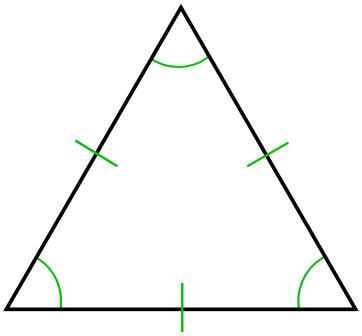
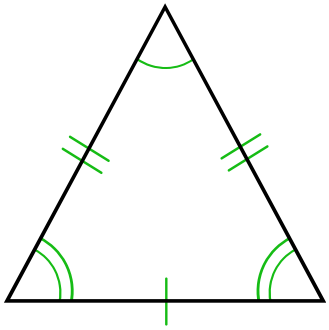
2D Shapes - Triangles

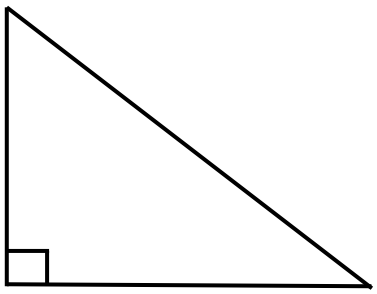
Equilateral - has 3 sides equal in length, and all 3 angles are 60 degrees



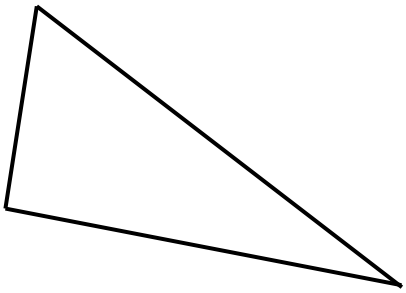
Isosceles - has 2 sides equal in length, and the two base angles are equal



Right Angled - has 1 angle equal to 90 degrees



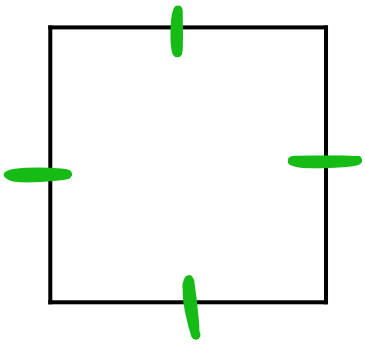
Scalene - has 3 sides of different length, and no angles are the same



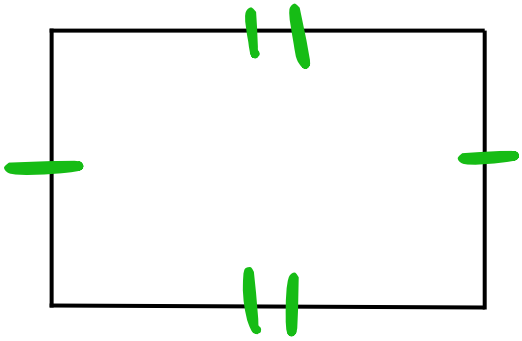
Geometry - Class 10

2D Shapes - Quadrilaterals

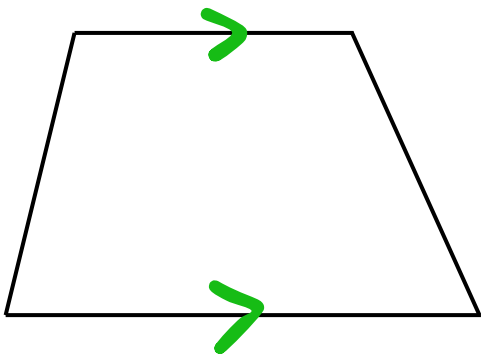
Square - has 4 sides and angles all equal, each angle is 90 degrees



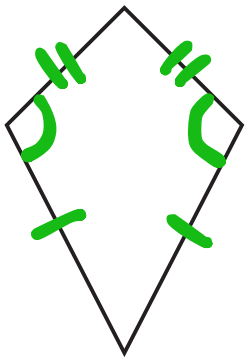
Rectangle - has 4 equal angles, each 90 degrees and the opposite lengths are equal



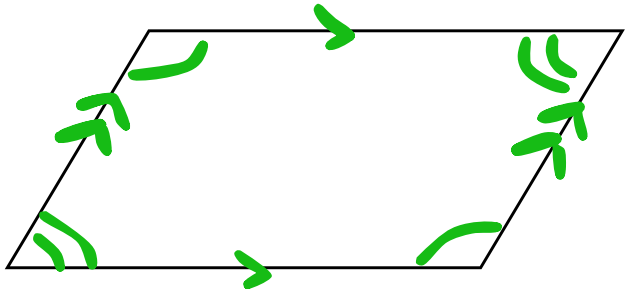
Trapezium - has 1 pair of parallel sides



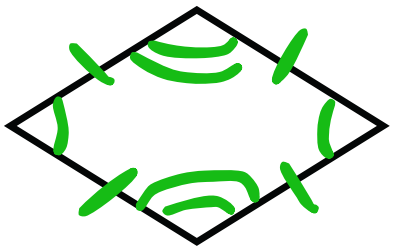
Kite - has 2 pairs of equal sides, each pair must be adjacent to each other. Additionally, two angles are equal (shown below)



Parallelogram - has 2 pairs of parallel sides. Additionally, opposite angles are equal, and adjacent angles add to 180 degrees.

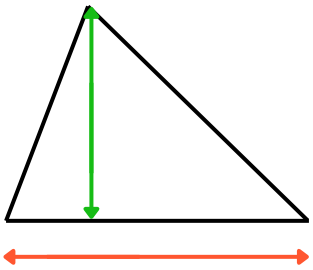


Rhombus - has 4 sides equal in length. Additionally, opposite angles are equal and opposite sides are parallel.



Geometry - Class 10

2D Shapes - Area

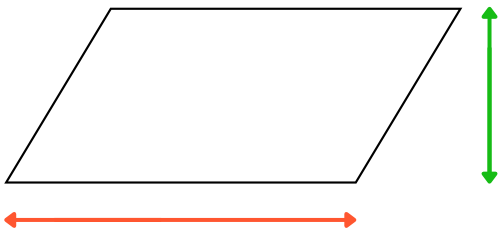


Triangle Area = $\frac{1}{2}$ x **b** x **h**

b --> base width
h --> vertical height

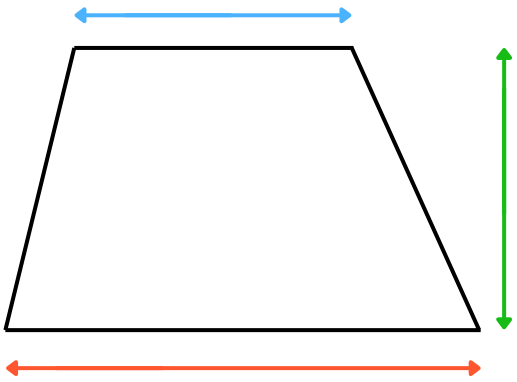
Rectangle Area = **L** x **W**

L --> length
W --> width



Parallelogram Area = **b** x **h**

b --> base
h --> vertical height



Trapezium Area = $\frac{1}{2}$ (**a** + **b**) **h**

a --> length of parallel side
b --> length of the other parallel side
h --> vertical height

Geometry - Class 10

Regular - all sides and angles are identical

Irregular - all sides and angles are different

Five sides = pentagon

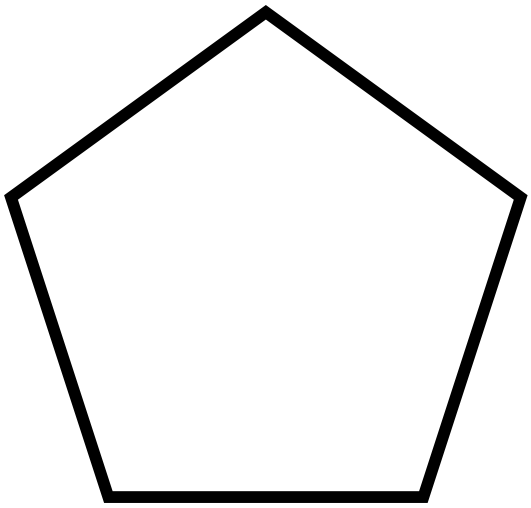
Six sides = hexagon

Seven sides = heptagon

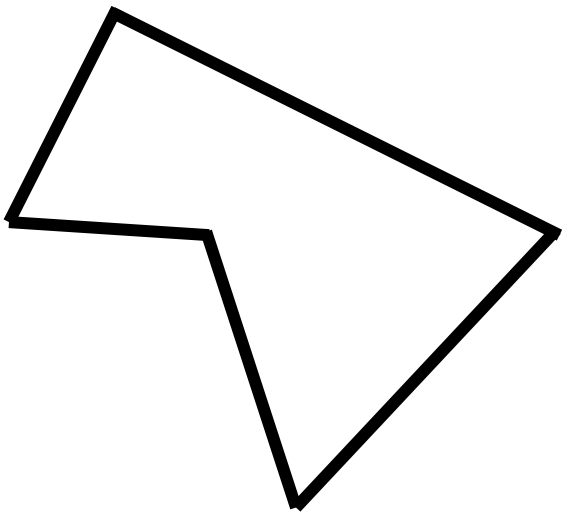
Eight sides = octagon

Nine sides = nonagon

Ten sides = decagon



Regular Pentagon

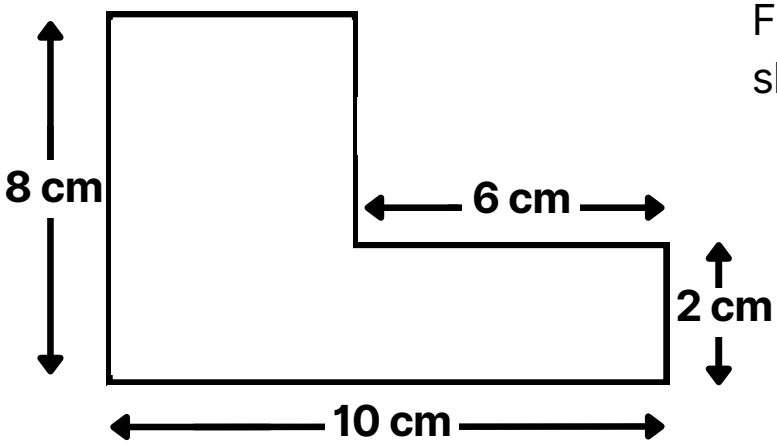


Irregular Pentagon

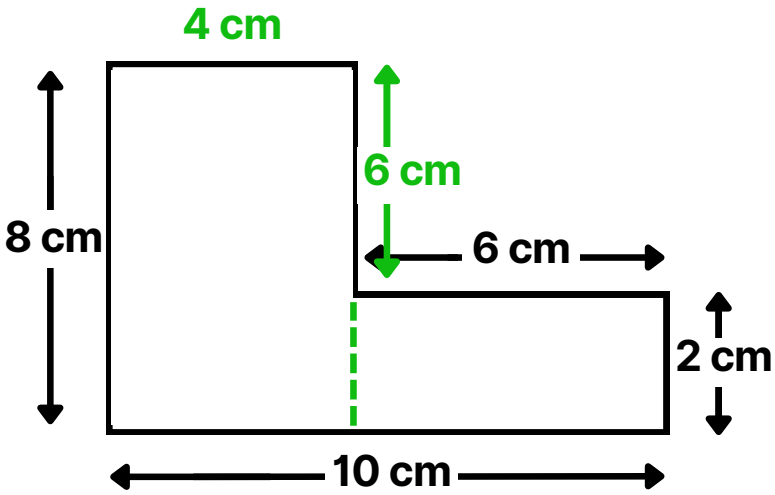
Geometry - Class 10

A compound shape is a combination of shapes. Often sides will be missing and therefore need to be found before finding the area and/ or perimeter.

Example



Find the area and perimeter of the shape.



We first need to work out the missing sides.

8 - 2 = 6
10 - 6 = 4

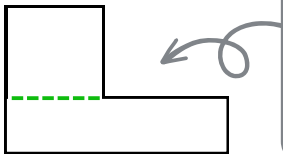
Perimeter --> all the sides added together

Perimeter = 8 + 4 + 6 + 6 + 2 + 10 = 36 cm

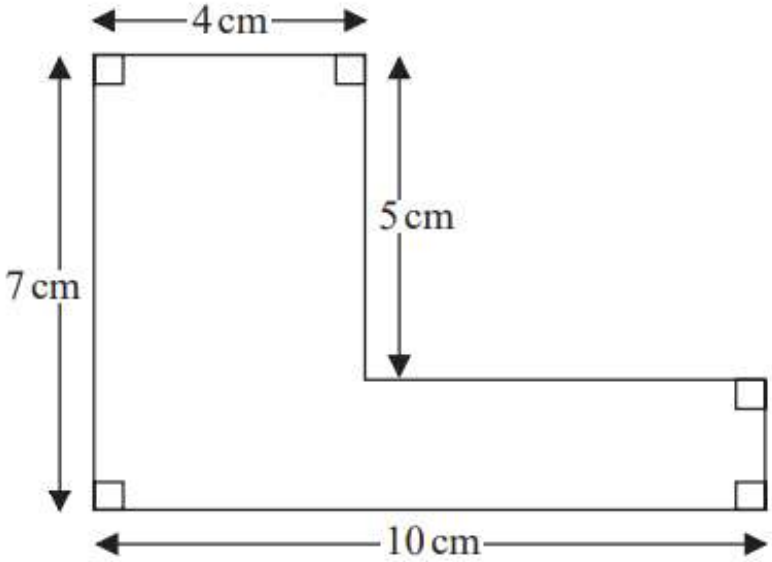
To find the area, we need to split the shape into two separate rectangles and work out the area of each

Rectangle 1 - 8 x 4 = 32 cm^2
Rectangle 2 - 6 x 2 = 12 cm^2

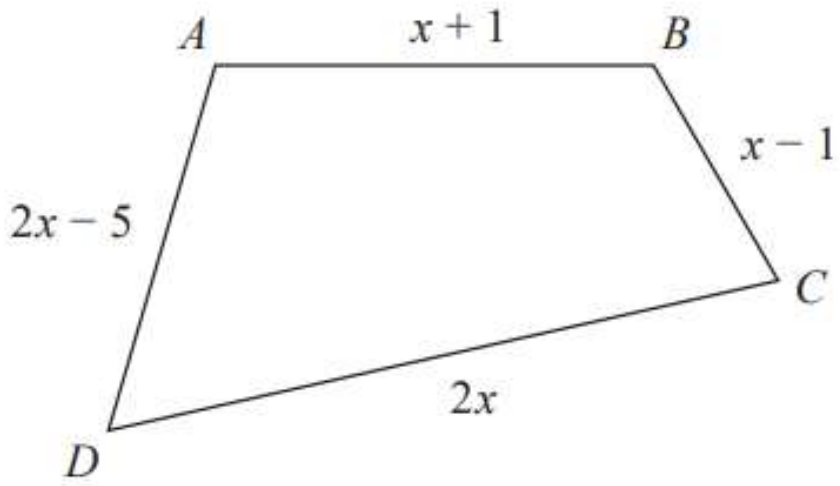
Area = 32 + 12 = 44 cm^2



the shape could also be split into two rectangles like this!



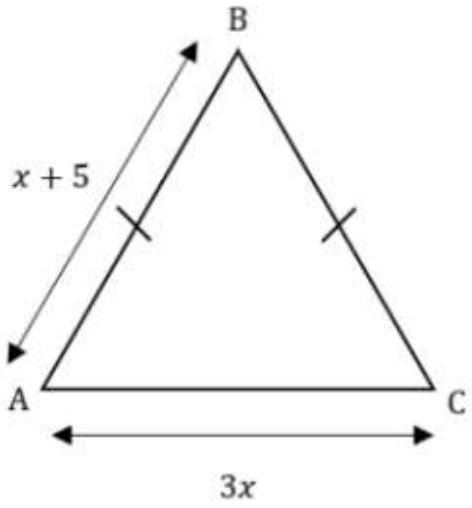
Work out the perimeter of the shape.



All the measurements are in centimetres.

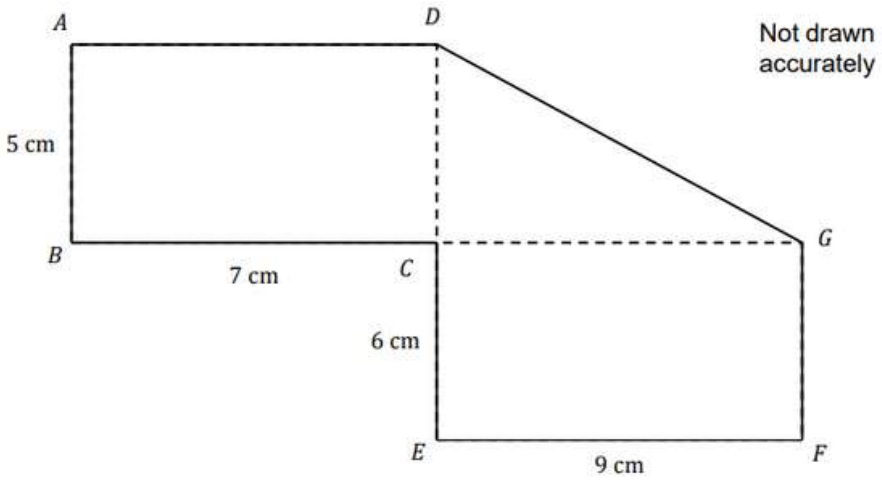
The perimeter of ABCD is 52 centimetres.

Work out the length of DC.



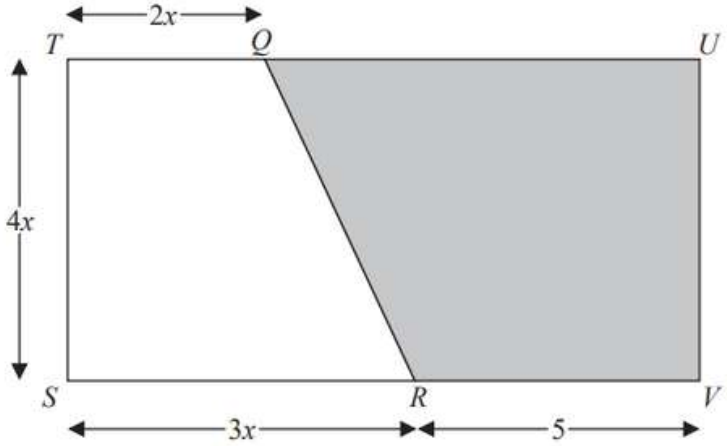
ABC is an isosceles triangle. The perimeter of ABC is 45 cm.

Work out the value of x.



The diagram shows a plan for some cardboard packaging.

Calculate the total area of the cardboard used.



The diagram shows a rectangle STUV.

TQU and SRV are straight lines.

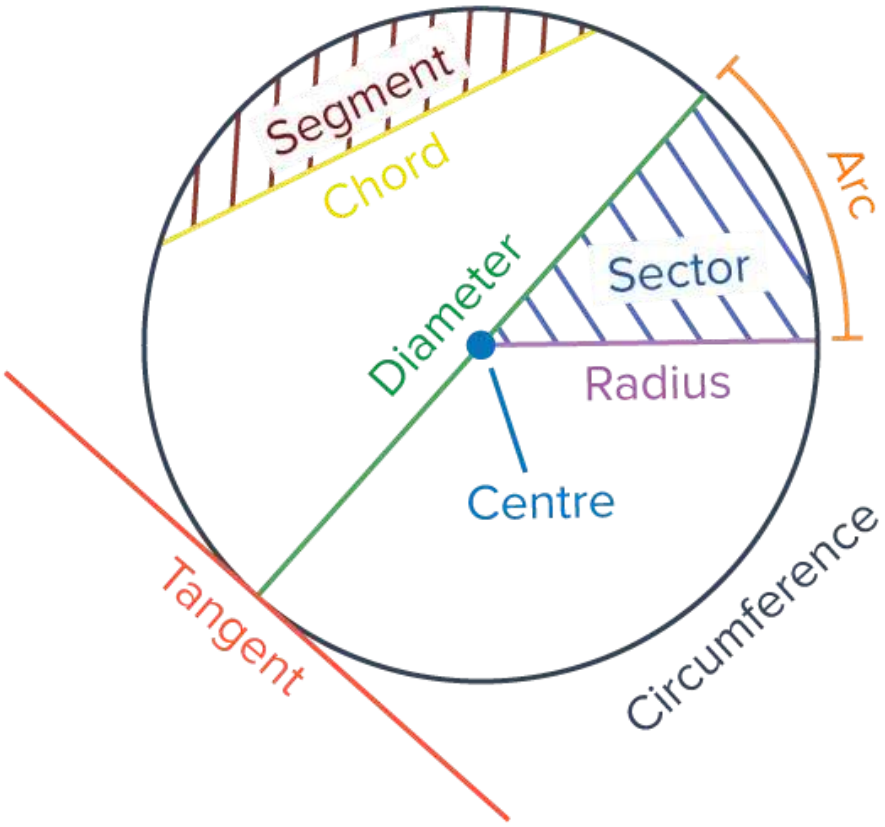
All measurements are in cm.

The area of the trapezium QUVR is A cm^2

Show that $A = 2x^2 + 20x$

2D Shapes - Circles

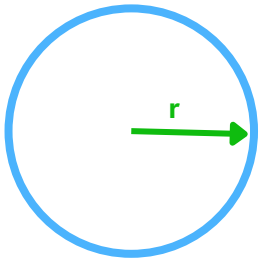
- The **circumference** is the outside edge of the circle.
- A **diameter** is a straight line going straight through the centre of the circle and touching the circumference at each end.
- A **chord** is a straight line joining any two parts of the circumference.
- A **segment** is the area bound by the circumference and a chord.
- An **arc** is a section of the circumference.
- A **radius** is a straight line joining the centre to the circumference.
- A **sector** is the area bound by two radii and an arc – like a pizza slice.
- A **tangent** is a straight line that touches the circumference at a single point.



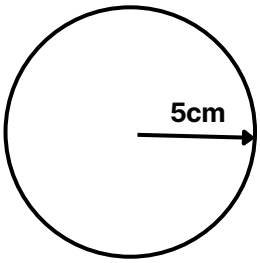
2D Shapes - Circles

Area = πr^2

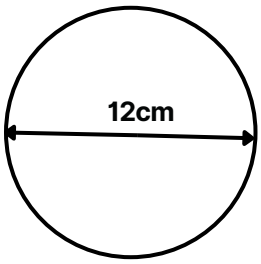
Circumference = $2\pi r$



Note: diameter is twice the length of the radius : **d=2r**



Area = π x 5^2 = 78.5 cm^2 (1 decimal place)
Circumference = 2 x π x 5 = 31.4 cm (1 decimal place)



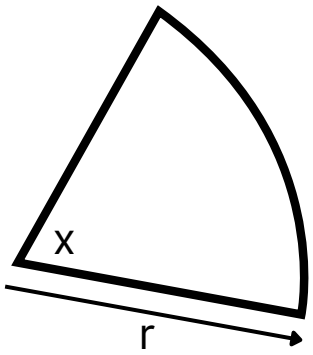
Area = π x 6^2 = 113.1 cm^2 (1 decimal place)
Circumference = 2 x π x 6 = 37.7 cm (1 decimal place)

2D Shapes - Circles

A sector is a proportion of the entire circle. As there are 360 degrees around the centre, we can use the equations below

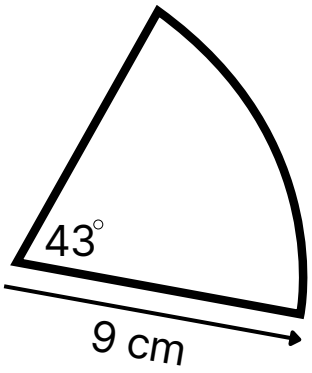
$$\text{Area of a sector} = \frac{x}{360} \pi r^2$$

area of full circle



$$\text{Arc length} = \frac{x}{360} 2\pi r$$

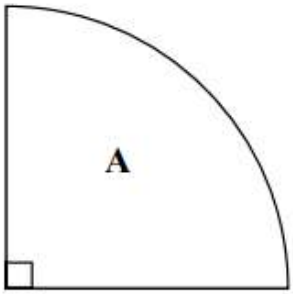
circumference of full circle

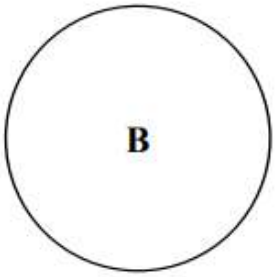


$$\text{Area of a sector} = \frac{43}{360} \pi \times 9^2 = 30.4 \text{ (1 decimal place)}$$

$$\text{Arc length} = \frac{43}{360} 2\pi \times 9 = 6.8 \text{ (1 decimal place)}$$

2D Shapes - Circles



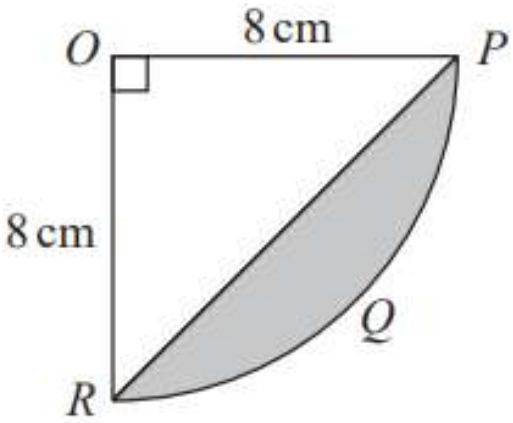


A is in the shape of a quarter circle of radius 15 cm.
B is in the shape of a circle.

The area of A is 9 times the area of B.

Show that the radius of B is 2.5 cm.

2D Shapes - Circles



The diagram shows a sector OPQR of a circle, centre O and radius 8 cm.

OPR is a triangle.

Work out the area of the shaded segment PQR.

Give your answer to 3 significant figures.

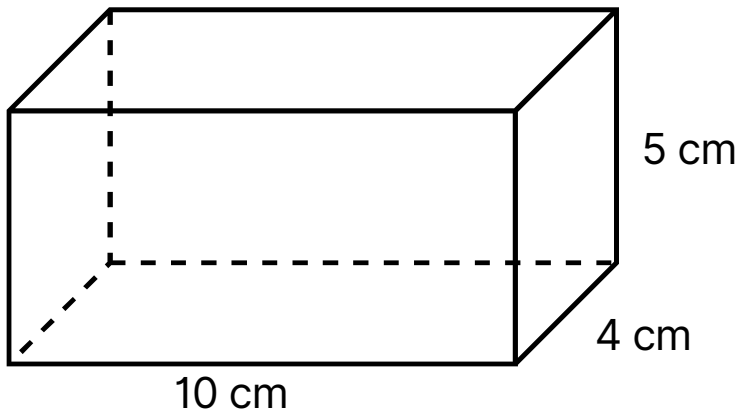
3D Shapes - Volume + Surface Area

When a shape has a cross section (2D) shape on the end and then is the same width throughout, you simply need to find the area of the cross section and then multiply this by the length/width to find the volume.

The surface area of a 3D shape is found by finding the area of all the faces of the shape and adding them together.

Volume is measured in cm^3

Surface area is measured in cm^2

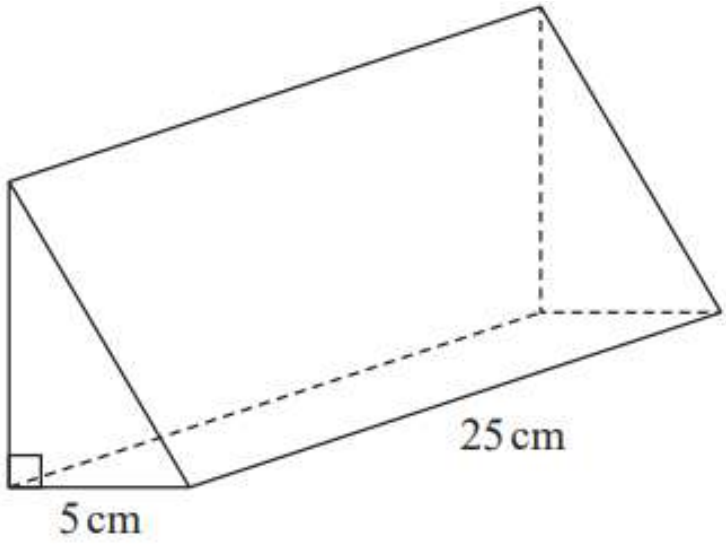


Volume: $10 \times 4 \times 5 = 200\ cm^3$

Left and right faces - $2 \times 4 \times 5 = 40\ cm^2$
Top and bottom faces - $2 \times 4 \times 10 = 80\ cm^2$
Front and back faces - $2 \times 5 \times 10 = 100\ cm^2$

Surface area: $100 + 80 + 40 = 220\ cm^2$

3D Shapes - Volume

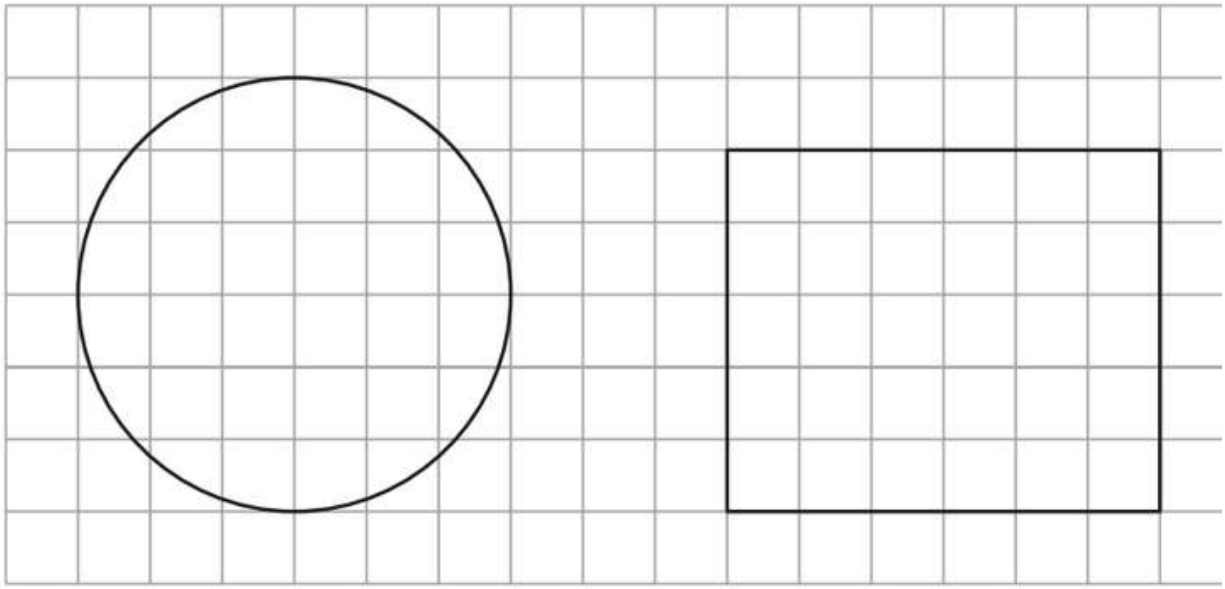


The cross-section of the prism is a right-angled triangle.
The base of the triangle has length 5 cm

The prism has length 25 cm
The prism has volume 750 cm^3

Work out the height of the prism.

3D Shapes - Volume



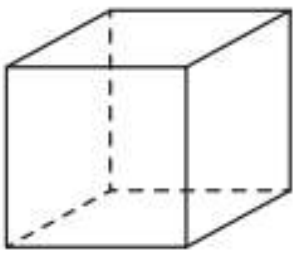
Plan Front elevation

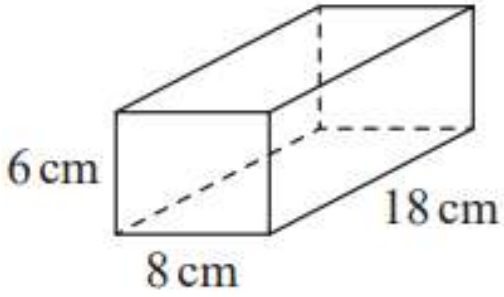
The centimetre grid shows the plan and the front elevation of a cylinder.

Work out the volume of the cylinder.

Give your answer in terms of π

3D Shapes - Surface Area





The diagram shows a cube and a cuboid.

The total surface area of the cube is equal to the total surface area of the cuboid.

Janet says,

"The volume of the cube is equal to the volume of the cuboid"

Is Janet correct?

You must show how you get your answer.