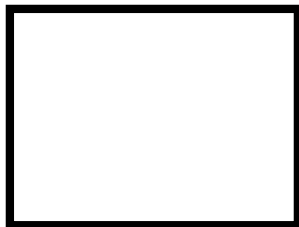


## Area – Rectangles and Circles

Area – the amount of surface an object has

- area has 2 dimensions, therefore the units are always squared
- to find the area of a square or rectangle, you multiply the length by the width

e.g.



2 cm

3 cm

$$A = L \times W$$

$$A = 3 \text{ cm} \times 2 \text{ cm}$$

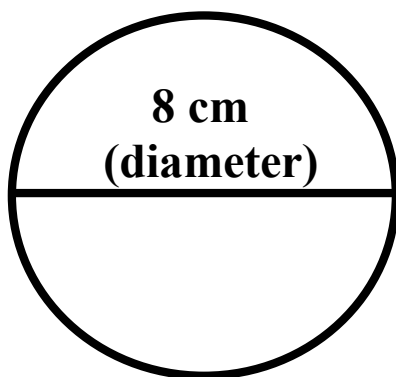
$$A = 6 \text{ cm}^2$$

To find the area of a circle, square the radius and then multiply by Pi ( $\Pi = 3.14\dots$ ).

$$\text{Area}_{\text{circle}} = \Pi r^2$$

In this class,  $\Pi$  will always be 3.14 – do not use the  $\Pi$  button!

“r” is the radius of the circle, which is half of the diameter.



To find the area of this circle:

$$A = \Pi r^2$$

$$r = 8 \text{ cm} \div 2 \rightarrow 4 \text{ cm}$$

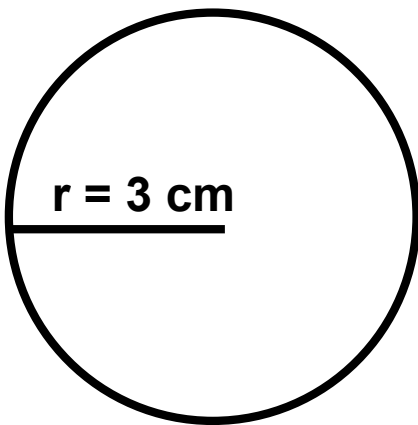
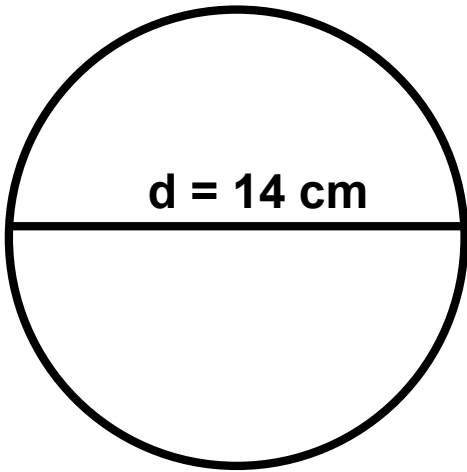
$$A = 3.14 \times 4 \text{ cm} \times 4 \text{ cm}$$

$$A = 3.14 \times 16 \text{ cm}^2$$

$$A = 50.24 \text{ cm}^2$$

**NOTE:** Unless you are told otherwise, always round to the hundredths place (2 places past the decimal).

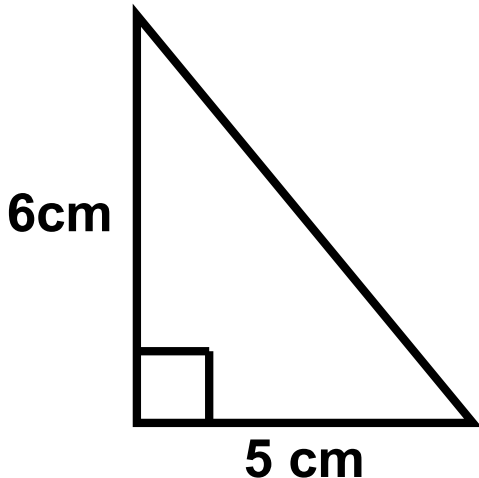
**Find the area of the following circles. Show all of your work, including proper units where appropriate.**



## Area – Right Triangles and Trapezoids

### Right Triangles:

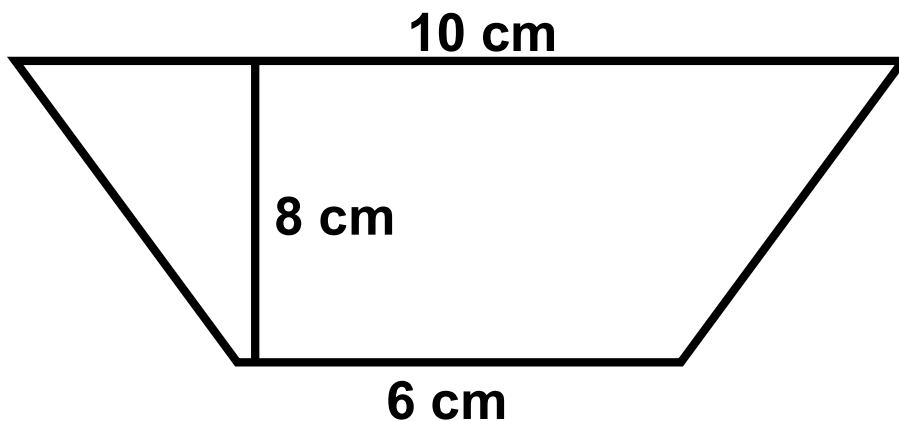
$$A = \frac{1}{2} \times \text{base} \times \text{height} \quad A = \frac{1}{2} b h \quad \text{or} \quad A = \frac{bh}{2}$$



$$A = \frac{1}{2} b h$$
$$A = \frac{1}{2} \times 5 \text{ cm} \times 6 \text{ cm}$$
$$A = \frac{1}{2} \times 30 \text{ cm}^2$$
$$A = 15 \text{ cm}^2$$

### Trapezoids:

$$A = \frac{1}{2} \times \text{height} \times (\text{base}_1 + \text{base}_2) \quad A = \frac{1}{2} h (b_1 + b_2)$$



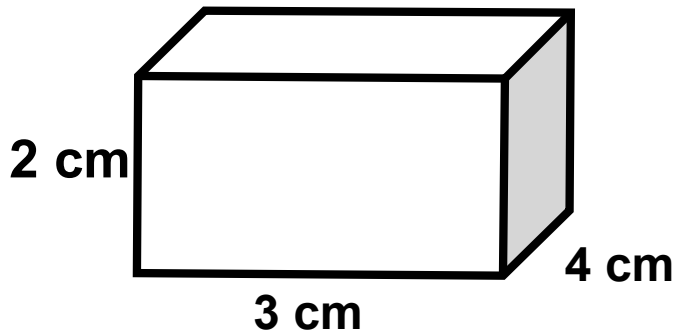
$$A = \frac{1}{2} h (b_1 + b_2)$$
$$A = \frac{1}{2} \times 8 \text{ cm} \times (6 \text{ cm} + 10 \text{ cm})$$
$$A = 4 \text{ cm} (16 \text{ cm})$$
$$A = 64 \text{ cm}^2$$

# Volume

1. Volume – how much space an object occupies
2. Volume has 3 dimensions, therefore the units are always cubed.
3. To find the volume of a cube, multiply length, width, and height (or depth) together.

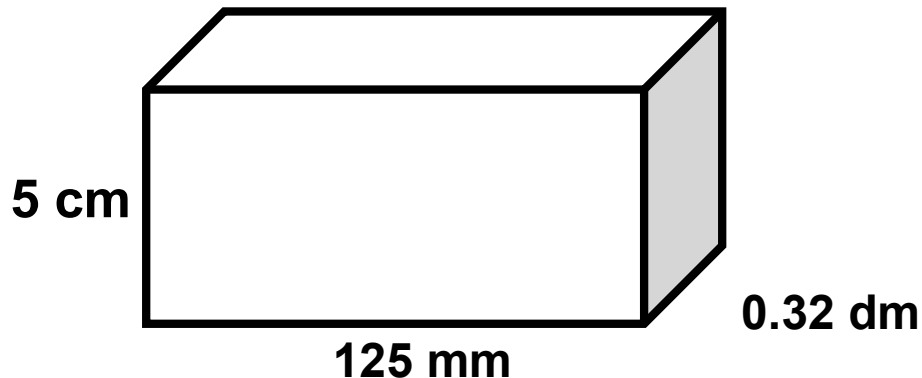
$$V = L \times W \times H$$

e.g.



$$\begin{aligned} V &= 3 \text{ cm} \times 2 \text{ cm} \times 4 \text{ cm} \\ &= 24 \text{ cm}^3 \end{aligned}$$

**Be careful – all of the units must be the same to multiply them together. Try to find the volume for the following:**

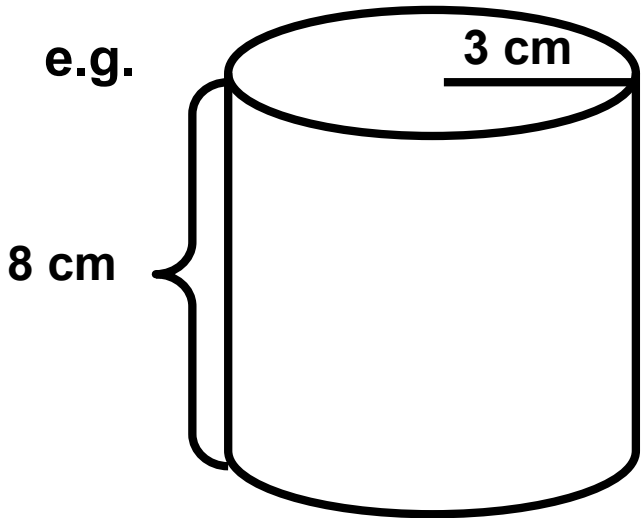


## Volume of Cylinders and Sphere

To find the volume of a cylinder:

$$V = \Pi \times \text{Radius}^2 \times \text{height}$$

$$V = \Pi r^2 h$$



$$V = 3.14 \times 3\text{cm} \times 3\text{cm} \times 8\text{cm}$$

$$V = 3.14 \times 9\text{cm}^2 \times 8\text{cm}$$

$$V = 226.08 \text{ cm}^3$$

To find the volume of a sphere:

$$V = 4/3 \times \Pi \times \text{radius}^3$$

e.g. a ball with a radius of 2 cm

$$V = 4/3 \times 3.14 \times 2\text{cm} \times 2\text{cm} \times 2\text{cm}$$

$$V = 4/3 \times 3.14 \times 8 \text{ cm}^3$$

$$V = 33.49 \text{ cm}^3$$

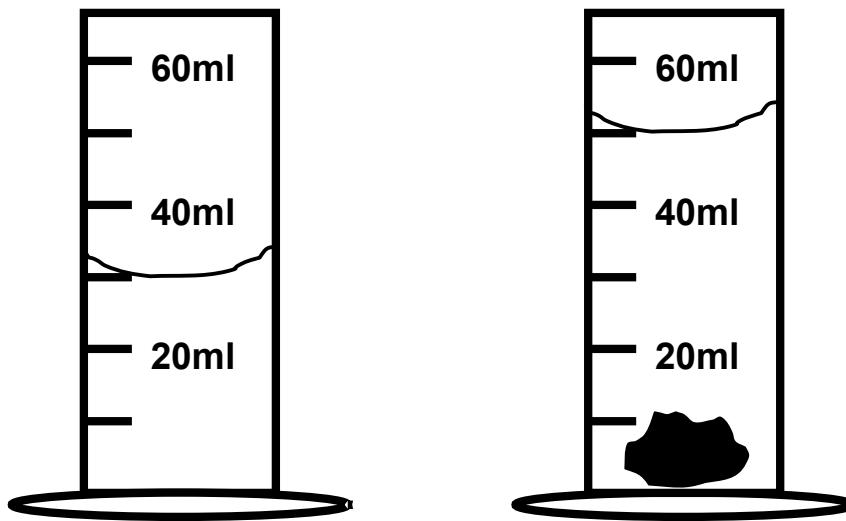
# Volume of Irregularly Shaped Objects

## Water Displacement Method

**Displacement = movement**

**Steps:**

- 1. Carefully place the object into a calibrated container filled with water. Be sure to note the water level before placing the object into it.**
- 2. The object will move water out of the way. Check how much space the object occupies by finding how much water is moved.**
- 3. The amount of water displaced will be exactly equal to the volume of the object.**



**Meniscus: the middle of the curved surface of the liquid**

**Volume of the object: 2<sup>nd</sup> reading – 1<sup>st</sup> reading**

$$V = 50 \text{ ml} - 30 \text{ ml}$$

$$V = 20 \text{ ml}$$