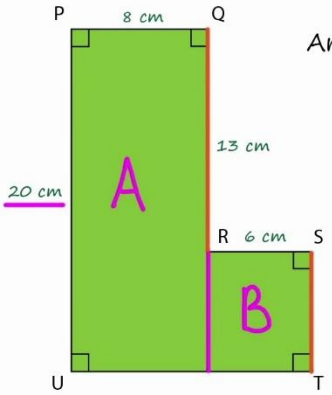
If θ is measured in degrees then

area of sector $= \frac{\theta}{360^\circ} \times \pi r^2$



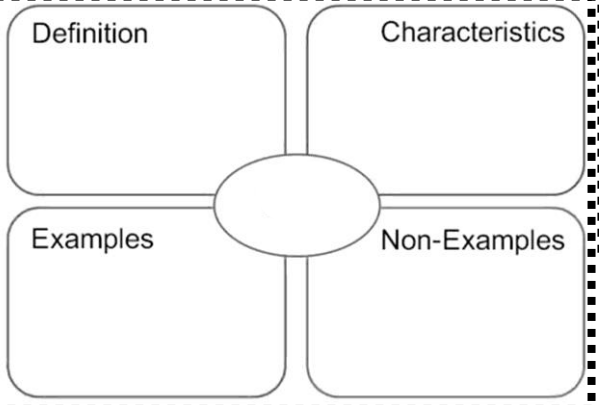
If θ is measured in degrees then

arc length $= \frac{\theta}{360^\circ} \times 2\pi r$



Area of Figure = Area A + Area B

Area A = 20cm × 8cm
= 160cm²



Year 9 H – Knowledge Organiser

SHAPE 3

Spring Term

Shape 3

Topics

- Volume of prisms
- Surface area of prisms
- Volume/ surface area of a cylinder
- Volume/surface area of a cone
- Volume of a sphere
- Volume of a pyramid
- Surface area of a cone/sphere/pyramid

What do I need to be able to do?

- Find the volume and surface area of different 3D shapes

Cube  6 square faces, 12 edges, 8 vertices	**Tetrahedron**  4 triangular faces, 6 edges, 4 vertices	**Sphere**  1 curved surface, 0 edges, 0 vertices
Cuboid  6 faces, 12 edges, 8 vertices	**Octahedron**  8 faces, 12 edges, 6 vertices	**Triangular prism**  5 faces, 9 edges, 6 vertices
Square-based pyramid  5 faces, 8 edges, 5 vertices	**Cone**  1 circular face, 1 curved surface, 1 curved edge, 1 apex	**Cylinder**  2 circular faces, 1 curved surface, 2 curved edges, 0 vertices

Career Links

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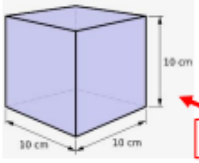
- Architecture
- Landscaping
- Engineering
- Construction
- Carpenter

Key Vocabulary

Prism	A solid object with two identical ends and flat sides
Surface area	The total area of the surface of a three dimensional object
Volume	The amount of 3 dimensional space something takes up
Cylinder	A solid object two identical flat ends that are circular and one curved side
Cone	A solid object that has a circular base joined to a point by a curved side
Sphere	A 3D object shaped like a ball
Pyramid	A solid object where the sides are triangles which meet at the top and the base is a polygon

Cubes: Find the area of one of the faces and then multiply by 6. This is because all of the faces of a cube are the same size.

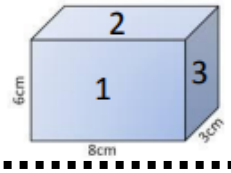


Area of 1 face = 10 x 10 = 100cm²

Total surface area = 100 x 6 = 600cm²

There are 6 faces with the same area.

Cuboids: They have 3 pairs of faces. We need to find the area of each of the faces we can see, add them together and then double.

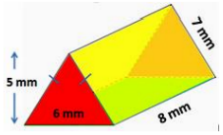


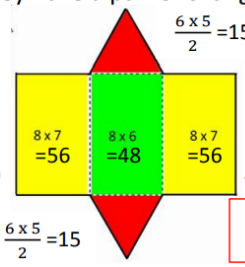
Face 1 = 8 x 6 = 48cm²
Face 2 = 8 x 3 = 24cm²
Face 3 = 3 x 6 = 18cm²

Total = 90cm²

Surface area = 2 x 90 = 180cm²

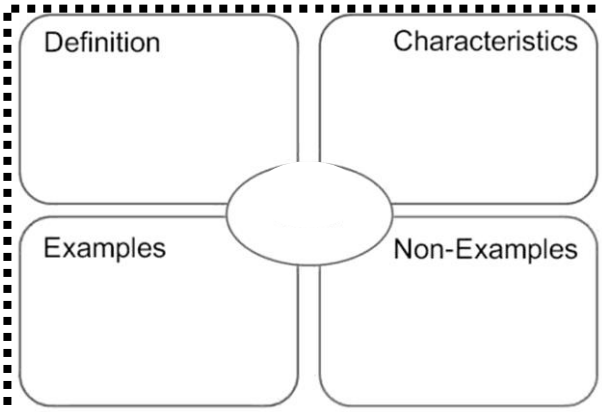
Triangular prism: They have a pair of triangular sides and 3 rectangular sides





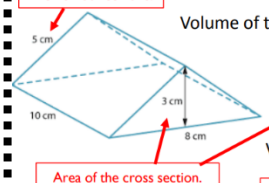
Surface area
= 15 + 15 + 56 + 56 + 48
=190mm²

Find the area of each face and then add together.



Prism: A prism is a solid object with identical ends and flat faces.
The general formula for the volume of a prism is:
Volume = Area of the cross section x Length

We do not need this.



Volume of triangular prism = Area of a triangle x length

Area of triangle $= \frac{3 \times 8}{2} = 12$

Volume = 12 x 10 = 120cm³

Area of the cross section.

Multiply the area of the cross section by 10 which is the length.

Year 9 H – Knowledge Organiser