

# DENSITY

Volume of prism = area of cross-section  $\times$  length  
 given to you  $\uparrow$

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A metal bar has a uniform cross-section in the shape of a trapezium ABCD.

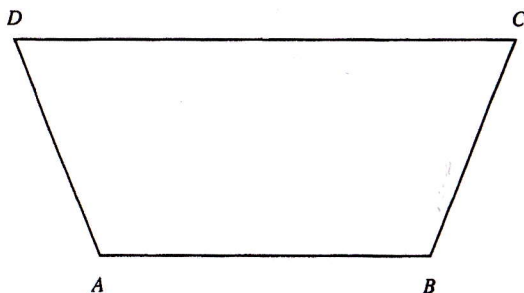


Diagram not drawn to scale.

The area of the cross-section of the metal bar is  $48.7 \text{ cm}^2$ .  
 It is  $12.8 \text{ cm}$  long and has a mass of  $3.2 \text{ kg}$ .  
 Calculate the density of the metal from which the bar is made, giving your answer in  $\text{g/cm}^3$ .

$$\text{Volume of bar} = 48.7 \times 12.8 = 623.36 \text{ cm}^3$$

$$\text{Density} = \frac{\text{Mass (in g)}}{\text{Volume (in cm}^3\text{)}} = \frac{3200}{623.36} = 5.1 \text{ g/cm}^3$$

[4]

Turn over.

density =  $\frac{\text{Mass}}{\text{Volume}}$   
 Mt given to you  $\rightarrow$

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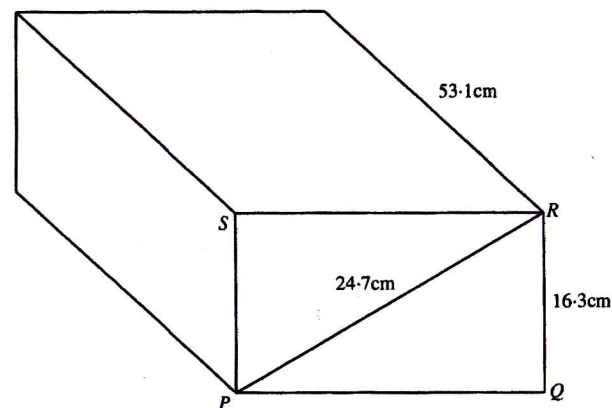


Diagram not drawn to scale.

The diagram shows a cuboid of length  $53.1 \text{ cm}$ . The cross-section, PQRS, is such that  $PR = 24.7 \text{ cm}$  and  $QR = 16.3 \text{ cm}$ .

(a) Calculate the length of PQ.

$$PQ^2 = 24.7^2 - 16.3^2$$

$$PQ^2 = 344.4$$

$$PQ = \sqrt{344.4} = 18.6 \text{ cm}$$

[3]

(b) The density of the material from which the cuboid is made is  $4.3 \text{ g/cm}^3$ . Calculate the mass of the cuboid in kilograms.

$$\text{Volume of cuboid} = 18.6 \times 16.3 \times 53.1 = 16098.9 \text{ cm}^3$$

$$\begin{aligned} D &= \frac{m}{V} \quad \text{so} \quad \text{Mass} = D \times V \\ &= 4.3 \times 16098.9 = 69225 \text{ grams} \\ &= 69.225 \text{ kg} \end{aligned}$$

[3]

Turn over.