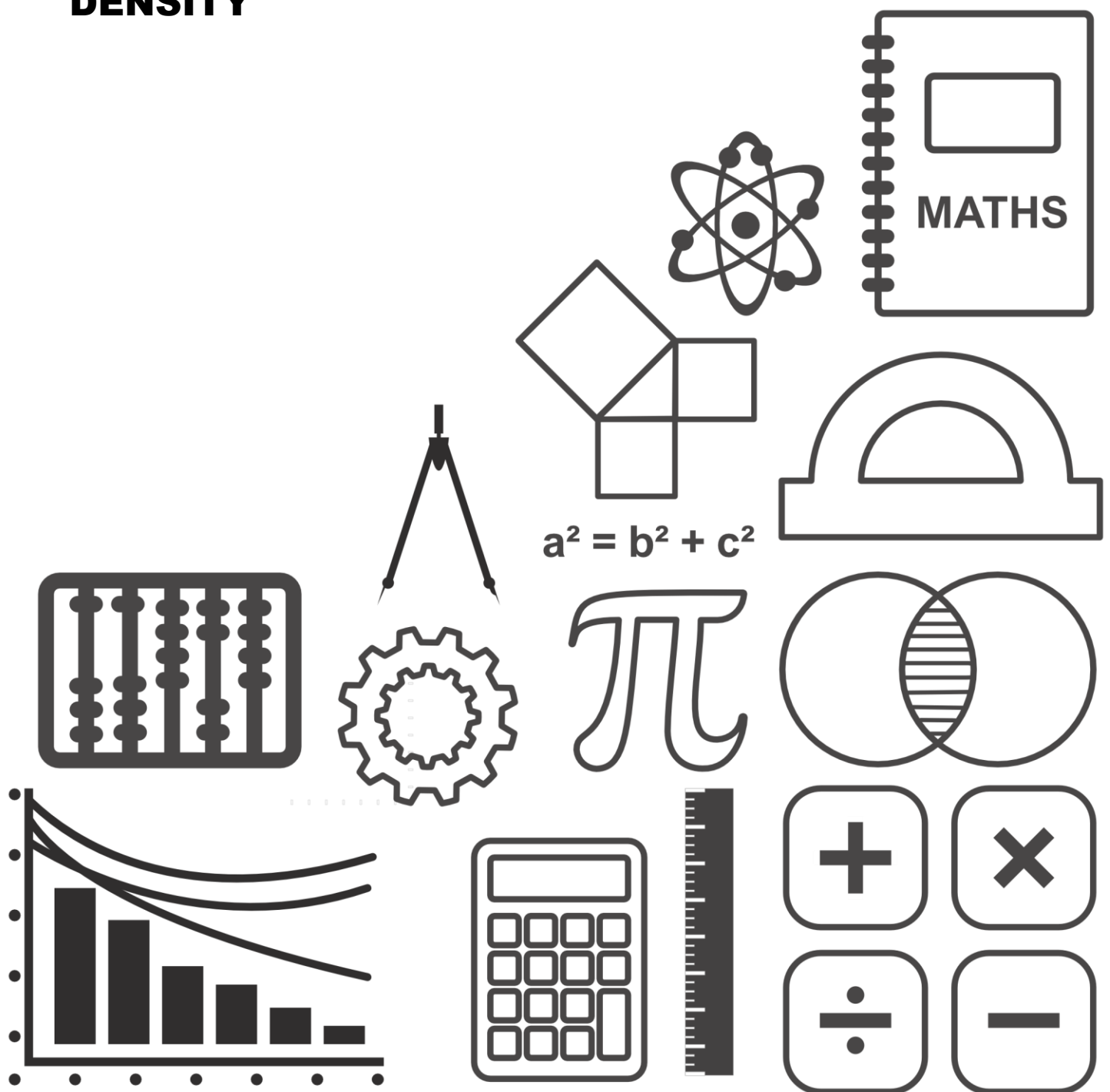


GCSE TOPIC BOOKLET DENSITY



1.

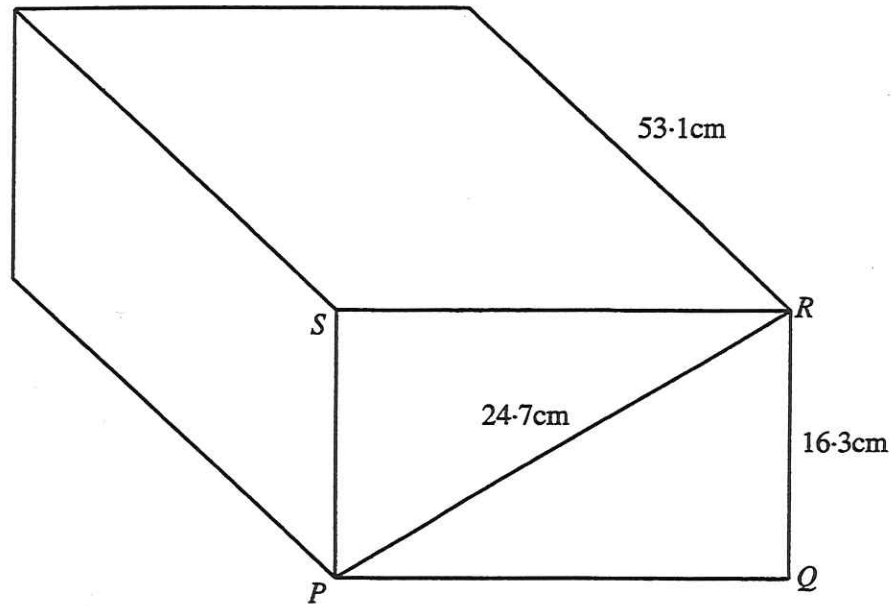


Diagram not drawn to scale.

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

(a) Calculate the length of PQ .

[3]

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

[3]

2.

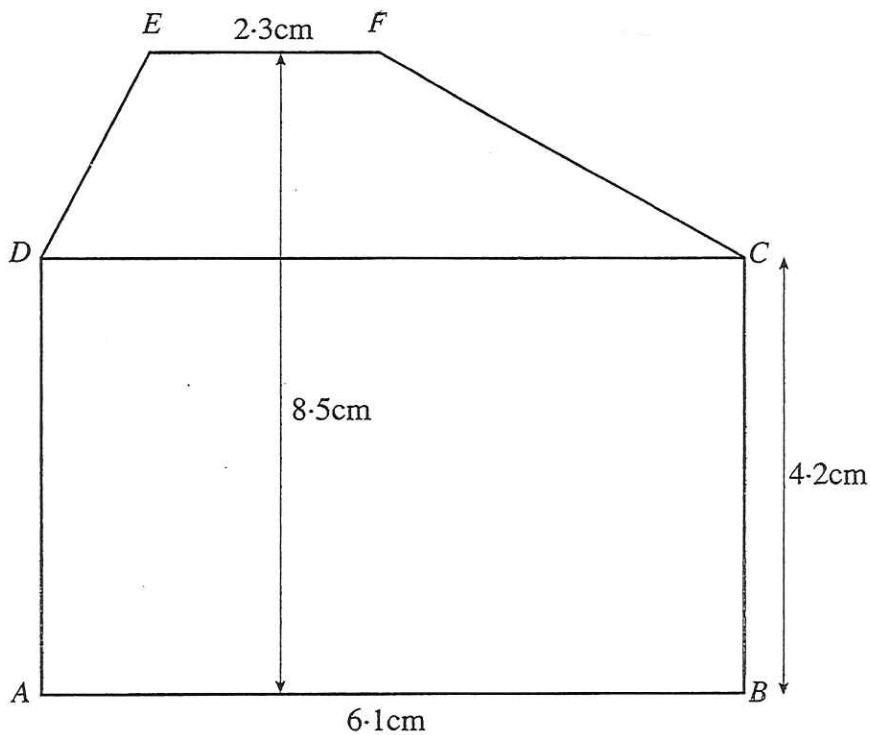


Diagram not drawn to scale.

$ABCFED$ represents the uniform cross-section of a solid block of material. $ABCD$ is a rectangle in which $AB = 6.1$ cm and $BC = 4.2$ cm. EF is of length 2.3 cm and is parallel to AB . The distance between EF and AB is 8.5 cm.

- (a) Calculate the area of cross-section of the block.

.....

.....

.....

.....

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.....

.....

[3]

- (b) The block has this uniform cross-section along its length of 12.6 cm and has a mass of 2 kg. Calculate the density, in g/cm^3 , of the material from which the block is made.

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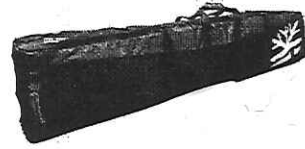
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[4]

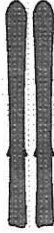
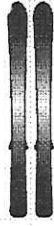
3.

- (a) A ski bag has a label which states that the fabric used to make the bag weighs 920 g per m^2 .
A rectangular piece of this fabric weighs 0.46 kg.
The piece of fabric is 0.4 m wide.
Calculate the length of this piece of fabric in metres.



[4]

(b)

	Old skis	Person	New skis
Paulo is 177 cm tall. His old skis are 173 cm long. His new skis are 166 cm long.			
Layla is 163 cm tall. Her old skis are 160 cm long. Her new skis are 153 cm long.			

Paulo says,

'In proportion to our heights, my new skis are shorter for me than Layla's new skis are for her.'

Layla says,

'Paulo can't be right!
We have both gone for 7 cm shorter skis than our old ones.'

Is Paulo correct?

You must show your calculations and give a reason for your answer.

[4]

[illegible]



Astra Jacket
90% Polyester, 10% Elastane
Soft fleece fabric 180g/m²

Snug Jacket
80% Polyester, 20% Elastane
Stretchy fleece fabric 140g/m²

14

[illegible]

- (b) The density of the fleece fabric in *Snug Jackets* is actually 140 g/m^2 , correct to the nearest 2 g/m^2 .
This fabric is sold to the makers of the jackets on cardboard rolls.
A cardboard roll with fleece fabric on it weighs 4.5 kg .
The empty cardboard roll weighs 360 g .



Complete the following sentence by inserting a correct value, accurate to 4 significant figures.

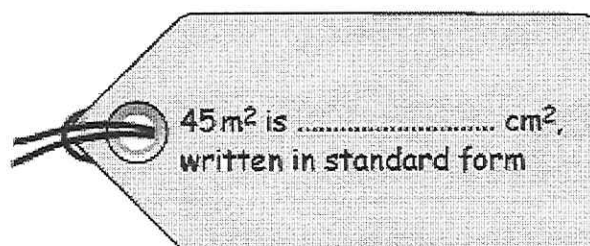
The roll contains at least m^2 of *Snug Jacket* fleece fabric.

You must show your working.

[6]

- (c) A different roll contains 45 m^2 of fleece fabric.
This roll of fleece fabric has a label attached giving the area of fabric in cm^2 , written in standard form.
Complete the label below.
You must show your working.

[2]



5. a)

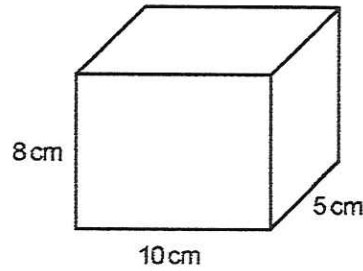
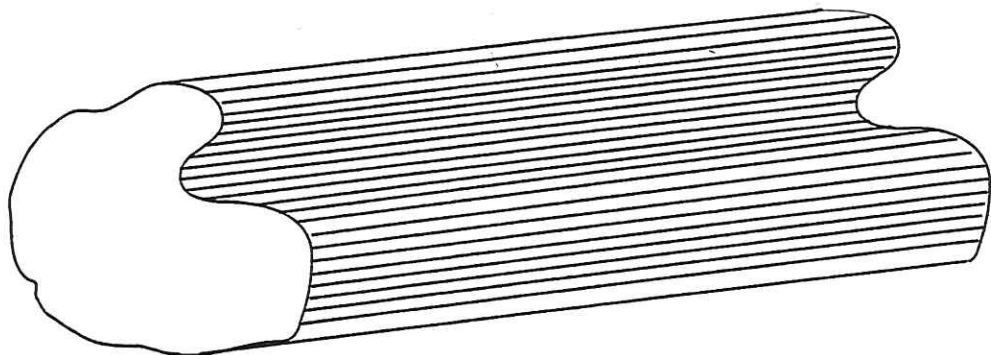


Diagram not drawn to scale

A cuboid made of metal has dimensions 10 cm, 8 cm and 5 cm. The mass of the cuboid is 1.1 kg. Calculate the density of the metal. State the units of your answer. [4]

b)



The diagram represents a prism with an uniform cross-section of area 78 cm^2 . The prism is 54 cm long and has a mass of 19.6 kg. Find the density, in g/cm^3 , of the material from which the prism has been made.

[3]

6.

The diagram below shows the uniform cross-section of a metal beam.

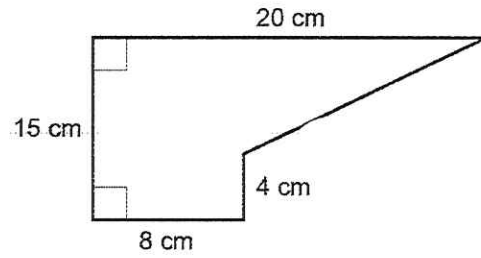


Diagram not drawn to scale

- (a) You will be assessed on the quality of your written communication in this part of the question.

Calculate the area of the cross-section.
You must show your working.

[6]

- (b) The length of the metal beam is 2 m and its mass is 108 kg.
Calculate the density of the metal, giving your answer in g/cm^3 .

[4]

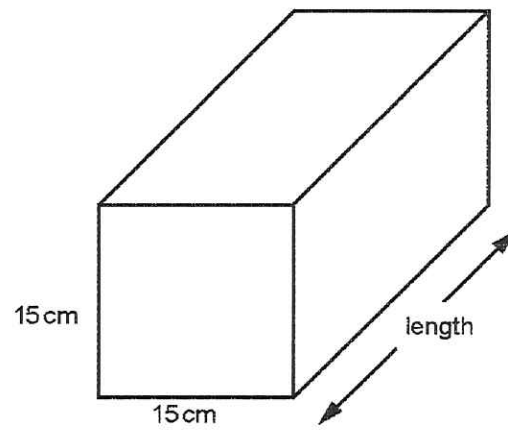


Diagram not drawn to scale

The solid block shown above is made from a metal that has a density of 2.7 g/cm^3 . The volume of the solid block is $40\,500 \text{ cm}^3$.

A hole is drilled through the entire length of the block. The hole has a cross-sectional area of 25 cm^2 . Calculate the mass of the block that remains.

[6]

[illegible]

The diagram shows a composite figure. It consists of a rectangle with a width of 56 cm and a height of 34 cm. On top of the rectangle, there are two semicircles. The diameter of each semicircle is equal to the width of the rectangle, which is 56 cm. The total height of the figure, including the semicircles, is 34 cm.

[7]

[illegible]