

Exam Questions

Standard & Compound Units

Time / Converting between Units / Squared & Cubic Units / Compound Measures / Speed, Density & Pressure

Easy (22 questions)	/64
Medium (18 questions)	/54
Hard (13 questions)	/56
Total Marks	/174

Scan here to return to the course
or visit [savemyexams.com](https://www.savemyexams.com)



Easy Questions

1 A rectangle has an area of 4 m^2 . Write this area in cm^2 .

(2 marks)

2 (a) Peter goes for a walk.
He walks 15 miles in 6 hours.

Work out Peter's average speed.
Give your answer in miles per hour.

(2 marks)

(b) 5 miles = 8 km.
Sunita says that Peter walked more than 20 km.

Is Sunita right?
You must show all your working.

(2 marks)

3 (a) Manchester airport is on a bearing of 330° from a London airport.

Find the bearing of the London airport from Manchester airport.

(2 marks)

(b) The London airport is 200 miles from Manchester airport.

A plane leaves Manchester airport at 10am to fly to the London airport. The plane flies at an average speed of 120 mph.

What time does the plane arrive at the London airport?

(4 marks)

4 (a) Gary drove from London to Sheffield. It took him 3 hours at an average speed of 80km/h.

Lyn drove from London to Sheffield.

She took 5 hours.

Assuming that Lyn

drove along the same roads as Gary
and did not take a break,

work out Lyn's average speed from London to Sheffield.

(3 marks)

(b) If Lyn did **not** drive along the same roads as Gary, explain how this could affect your answer to part (a).

(1 mark)

5

$$p = \frac{F}{A}$$

p = pressure
 F = force
 A = area

A box exerts a force of 140 newtons on a table.

The pressure on the table is 35 newtons/m².

Calculate the area of the box that is in contact with the table.

(3 marks)

- 6** A train journey from Paris to Amsterdam took 3 hours 24 minutes. The total distance the train travelled was 433.5 km.

Work out the average speed of the train. Give your answer in kilometres per hour.

..... km/h

(3 marks)

- 7** Change 1 m^3 to cm^3 .

..... cm^3

(1 mark)

- 8** A train takes 6 hours 39 minutes to travel from New Delhi to Kanpur.
The train travels a distance of 429 km.

Work out the average speed of the train. Give your answer in km/h correct to one decimal place.

(3 marks)

- 9** Change 32.4 m^3 into cm^3 .

..... cm^3

(2 marks)

- 10** A rocket travelled 100 km at an average speed of 28440 km/h.

Work out how long it took the rocket to travel the 100 km. Give your answer in seconds, correct to the nearest second.

..... seconds

(3 marks)

- 11** The ratio 50 grams to 1 kilogram can be written in the form $1 : n$.

Find the value of n .

$n =$

(2 marks)

- 12** Carol makes birthday cards. Each card takes the same amount of time to make.

She makes 3 cards in 48 minutes.

She has an order for 80 cards.

Can she complete this order in 3 days if she works 8 hours each day?

Show how you decide.

..... because

(5 marks)

13 Choose the volume that is the same as 15 cm^3

A. $15\,000 \text{ mm}^3$

B. 1.5 mm^3

C. 0.0015 mm^3

D. 150 mm^3

(1 mark)

14

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

A box is put on a table.

The face of the box in contact with the table is in the shape of a rectangle, 2 m by 1.25 m .

The pressure on the table due to the box is 42 newtons/m^2

Work out the force exerted by the box on the table.

..... newtons

(3 marks)

15 Abellie flew by plane from Dubai to Rome.

The flight time was $6 \text{ hours } 42 \text{ minutes}$. The average speed of the plane was $650 \text{ kilometres per hour}$.

Work out the distance the plane flew.

.....kilometres

(3 marks)

16 (a) Hector can run 400 metres in 66 seconds.

Use this information to show that he could run 5 kilometres in less than 14 minutes.

(4 marks)

(b) Hector tries to run 5 kilometres in less than 14 minutes.

Give one reason why he might not achieve this.

(1 mark)

17 A solid metal block has mass 500 g and volume 125 cm^3 .

Work out the density of the block. Give the units of your answer.

(3 marks)

18 (a) The depth of water in a garden pond is 57.8 cm.
The depth decreases by 0.3 cm per day.

Assume the depth continues to decrease at the same rate.

After how many days will the depth reach 54.2 cm?

..... days

(3 marks)

- (b) If the depth of water decreases at a slower rate, what effect will this have on your answer to part (a)?

(1 mark)

19 Choose the area that is equal to 36 mm^2

- A. 360 cm^2
- B. 3600 cm^2
- C. 3.6 cm^2
- D. 0.36 cm^2

(1 mark)

20 $\text{pressure} = \frac{\text{force}}{\text{area}}$

Find the pressure exerted by a force of 810 newtons on an area of 120 cm^2
Give your answer in newtons/m^2

.....newtons/ m^2

(3 marks)

21 Convert 2345 millilitres into litres.

(1 mark)

22 Change 2.1 cm^2 into mm^2 .

(2 marks)

Medium Questions

- 1 One sheet of A3 card has area $\frac{1}{8} \text{ m}^2$.

The card has a mass of 160 g per m^2 .

Work out the total mass of 25 sheets of A3 card.

(4 marks)

- 2 The diagram shows a solid triangular prism.

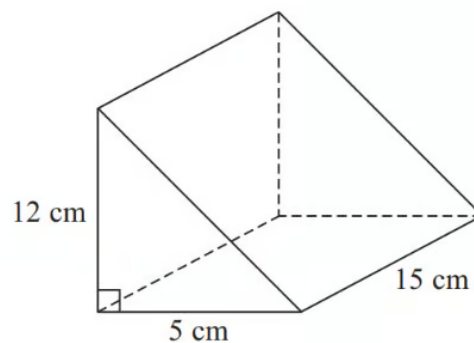


Diagram **NOT**
accurately drawn

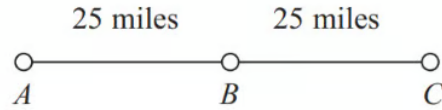
The prism is made from metal.

The density of the metal is $6.6 \text{ grams per cm}^3$.

Calculate the mass of the prism.

(3 marks)

3



A, *B* and *C* are 3 service stations on a motorway.

$AB = 25$ miles

$BC = 25$ miles

Aysha drives along the motorway from *A* to *C*

Aysha drives at an average speed of 50 mph from *A* to *B*.

She drives at an average speed of 60 mph from *B* to *C*.

Work out the difference in the time Aysha takes to drive from *A* to *B* and the time Aysha takes to drive from *B* to *C*.

Give your answer in minutes.

(3 marks)

4 Sue is driving home from her friend's house.

Sue drives

10 miles from her friend's house to the motorway

240 miles on the motorway

5 miles from the motorway to her home

Sue

takes 20 minutes to drive from her friend's house to the motorway

drives at an average speed of 60 mph on the motorway takes 25 minutes to drive from the motorway to her home

Sue stops for a 30 minute rest on her drive home.

Sue leaves her friend's house at 9.00 am.

What time does Sue get home? You must show all your working.

(3 marks)

- 5 The diagram shows a metal bar in the shape of a prism.

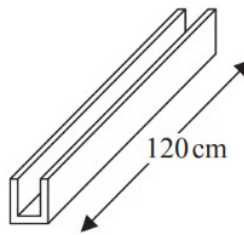


Diagram **NOT**
accurately drawn

The length of the metal bar is 120 cm. The cross section of the metal bar is shown below.

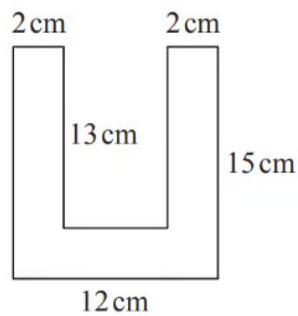


Diagram **NOT**
accurately drawn

All corners are right angles. The metal bar is made from steel with density 8 g/cm^3 .

Sean has a trolley. The trolley can carry a maximum mass of 250 kg.

How many metal bars can the trolley carry at the same time? You must show your working.

(5 marks)

- 6 A gold bar has a mass of 12.5 kg.
The density of gold is 19.3 g/cm³.

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

(3 marks)

- 7 A force of 70 newtons acts on an area of 20 cm².

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

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.

(3 marks)

8 $\text{Pressure} = \frac{\text{force}}{\text{area}}$

Find the pressure exerted by a force of 900 newtons on an area of 60cm².
Give your answer in newtons/m².

(2 marks)

- 9** Tame Valley is a company that makes yoghurt.

A machine fills trays of 20 pots with yoghurt.

In one hour, the machine fills a total of 15 000 pots.

Work out how many seconds the machine takes to fill each tray of 20 pots.

(4 marks)

- 10** There are 18500 gallons of fuel in a fuel tank.

The fuel is pumped from the fuel tank into a plane at a rate of 1700 litres per minute.

1 gallon = 4.5 litres.

How many minutes will it take to empty the fuel tank completely? Give your answer to the nearest minute.

(3 marks)

- 11** 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

To Junction 8

30 miles 26 minutes

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.

(3 marks)

12 Change a speed of 50 metres per second to a speed in kilometres per hour.

..... kilometres per hour

(3 marks)

13 A block of wood has a mass of 3.5 kg.

The wood has density 0.65 kg/m^3

Work out the volume of the block of wood.

Give your answer correct to 3 significant figures.

(3 marks)

14 Change a speed of 630 kilometres per hour to a speed in metres per second.

(3 marks)

15 Arron ran a distance of 5 km at an average speed of 2.2 m/s.

How long did Arron run for?

Give your answer in minutes and seconds, to the nearest second.

..... minutes seconds

(4 marks)

16 Density = $\frac{\text{mass}}{\text{volume}}$

The mass is divided by 2 and the volume is multiplied by 4

What happens to the density?

A. $\times 2$

B. $\div 2$

C. $\times 8$

D. $\div 8$

(1 mark)

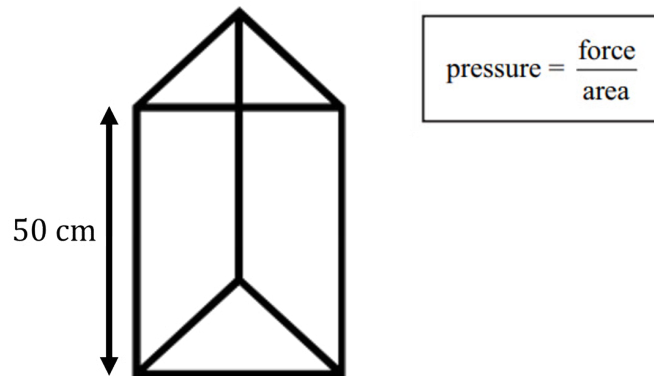
17 Which **one** of these is a unit of density?

A. kg/m^2

- B. m^2 / kg
- C. kg / m^3
- D. m^3 / kg

(1 mark)

18 The diagram shows a solid triangular prism resting on a horizontal floor.



The prism has a volume of 1500 cm^3 .

The prism has a height of 50 cm.

The prism exerts a force of 75 newtons on the floor.

Work out the pressure on the floor due to the prism.

State the units.

(3 marks)

Hard Questions

- 1 Henry is thinking of having a water meter. These are the two ways he can pay for the water he uses.

Water Meter

A charge of £28.20 per year

plus

91.22p for every cubic metre of
water used

1 cubic metre = 1000 litres

No Water Meter

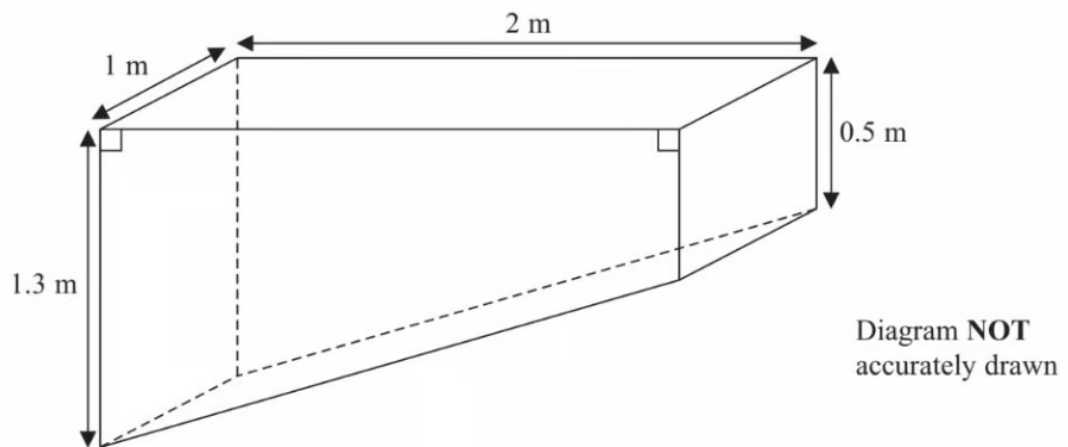
A charge of £107 per year

Henry uses an average of 180 litres of water each day.

Use this information to determine whether or not Henry should have a water meter.

(5 marks)

- 2 Sumeet has a pond in the shape of a prism.



The pond is completely full of water.

Sumeet wants to empty the pond so he can clean it.

Sumeet uses a pump to empty the pond.

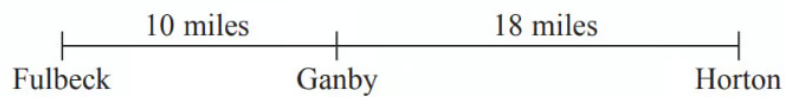
The volume of water in the pond decreases at a constant rate. The level of the water in the pond goes down by 20 cm in the first 30 minutes.

Work out how much more time Sumeet has to wait for the pump to empty the pond completely.

(6 marks)

- 3 The distance from Fulbeck to Ganby is 10 miles. The distance from Ganby to Horton is 18

miles.



Raksha is going to drive from Fulbeck to Ganby.
Then she will drive from Ganby to Horton.

Raksha leaves Fulbeck at 10 00
She drives from Fulbeck to Ganby at an average speed of 40 mph.

Raksha wants to get to Horton at 10 35
Work out the average speed Raksha must drive at from Ganby to Horton.

(3 marks)

- 4 Liquid A has a density of 0.7 g/cm^3 . Liquid B has a density of 1.6 g/cm^3 .

140 g of liquid A and 128 g of liquid B are mixed to make liquid C.

Work out the density of liquid C.

(4 marks)

5 Ibrar mixes 74 g of lead and 126 g of tin to make 200 g of an alloy.

Lead has a density of 11.34 g/cm^3 .

Tin has a density of 7.31 g/cm^3 .

Work out the density of the alloy.

Give your answer correct to 1 decimal place.

(3 marks)

6 (a) 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.

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

(4 marks)

(b) 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.

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

(1 mark)

7 The density of apple juice is 1.05 grams per cm^3 .

The density of fruit syrup is 1.4 grams per cm^3 .

The density of carbonated water is 0.99 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.

(4 marks)

8 James and Peter cycled along the same 50km route.

James took $2\frac{1}{2}$ hours to cycle the 50km.

Peter started to cycle 5 minutes after James started to cycle. Peter caught up with James when they had both cycled 15 km.

James and Peter both cycled at constant speeds.
Work out Peter's speed.

(5 marks)

9 Sean drives from Manchester to Gretna Green.

He drives at an average speed of 50 mph for the first 3 hours of his journey.

He then has 150 miles to drive to get to Gretna Green. Sean drives these 150 miles at an average speed of 30 mph.

Sean says,

"My average speed from Manchester to Gretna Green was 40 mph."

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

(4 marks)

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

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

Work out the density of the alloy.

(4 marks)

11 (a) In May 2019, the distance between Earth and Mars was $3.9 \times 10^7 \text{ km}$.

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 $3 \times 10^5 \text{ km per second}$, how long did the signal take to get to Mars?

.....seconds

(2 marks)

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

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

(1 mark)

- 12 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

(4 marks)

- 13 A truck is used to transport some wood panels.
Each wood panel is a cuboid measuring 2.4 m by 1.2 m by 1.8 cm. The density of each wood panel is 750 kg/m^3 .

The truck can carry 15 tonnes of these wood panels.

Calculate the maximum number of wood panels that the truck can carry.
Show how you decide.

(6 marks)