3.1 Ratio, Proportion and Rates of Change: 1-hour Pack

Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A train travels at an average speed of 80 km/h for 2 hours 30 minutes. How far does it travel?

(2)

2 Priya and Tom share £420 in the ratio 3 : 4. Work out how much each person receives.

(2)

3 Ria earns £304 for 38 hours of work. Work out her hourly rate of pay.

(2)

4 Ben is paid £12.40 per hour. He works 41 hours in a week. How much is he paid?

(2)

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5 The table shows pairs of values of two quantities that are directly proportional.

x	7	2
y	35	?

Work out the missing value.

(2)

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6 The table shows pairs of values of two quantities that are directly proportional.

x	4	7
y	32	?

Work out the missing value.

(2)

---

7 A machine makes 300 bolts in 15 minutes. How many bolts does it make per minute?

(2)

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8 A metal has a density of 0.8 g/cm^3. Work out the mass of 100 cm^3 of the metal.

(2)

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9 A liquid has a density of 10.3 g/cm^3. It has a mass of 206 g. Work out its volume.

(3)

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10 Ben is paid £7.50 per hour. He works 41 hours in a week. How much is he paid?

(2)

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11 Amara, Ben and Chidi share 720 kg of gravel in the ratio 2 : 3 : 4 for a building project. Work out the mass each person receives.

(3)

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12 y is directly proportional to x. When x = 3, y = 12. Work out the value of y when x = 11.

(2)

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13 One of a type of bottles of water costs £3. Work out the cost of 4 of them.

(1)

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14 A pump moves water at 25 litres per minute. How many litres does it move in one hour?

(2)

---

15 A liquid has a density of 6.9 g/cm^3. It has a mass of 55.2 g. Work out its volume.

(3)

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16 The table shows pairs of values of two quantities that are directly proportional.

x	2	12
y	10	?

Work out the missing value.

(2)

---

17 A block has a mass of 480 g and a volume of 50 cm³. Work out its density in g/cm^3.

(2)

---

18 y is directly proportional to x. When x = 7, y = 21. Work out the value of y when x = 14.

(2)

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19 A sofa has a price of £680 before VAT. VAT is charged at 20%.

(a) Calculate the total price of the sofa including VAT. **(2)**

.....

(b) In a sale, the total price (including VAT) is reduced by 15%. Calculate the sale price. **(2)**

.....

20 A population of rabbits increases by 20% each year. The starting population is 150.

(a) Find the population after 2 years. **(2)**

.....

(b) Find the single multiplier that could be used to calculate the population after 3 years directly from the starting population. **(2)**

.....

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Mark scheme · 3.1 Ratio, Proportion and Rates of Change: 1-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

80 x 2.5	M1
200 km cao	A1

Answer: **200 km**

Question 2

420 / 7 = 60 (finds value of one part)	M1
Priya = £180 and Tom = £240 cao	A1

Answer: **Priya = £180, Tom = £240**

Question 3

£304 ÷ 38	M1
£8 cao	A1

Answer: **£8**

Question 4

£12.40 x 41	M1
£508.40 cao	A1

Answer: **£508.40**

Question 5

35 ÷ 7 = 5	M1
10 cao	A1

Answer: **10**

Question 6

32 ÷ 4 = 8	M1
56 cao	A1

Answer: **56**

Question 7

300 ÷ 15	M1
20 cao	A1

Answer: **20**

Question 8

0.8 x 100	M1
80 g cao	A1

Answer: **80 g**

Question 9

volume = mass ÷ density	M1
206 ÷ 10.3	M1
20 cm³ cao	A1

Answer: **20 cm^3**

Question 10

£7.50 x 41	M1
£307.50 cao	A1

Answer: **£307.50**

Question 11

720 / 9 = 80 (finds value of one part)	M1
Amara = 160 kg and Ben = 240 kg correct	A1
Chidi = 320 kg cao	A1

Answer: **Amara = 160 kg, Ben = 240 kg, Chidi = 320 kg**

Question 12

y = kx with k = 12 ÷ 3 = 4	M1
44 cao	A1

Answer: **44**

Question 13

£12 cao	B1

Answer: **£12**

Question 14

25 x 60	M1
1500 litres cao	A1

Answer: **1500 litres**

Question 15

volume = mass ÷ density	M1
55.2 ÷ 6.9	M1
8 cm³ cao	A1

Answer: **8 cm^3**

Question 16

10 ÷ 2 = 5	M1
60 cao	A1

Answer: **60**

Question 17

480 ÷ 50	M1
9.6 g/cm^3 cao	A1

Answer: **9.6 g/cm^3**

Question 18

y = kx with k = 21 ÷ 7 = 3	M1
42 cao	A1

Answer: **42**

Question 19

(a) 680 x 1.2 (or finds 20% of 680 and adds to 680)	M1
(a) £816 cao	A1

(a) Answer: **£816**

(b) 816 x 0.85 (or finds 15% of 816 and subtracts), ft from part a	M1
(b) £693.60 cao	A1

(b) Answer: **£693.60**

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Question 20

(a) 150 x 1.2 x 1.2 (or 150 x 1.2^2), correct method	**M1**
(a) 216 cao	**A1**
(a) Answer: **216 rabbits**	
(b) 1.2^3 seen (correct method)	**M1**
(b) 1.728 cao	**A1**
(b) Answer: **1.728**	

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