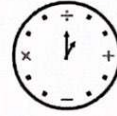
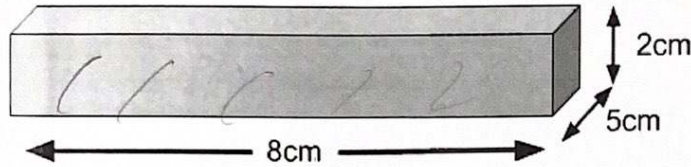


## QT Compound Measures



1. A bar of gold has a length of 8cm, a height of 5cm and a width of 2cm as shown below. The bar of gold has a mass of 1.52kg. Work out the density of the bar of gold giving your answer in  $\text{g/cm}^3$



$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$= \frac{1520}{80} = \underline{\underline{19 \text{ g/cm}^3}}$$

1520g.

$$\begin{aligned} \text{Vol} &= \text{Area} \times \text{Depth} \\ &= (8 \times 2) \times 5 \\ &= 80 \text{ cm}^3 \end{aligned}$$

2. A steel block exerts a force of 120 Newtons on the ground. The block has an area of  $2.5\text{m}^2$ . Work out the pressure on the ground, giving your answer in  $\text{N/m}^2$

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

$$= \frac{120}{2.5} = \underline{\underline{48 \text{ N/m}^2}}$$

3. A crystal rock has a density of  $1.6 \text{ g/cm}^3$  and a mass of 80g. Work out the volume of the crystal rock.

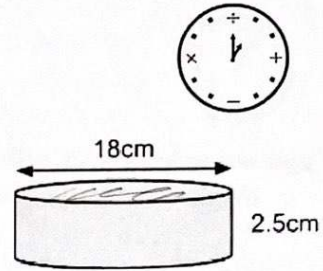
$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$1.6 = \frac{80}{\text{Volume}}$$

$$\text{Volume} = \frac{80}{1.6} = \underline{\underline{50 \text{ cm}^3}}$$

## QT Compound Measures

4. A solid cylinder is made of wood.  
It has a diameter of 18cm and a height of 2.5cm  
The cylinder has a mass of 392 grams  
Work out the density of the wood



Give your answer correct to 2 significant figures.

$$\begin{aligned} \text{Density} &= \frac{\text{Mass}}{\text{Volume}} \\ &= \frac{392}{202.5\pi} \\ &= 0.61618 \text{ g/cm}^3 \\ &= \underline{\underline{0.62 \text{ g/cm}^3}} \end{aligned}$$

$$\begin{aligned} \text{Volume} &= \text{Area} \times \text{Depth} \\ &= \pi r^2 \times 2.5 \\ &= \pi(9)^2 \times 2.5 \\ &= 202.5\pi \text{ cm}^3 \end{aligned}$$

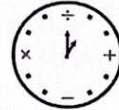
5. A train travels a distance of 295 miles in 3 hours and 20 minutes. Work out the average speed of the train in miles per hour.

$$\begin{aligned} \text{Speed} &= \frac{\text{Distance}}{\text{Time}} \\ &= \frac{295}{3\frac{20}{60}} = \underline{\underline{88.5 \text{ mph}}} \end{aligned}$$

6. An iron bar exerts a force of 38 Newtons on a table. The pressure on the table is 30 N/m<sup>2</sup>. Work out the area of the iron bar that is in contact with the table.

$$\begin{aligned} \text{Pressure} &= \frac{\text{Force}}{\text{Area}} \\ 30 &= \frac{38}{\text{Area}} \\ \text{Area} &= \frac{38}{30} = \underline{\underline{1.26 \text{ m}^2}} \end{aligned}$$

## QT Compound Measures



7. Govin drives 200 miles from Leeds to London. He drives the first 78 miles at an average speed of 65mph. From this point it takes Govin 1 hour and 48 minutes to complete his journey.

Work out Govin's average speed for the whole journey.

Give your answer correct to 1 decimal place.

First  
78 miles

$$\text{Speed} = \frac{\text{Dist}}{\text{Time}}$$

$$65 = \frac{78}{\text{Time}}$$

$$\text{Time} = \frac{78}{65}$$

$$= 1.2 \text{ hours}$$

$$1 + (0.2 \text{ of } 60)$$

$$= 1 \text{ hr } 12 \text{ mins.}$$

Whole  
Journey

$$\text{Speed} = \frac{\text{Dist}}{\text{Time}}$$

$$= \frac{200}{1 \frac{12}{60} + 1 \frac{48}{60}}$$

$$= 66.6 \text{ mph}$$

$$= 66.7 \text{ mph.}$$

$$= \underline{\underline{66.7 \text{ mph.}}}$$

8. John drives from Leeds to London at an average speed of 65 miles per hour. The journey takes him 3 hours and 15 minutes.

Julie makes the same journey in 3 hours and 35 minutes.

Work out Julie's average speed for the journey.

Give your answer correct to 2 significant figures.

$$\text{John} = \text{Speed} = \frac{\text{Dist}}{\text{Time}}$$

$$65 = \frac{\text{Dist}}{3 \frac{15}{60}}$$

$$211.25 = \text{Dist}$$

$$\text{Julie} \Rightarrow \text{Speed} = \frac{\text{Dist}}{\text{Time}}$$

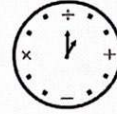
$$= \frac{211.25}{3 \frac{35}{60}}$$

$$= 58.953488$$

$$= 59 \text{ mph.}$$

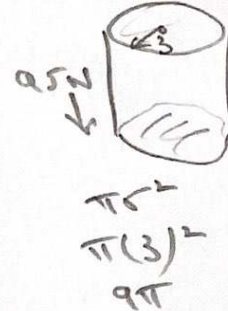
$$= \underline{\underline{59 \text{ mph.}}}$$

# QT Compound Measures



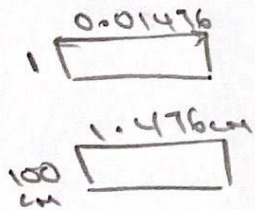
9. A cylinder is placed on the ground. The cylinder has a weight of 95 Newtons and a radius of 3cm. Work out the pressure on the ground in  $\text{N/cm}^2$

$$\begin{aligned}
 \text{Pressure} &= \frac{\text{Force}}{\text{Area}} \\
 &= \frac{95}{9\pi} \\
 &= 3.35993 \text{ N/cm}^2 \\
 &= \underline{\underline{3.36 \text{ N/cm}^2}} \text{ (2dp)}
 \end{aligned}$$



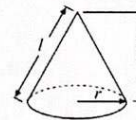
10. A cone with a perpendicular height of 20cm, is placed on a table. The weight of the cone is 62N. The cone exerts a pressure of  $4200 \text{ N/m}^2$  on the table. Work out the volume of the cone, giving your answer in  $\text{cm}^3$ .

$$\begin{aligned}
 \text{Pressure} &= \frac{\text{Force}}{\text{Area}} \\
 4200 &= \frac{62}{\text{Area}} \\
 \text{Area} &= \frac{62}{4200} \\
 &= 0.01476 \text{ m}^2 \\
 &= 147.6 \text{ cm}^2 \\
 &= \pi r^2
 \end{aligned}$$



Volume of cone =  $\frac{1}{3}\pi r^2 h$

Curved surface area of cone =  $\pi r l$



$$\begin{aligned}
 \text{Volume} &= \frac{1}{3}\pi r^2 h \\
 &= \frac{1}{3}(147.6)(20) \\
 &= \underline{\underline{984 \text{ cm}^3}}
 \end{aligned}$$