

**Compound Measures Questions - Calculator**

1.

A box in the shape of a cuboid is placed on a horizontal floor.

The box exerts a force of 180 newtons on the floor.

The box exerts a pressure of 187.5 newtons/m<sup>2</sup> on the floor.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The face in contact with the floor is a rectangle of length 1.2 metres and width  $x$  metres.

Work out the value of  $x$ .

2.

Jessica runs for 15 minutes at an average speed of 6 miles per hour.

She then runs for 40 minutes at an average speed of 9 miles per hour.

It takes Amy 45 minutes to run the same total distance that Jessica runs.

Work out Amy's average speed.

Give your answer in miles per hour.

3.

Liquid **A** has a density of  $1.8 \text{ g/cm}^3$

Liquid **B** has a density of  $1.2 \text{ g/cm}^3$

$80 \text{ cm}^3$  of liquid **A** is mixed with  $40 \text{ cm}^3$  of liquid **B** to make  $120 \text{ cm}^3$  of liquid **C**.

Work out the density of liquid **C**.

4.

A water tank is empty.

Anil needs to fill the tank with 2400 litres of water.

Company **A** supplies water at a rate of 8 litres in 1 minute 40 seconds.

Company **B** supplies water at a rate of 2.2 gallons per minute.

1 gallon = 4.54 litres

Company **A** would take more time to fill the tank than Company **B** would take to fill the tank.

How much more time?

Give your answer in minutes correct to the nearest minute.

5.

Andy cycles a distance of 30 km at an average speed of 24 km/h.  
He then runs a distance of 12 km at an average speed of 8 km/h.

Work out the total time Andy takes.  
Give your answer in hours and minutes.

6.

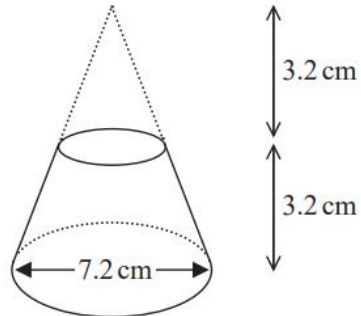
The density of ethanol is  $1.09 \text{ g/cm}^3$   
The density of propylene is  $0.97 \text{ g/cm}^3$

60 litres of ethanol are mixed with 128 litres of propylene to make 188 litres of antifreeze.

Work out the density of the antifreeze.  
Give your answer correct to 2 decimal places.

7.

Here is a frustum of a cone.

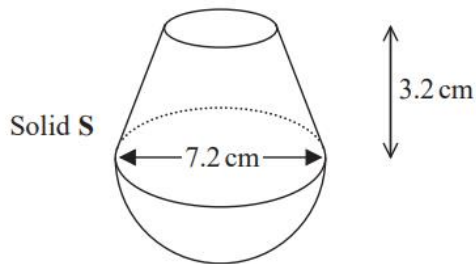


Volume of sphere =  $\frac{4}{3} \pi r^3$

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

The diagram shows that the frustum is made by removing a cone with height 3.2 cm from a solid cone with height 6.4 cm and base diameter 7.2 cm.

The frustum is joined to a solid hemisphere of diameter 7.2 cm to form the solid **S** shown below.



The density of the frustum is 2.4 g/cm<sup>3</sup>

The density of the hemisphere is 4.8 g/cm<sup>3</sup>

8.

Lara is a skier.

She completed a ski race in 1 minute 54 seconds.  
The race was 475 m in length.

Lara assumes that her average speed is the same for each race.

- (a) Using this assumption, work out how long Lara should take to complete a 700 m race.  
Give your answer in minutes and seconds.

(c)

Lara's average speed actually increases the further she goes.

- (b) How does this affect your answer to part (a)?
-

9.

A force of 70 newtons acts on an area of  $20 \text{ cm}^2$

The force is increased by 10 newtons.

The area is increased by  $10 \text{ cm}^2$

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Helen says,

“The pressure decreases by less than 20%”

Is Helen correct?

You must show how you get your answer.

10.

A gold bar has a mass of 12.5 kg.

The density of gold is  $19.3 \text{ g/cm}^3$

Work out the volume of the gold bar.

Give your answer correct to 3 significant figures.

11.

Olly drove 56 km from Liverpool to Manchester.  
He then drove 61 km from Manchester to Sheffield.

Olly's average speed from Liverpool to Manchester was 70 km/h.  
Olly took 75 minutes to drive from Manchester to Sheffield.

(a) Work out Olly's average speed for his total drive from Liverpool to Sheffield.

Janie drove from Barnsley to York.

Janie's average speed from Barnsley to Leeds was 80 km/h.  
Her average speed from Leeds to York was 60 km/h.

Janie says that the average speed from Barnsley to York can be found by working out the mean of 80 km/h and 60 km/h.

(b) If Janie is correct, what does this tell you about the two parts of Janie's journey?

12.

The density of apple juice is 1.05 grams per  $\text{cm}^3$ .

The density of fruit syrup is 1.4 grams per  $\text{cm}^3$ .

The density of carbonated water is 0.99 grams per  $\text{cm}^3$ .

25  $\text{cm}^3$  of apple juice are mixed with 15  $\text{cm}^3$  of fruit syrup and 280  $\text{cm}^3$  of carbonated water to make a drink with a volume of 320  $\text{cm}^3$ .

Work out the density of the drink.

Give your answer correct to 2 decimal places.