3.9 Compound Measures: Speed, Density and Rates: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A metal has a density of 9 g/cm^3. Work out the mass of 12 cm³ of the metal.

(2)

2 A block has a mass of 62.4 g and a volume of 12 cm³. Work out its density in g/cm^3.

(2)

3 A pump moves water at 20 litres per minute. How many litres does it move in one hour?

(2)

4 A tap fills a container at a rate of 6 litres per minute. How long does it take to put 240 litres into the container?

(2)

5 A cyclist travels 7.2 km in 24 minutes. Work out the cyclist's average speed in km/h.

(2)

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6 A metal has a density of 5 g/cm^3. Work out the mass of 100 cm^3 of the metal.

(2)

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7 A liquid has a density of 3.8 g/cm^3. It has a mass of 30.4 g. Work out its volume.

(3)

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8 A metal has a density of 8.9 g/cm^3. Work out the mass of 40 cm^3 of the metal.

(2)

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9 A tap fills a bucket at a rate of 8 litres per minute. How many litres does it deliver in 45 minutes?

(2)

---

10 Mia runs 20 km in 30 minutes. Work out her average speed in km/h.

(2)

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11 A block has a mass of 47 g and a volume of 5 cm^3. Work out its density in g/cm^3.

(2)

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12 Mia runs 216 km in 3 hours. Work out her average speed in km/h.

(2)

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13 A metal has a density of 2.8 g/cm^3. Work out the mass of 20 cm³ of the metal.

(2)

---

14 A lorry travels at a steady speed of 22 m/s. How far in metres does it travel in 3 minutes?

(3)

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15 A train travels at an average speed of 80 km/h for 45 minutes. How far does it travel?

(2)

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16 A runner travels at 15 m/s. Convert this speed to km/h.

(3)

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17 The density of a metal is 8 g/cm^3. Find the mass, in kilograms, of a block of this metal with volume 0.012 m³. Show your working.

(3)

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18 A pedestrian walks 400 m in 5 minutes, then runs 1.2 km in 8 minutes. Calculate their average speed for the whole journey in m/s. Give your answer to 2 decimal places.

(3)

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19 A drone flies at a steady 15 m/s. Work out how far it travels in 2 minutes, giving your answer in metres.

(2)

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20 A factory fills bottles at a rate of 45 bottles per minute for the first 10 minutes, then increases to 60 bottles per minute for the next 5 minutes. Work out the total number of bottles filled.

(3)

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21 Find the density of an object with mass 60 g and volume 12 cm³.

(1)

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Mark scheme · 3.9 Compound Measures: Speed, Density and Rates: 1-hour Pack

Question 1

9 x 12	M1
108 g cao	A1

Answer: **108 g**

Question 2

62.4 ÷ 12	M1
5.2 g/cm^3 cao	A1

Answer: **5.2 g/cm^3**

Question 3

20 x 60	M1
1200 litres cao	A1

Answer: **1200 litres**

Question 4

240 ÷ 6	M1
40 minutes cao	A1

Answer: **40 minutes**

Question 5

convert 24 minutes to hours or use proportion: 7.2 km in 0.4 h or equivalent method	M1
18 km/h cao	A1

Answer: **18**

Question 6

5 x 100	M1
500 g cao	A1

Answer: **500 g**

Question 7

volume = mass ÷ density	M1
30.4 ÷ 3.8	M1
8 cm³ cao	A1

Answer: **8 cm^3**

Question 8

8.9 x 40	M1
356 g cao	A1

Answer: **356 g**

Question 9

8 x 45	M1
360 litres cao	A1

Answer: **360 litres**

Question 10

20 ÷ 0.5	M1
40 km/h cao	A1

Answer: **40 km/h**

Question 11

47 ÷ 5	M1
9.4 g/cm^3 cao	A1

Answer: **9.4 g/cm^3**

Question 12

216 ÷ 3	M1
72 km/h cao	A1

Answer: **72 km/h**

Question 13

2.8 x 20	M1
56 g cao	A1

Answer: **56 g**

Question 14

convert 3 minutes to 180 seconds and multiply by speed	M1
3960 m cao	A1
answer with units shown	A1

Answer: **3960**

Question 15

80 x 0.75	M1
60 km cao	A1

Answer: **60 km**

Question 16

15 x 3600	M1
÷ 1000	M1
54 km/h cao	A1

Answer: **54 km/h**

Question 17

convert volume to cm^3 or density to kg/m^3 correctly	M1
use mass = density x volume	M1
96 kg cao	A1

Answer: **96**

Question 18

find total distance in metres: 400 + 1200 = 1600 m	M1
find total time in seconds: 5 + 8 = 13 minutes = 780 s	M1
2.05 m/s to 2 d.p. cao	A1

Answer: **2.05**

Question 19

convert 2 minutes to 120 seconds	M1
1800 m cao	A1

Answer: **1800 m**

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Question 20

find bottles in first stage: 45*10 = 450	**M1**
find bottles in second stage: 60*5 = 300	**M1**
750 bottles cao	**A1**

Answer: **750 bottles**

Question 21

5 g/cm^3 cao	**B1**

Answer: **5 g/cm^3**

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