Name: _____

GCSE (1 – 9)

Compound Measures

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

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

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{200}{25} = 8 \text{ m/s}$$

8 ..... m/s

(Total for question 1 is 1 mark)

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2 A block exerts a force of 120 Newtons on the ground.
The block has an area of 2 m^2.

Work out the pressure on the ground.

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

$$\text{pressure} = \frac{120}{2} = 60 \text{ N/m}^2$$

60 ..... N/cm^2

(Total for question 2 is 1 mark)

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3 A piece of gold has a mass of 760 grams and a volume of 40 cm^3.
Work out the density of the piece of gold.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

$$= \frac{760}{40} = 19 \text{ g/cm}^3$$

19 ..... g/cm^3

(Total for question 3 is 1 mark)

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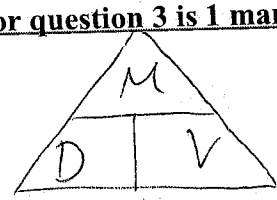
4 A rock has a mass of 56 grams and a density of 3.5 grams/cm^3.
Work out the volume of the rock.



$$\text{volume} = \frac{\text{mass}}{\text{density}}$$

$$= \frac{56}{3.5} = \frac{112}{7} = 16 \text{ cm}^3$$

16 ..... cm^3

(Total for question 4 is 1 mark)

5 A car travels a distance of 230 miles in 4 hours and 15 minutes.
Work out the average speed of the car, in miles per hour.
Give your answer to 1 decimal place.

4.25 hours

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{230}{4.25}$$

$$= 54.1 \text{ mph}$$

54.1 ..... miles/hour

(Total for question 5 is 2 marks)

6 A block exerts a force of 84 Newtons on a table.
The pressure on the table is 30 N/m^2.

Work out the area of the box that is in contact with the table.

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

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

$$= \frac{84}{30} = 2.8 m^2$$

2.8 ..... m^2

(Total for question 6 is 2 marks)

7 A liquid has a density of 1.3 grams per ml.
Find the mass of 250 ml of the liquid.

$$\text{mass} = \text{density} \times \text{volume}$$

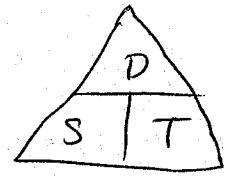
$$= 1.3 \times 250$$

$$= 325 g$$

325 ..... g

(Total for question 7 is 1 mark)

8 Dani leaves her house at 08 00.
She drives 63 miles to work.
She drives at an average speed of 27 miles per hour.
At what time does Dani arrive at work?



$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{63}{27}$$

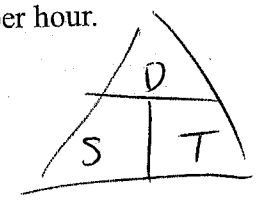
$$= 2.\dot{3} \text{ hours}$$

$$= 2 \text{ hours } 20 \text{ mins}$$

10:20 .....

(Total for question 8 is 2 marks)

9 Anthony travels from Newcastle to Manchester at an average speed of 65 miles per hour.
The journey takes him 2 hours and 15 minutes. 2.25 hours



Declan makes the same journey in 2 hours and 35 minutes.

(a) Work out Declan's average speed for the journey.

Anthony: distance = speed × time
= 65 × 2.25
= 146.25 miles

Declan: speed = distance / time
= 146.25 / 2.583
= 56.6 miles/hour (1dp)

2hrs 35 mins

$\frac{35}{60} = 0.583$ OR $\frac{7}{12}$

56.6 mph

(4)

(b) If Declan ~~stopped for a break during~~ his journey, how ~~would~~ this affect your answer to part (a)?

took a different roads for could

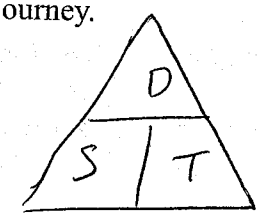
The ans: If the distance was increased the speed would be higher.
(If the distance decreased the speed would be lower)

(1)

(Total for question 9 is 5 marks)

10 Rachel drives 300 miles from London to Newcastle.
She drives the first 165 miles at an average speed of 60 mph.
From this point it takes Rachel 3 hours and 15 minutes to complete her journey.

What was Rachel's average speed for the whole journey?



FIRST 165 MILES

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{165}{60} = 2.75 \text{ hours}$$

$$= 2 \text{ hours } 45 \text{ mins}$$

2 hours 45 + 3 hours 15 = 6 hours

~~135 MILES LEFT~~

$$\text{average speed} = \frac{\text{total distance}}{\text{total time}}$$

$$= \frac{300}{6}$$

$$= 50 \text{ mph}$$

50 ..... mph

(Total for question 10 is 4 marks)

11 Andrew ran 3.1 miles in 14 minutes and 35 seconds.

He assumes he can run 8 miles at the same speed.

(a) Work out how long it would take Andrew to run 8 miles.

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

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{3.1}{14.583}$$

$$= 0.21257\ldots \text{ miles/min}$$

14 mins 35 secs

$= 14.583\dot{3}$ mins

~~distance = speed × time~~

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{8}{0.21257} = 37 \text{ mins } 38 \text{ sec}$$

37 mins 38 secs

(4)

Andrew's speed actually decreases the further he goes.

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

It would take longer to run 8 miles (the answer would be higher)

(1)

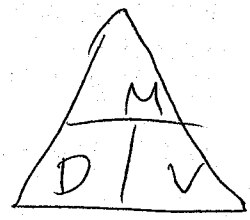
(Total for question 11 is 5 marks)

12 Liquid **A** has a density of 1.2 g/cm^3

150 cm^3 of Liquid **A** is mixed with some of Liquid **B** to make Liquid **C**.

Liquid **C** has a mass of 210 g and a density of 1.12 g/cm^3

Find the density of Liquid **B**.



Liquid A : mass = density × volume

= 1.2 × 150

= 180 g

Liquid C volume = $\frac{\text{mass}}{\text{density}}$

= $\frac{210}{1.12}$

= 187.5 cm^3

Liquid B Volume = Liquid C − Liquid A

= 187.5 − 150

= 37.5 cm^3

Liquid B mass = Liquid C − Liquid A

= 210 − ~~150~~ 180

= 30 g

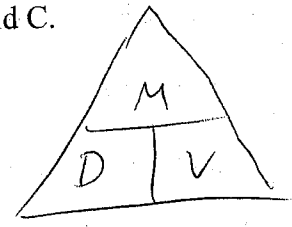
Liquid B density = $\frac{\text{mass}}{\text{volume}}$ = $\frac{30}{37.5}$ = 0.8

0.8 g/cm^3

(Total for question 12 is 3 marks)

13 100ml of liquid A and 200ml of liquid B are mixed together to make liquid C.
Liquid A has a density of 0.7g/ml.
Liquid B has a density of 1.1 g/ml.

Work the density of liquid C.



Liquid A: mass = density × volume

= 0.7 × 100

= 70 g

Liquid B: mass = 1.1 × 200

= 220 g

Liquid C density = $\frac{\text{total mass}}{\text{total volume}}$

= $\frac{70 + 220}{100 + 200}$

= $\frac{290}{300}$

= 0.96 g/ml

0.96 ..... g/ml

(Total for question 13 is 4 marks)

[$\frac{29}{30}$]