

GCSE QUESTIONS

Q1. CALCULATOR ALLOWED

A sprinter runs a distance of 200 metres in 25 seconds. Work out the average speed of the sprinter.

..... m/s

(Total for question = 1 mark)

Q2. CALCULATOR ALLOWED

Emily drives 186 miles in 3 hours.

(a) What is her average speed?

..... mph

(2)

Sarah drives at an average speed of 58 mph for 4 hours.

(b) How many miles does Sarah drive?

..... miles

(2)

(Total for question = 4 marks)

Q3. CALCULATOR ALLOWED

Time	13 30
Distance to destination	65 miles

Nimer was driving to a hotel.
He looked at his Sat Nav at 13 30

Nimer arrived at the hotel at 14 48

Work out the average speed of the car from 13 30 to 14 48. You must show all your working.

..... mph
(Total for question = 4 marks)

Q4. CALCULATOR ALLOWED

Change 72 km/h into m/s.

..... m / s
(Total for question = 3 marks)

Q5. CALCULATOR ALLOWED

A gold bar has a mass of 12.5 kg. The density of gold is 19.3 g/cm^3

Work out the volume of the gold bar. Give your answer correct to 3 significant figures.

..... cm^3
(Total for question = 3 marks)

Q6. CALCULATOR ALLOWED

Water flows through a pipe at a rate of 20 gallons per minute.

1 gallon = 4.55 litres.

Change 20 gallons per minute to litres per second. Give your answer correct to 3 significant figures.

..... litres per second
(Total for question = 2 marks)

Q7. CALCULATOR ALLOWED

A train travels from Madrid to Malaga at an average speed of 183 km/h.

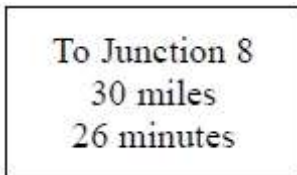
The train leaves Madrid at 08 40. The train arrives at Malaga at 11 28.

Work out the distance the train travels from Madrid to Malaga.

..... km

(Total for question = 3 marks)

Q8. CALCULATOR ALLOWED



Axel and Lethna are driving along a motorway.

They see a road sign.

The road sign shows the distance to Junction 8

It also shows the average time drivers take to get to Junction 8

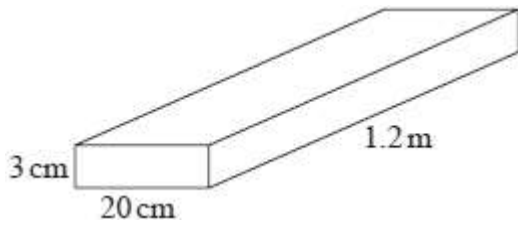
The speed limit on the motorway is 70 mph.

Lethna says "We will have to drive faster than the speed limit to drive 30 miles in 26 minutes."

Is Lethna right? You must show how you get your answer.

(Total for question = 3 marks)

Q9. CALCULATOR ALLOWED



The diagram shows a piece of wood in the shape of a cuboid.

The piece of wood is 3 cm by 20 cm by 1.2 m.
The mass of the piece of wood is 8 kg.

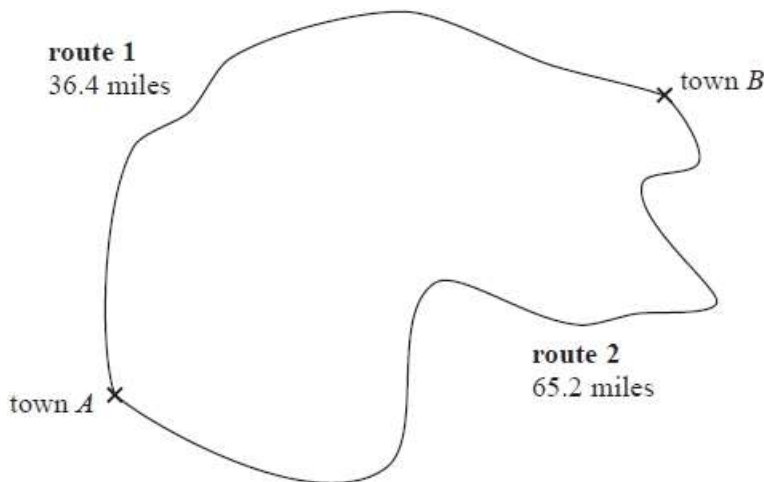
The piece of wood will float in sea water if the density of the wood is less than the density of the sea water.

In a large pool, 1 litre of sea water has a mass of 1030 g.

Will the piece of wood float in this pool? You must show how you get your answer.

(Total for question = 4 marks)

Q10. CALCULATOR ALLOWED



Eric and Geraldine both drove from town A to town B.

Both Eric and Geraldine left town A at 2 pm.

Eric drove on route 1
He got to town B at 2 48 pm.

Geraldine drove on route 2
She got to town B at 3 25 pm.

Who drove at the greater average speed? You must show all your working.

(Total for question = 3 marks)

Q11. CALCULATOR ALLOWED

In May 2019, the distance between Earth and Mars was 3.9×10^7 km.

In May 2019, a signal was sent from Earth to Mars.

Assuming that the signal sent from Earth to Mars travelled at a speed of 3×10^5 km per second,

(a) how long did the signal take to get to Mars?

..... seconds

(2)

The speed of the signal sent from Earth to Mars in May 2019 was actually less than 3×10^5 km per second.

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

.....
.....
.....

(1)

(Total for question = 3 marks)

Q12. CALCULATOR ALLOWED

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.

..... minutes seconds

(3)

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

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

.....
.....

(1)

(Total for question = 4 marks)

Q13. CALCULATOR ALLOWED

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.

..... km/h

(4)

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?

.....
.....

(1)

(Total for question = 5 marks)

Q14. CALCULATOR ALLOWED

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

A force of 70 newtons acts on an area of 20 cm²

The force is increased by 10 newtons.

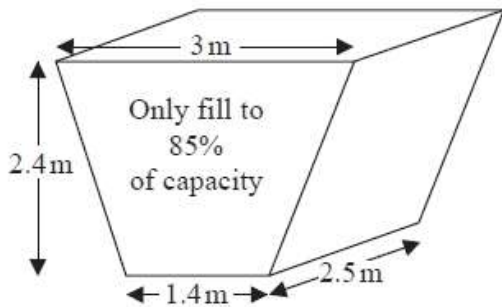
The area is increased by 10 cm²

Helen says "The pressure decreases by less than 20%".

Is Helen correct? You must show how you get your answer.

(Total for question = 3 marks)

Q15. CALCULATOR ALLOWED



The diagram shows an oil tank in the shape of a prism. The cross section of the prism is a trapezium.

The tank is empty.

Oil flows into the tank.

After one minute there are 300 litres of oil in the tank.

Assume that oil continues to flow into the tank at this rate.

(a) Work out how many **more** minutes it takes for the tank to be

85% full of oil.
(1 m³ = 1000 litres)

..... minutes

(5)

The assumption about the rate of flow of the oil could be wrong.

(b) Explain how this could affect your answer to part (a).

.....
.....

(1)

(Total for question = 6 marks)

Q16. CALCULATOR ALLOWED

A train travelled along a track in 110 minutes, correct to the nearest 5 minutes.

Jake finds out that the track is 270 km long.

He assumes that the track has been measured correct to the nearest 10 km.

(a) Could the average speed of the train have been greater than 160 km/h? You must show how you get your answer.

(4)

Jake's assumption was wrong. The track was measured correct to the nearest 5 km.

(b) Explain how this could affect your decision in part (a).

.....
.....
.....

(1)

(Total for question = 5 marks)

Q17. CALCULATOR ALLOWED

A high speed train travels a distance of 487 km in 3 hours.

The distance is measured correct to the nearest kilometre.
The time is measured correct to the nearest minute.

By considering bounds, work out the average speed, in km/minute, of the train to a suitable degree of accuracy.
You must show all your working and give a reason for your answer.

..... km/minute
(Total for question = 5 marks)

Q18. CALCULATOR ALLOWED

The densities of three metal alloys, A, B and C, are in the ratio

$$13 : 15 : 21$$

1 m³ of alloy B has a mass of 8600 kg.

Work out the difference between the mass of 5 m³ of alloy A and 3 m³ of alloy C.
Give your answer correct to 3 significant figures.

..... kg

(Total for question = 5 marks)

Q19. CALCULATOR ALLOWED

Zahra mixes 150g of metal A and 150g of metal B to make 300g of an alloy.

Metal A has a density of 19.3g/cm^3 . Metal B has a density of 8.9g/cm^3 .

Work out the density of the alloy.

..... cm^3

(Total for question = 4 marks)

Q20. CALCULATOR ALLOWED

The density of ethanol is 1.09 g/cm^3

The density of propylene is 0.97 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.

..... g/cm^3

(Total for question = 4 marks)

Q21. CALCULATOR ALLOWED

Liquid **A** has a density of 1.42 g/cm^3

7 cm^3 of liquid **A** is mixed with 125 cm^3 of liquid **B** to make liquid **C**.

Liquid **C** has a density of 1.05 g/cm^3

Find the density of liquid **B**. Give your answer correct to 2 decimal places.

..... g/cm^3

(Total for question = 3 marks)

Q22. CALCULATOR ALLOWED

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

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

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

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

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

..... g/cm^3

(Total for question = 4 marks)

Q23. CALCULATOR ALLOWED

The densities of two different liquids A and B are in the ratio 19 : 22

The mass of 1 cm³ of liquid B is 1.1 g.

5 cm³ of liquid A is mixed with 15 cm³ of liquid B to make 20 cm³ of liquid C.

Work out the density of liquid C.

.....g/cm³

(Total for question is 4 marks)

Q24. CALCULATOR ALLOWED

Liquid A and liquid B are mixed together in the ratio 2 : 13 by volume to make liquid C.

Liquid A has density 1.21 g/cm³

Liquid B has density 1.02 g/cm³

A cylindrical container is filled completely with liquid C. The cylinder has radius 3 cm and height 25 cm.

Work out the mass of the liquid in the container. Give your answer correct to 3 significant figures. You must show all your working.

..... g

(Total for question = 4 marks)

Q25. CALCULATOR ALLOWED

Jackson is trying to find the density, in g/cm^3 , of a block of wood.
The block of wood is in the shape of a cuboid.

He measures

- the length as 13.2 cm, correct to the nearest mm
- the width as 16.0 cm, correct to the nearest mm
- the height as 21.7 cm, correct to the nearest mm

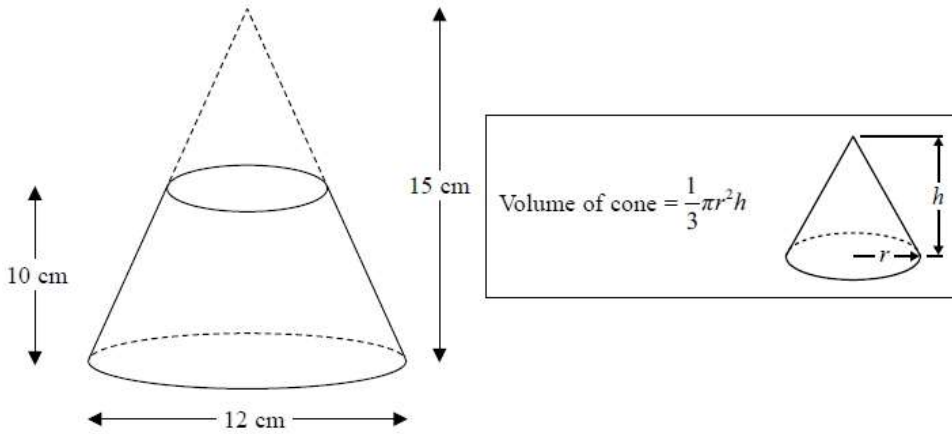
He measures the mass as 1970 g, correct to the nearest 5 g.

By considering bounds, work out the density of the wood. Give your answer to a suitable degree of accuracy. You must show all your working and give a reason for your final answer.

(Total for question = 5 marks)

Q26. CALCULATOR ALLOWED

A frustum is made by removing a small cone from a large cone as shown in the diagram.



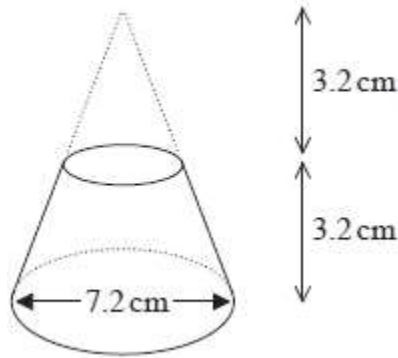
The frustum is made from glass.
The glass has a density of 2.5 g / cm^3

Work out the mass of the frustum. Give your answer to an appropriate degree of accuracy.

..... g
(Total for question = 5 marks)

Q27. CALCULATOR ALLOWED

Here is a frustum of a cone.

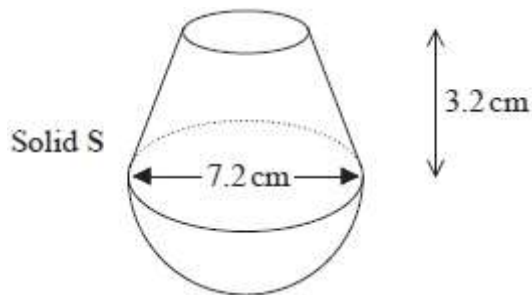


Volume of sphere = $\frac{4}{3} \pi r^3$

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/cm³
 The density of the hemisphere is 4.8 g/cm³
 Calculate the average density of solid **S**.

..... g/cm³

(Total for question = 5 marks)