

More compound units

Year 8 About 75 minutes Calculator allowed 48 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-8-more-compound-units/

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark] **A2** Needed today [1 mark]
 Work out the volume of a cuboid 5 cm by 4 cm by 3 cm. How many cm³ are there in 2.5 litres?

Answer

Answer

- A3** Last lesson [1 mark] **A4** Year 7 [1 mark]
 A car travels 150 km in 2 hours 30 minutes. Work out its average speed. Work out the area of a circle of radius 3 cm. Give your answer to 1 decimal place.

Answer

Answer

B Example, then your turn

Year 8

Rate of flow = quantity ÷ time. Density = mass ÷ volume. Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

A tap fills a 24 litre bucket in 3 minutes. Work out the rate of flow.

Hint Rate of flow = quantity ÷ time. Litres and minutes give litres per minute.

- B1** A hose puts 130 litres of water into a pond in 4 minutes. Work out the rate of flow. [2 marks]

Answer ... litres per minute

EXAMPLE 2

Water flows into a tank at 12 litres per minute. How long does it take to put 300 litres into the tank?

Hint Time = quantity ÷ rate.

- B2** A pump empties a pond at 45 litres per minute. The pond holds 3150 litres. How long does the pump take to empty it? Give your answer in hours and minutes. [3 marks]

Answer ... hour ... minutes

EXAMPLE 3

A fountain pumps 4 litres of water every second. Write this rate in litres per minute and in m^3 per hour.

Hint There are 60 seconds in a minute and 3600 seconds in an hour. $1 \text{ m}^3 = 1000 \text{ litres}$.

B3 Water flows through a pipe at 2.5 litres per second. Write this rate in litres per minute and in m^3 per hour. [3 marks]

Answer ... litres per minute, ... m^3 per hour

EXAMPLE 4

A block of metal has a mass of 540 g and a volume of 60 cm^3 . Work out its density.

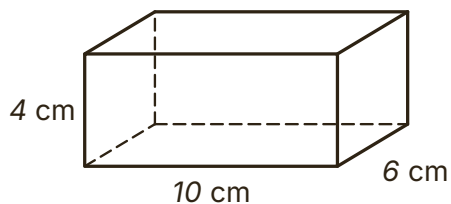
Hint Density = mass $\div$ volume. Grams and cm^3 give g/cm^3 .

B4 A stone has a mass of 351 g and a volume of 135 cm^3 . Work out its density. [2 marks]

Answer ... g/cm^3

EXAMPLE 5

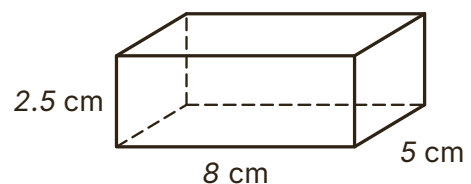
A wooden block is a cuboid. Its density is 0.7 g/cm^3 . Work out its mass.



Not drawn accurately

Hint Find the volume first. Then mass = density $\times$ volume.

B5 A glass block is a cuboid. The density of the glass is 2.5 g/cm^3 . Work out the mass of the block. [3 marks]



Not drawn accurately

Answer ... g

c Practice

Year 8

C1 Silver has a density of 10.5 g/cm^3 . A silver bracelet has a mass of 63 g. Work out its volume. [2 marks]

Answer ... cm^3

C2 A liquid has a density of 1.26 g/cm^3 . Write this density in kg/m^3 . [2 marks]

Answer ... kg/m^3

- C3** The table shows the mass and the volume of three blocks. [3 marks]
Which block has the greatest density? Show how you decide.

Block	Mass	Volume
A	120 g	50 cm ³
B	210 g	75 cm ³
C	96 g	32 cm ³

- C4** A cable has a mass of 0.15 kg per metre. A full roll of the cable has a mass of 18 kg. How many metres of cable are on the roll? [2 marks]

Answer ... m

- C5** A dripping tap loses 25 ml of water every minute. How many litres does it lose in one day? [3 marks]

Answer ... litres

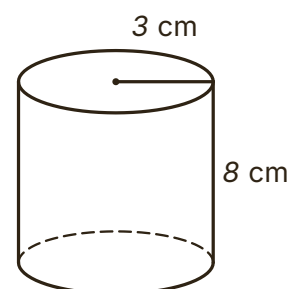
D Exam-style questions

GCSE Foundation

- D1** A block of plastic has a mass of 300 g and a volume of 375 cm³. Jo says: "The density of the plastic is 1.25 g/cm³." [3 marks]

Explain what Jo has done wrong. Work out the correct density.

- D2** A solid cylinder is made of aluminium. The density of aluminium is 2.7 g/cm³. Work out the mass of the cylinder. Give your answer to the nearest gram. [4 marks]

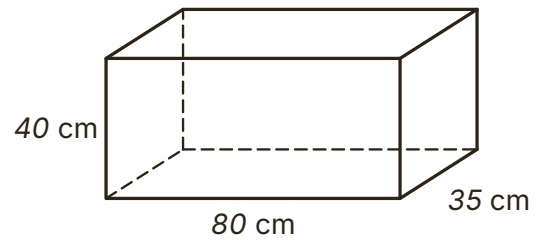


Answer ... g

Not drawn accurately

D3 A fish tank is a cuboid. It is empty. Water is put into the tank from a hose at 8 litres per minute. $1 \text{ litre} = 1000 \text{ cm}^3$.

- (a) How many litres does the tank hold [2 marks]
when it is full?



Answer ... litres

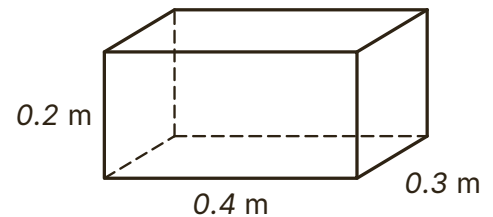
Not drawn accurately

- (b) The tank is filled until the water is 5 cm below the top. How long does this take? Give your answer in minutes and seconds.

Answer ... minutes ... seconds

Total for D3: 5 marks

D4 Pressure = force $\div$ area. A box has a weight of 360 N. It rests on the floor on its face 0.4 m by 0.3 m. Then it is turned so that it rests on its face 0.3 m by 0.2 m. How much does the pressure on the floor increase? Give the units of your answer. [4 marks]



Answer

Not drawn accurately

E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A tank holds 360 litres. Tap A on its own fills the empty tank in 30 minutes. Tap B on its own fills it in 45 minutes. Both taps are turned on together. How long does it take to fill the empty tank? [3 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1

Hint 1

Work out the rate of flow of each tap, in litres per minute.
- Hint 2

Tap A gives 12 litres per minute and tap B gives 8. Together they give 20 litres per minute.
- Hint 3

$360 \div 20$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can work out a rate of flow, and a time from a rate.
- I can change a rate or a density into different units.
- I can work out a density, a mass or a volume.
- I can use density with the volume of a cuboid or a cylinder.