3.11 Proportional Reasoning Problem Set: Test Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A recipe for one tray of flapjacks uses oats and syrup in the ratio 5:2. For two trays, how many parts of oats and syrup are needed? Give the answer as parts and then state the simplified ratio for the two trays.

(2)

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2 A photographer prints photos in sizes A and B in the ratio A:B = 5:8. She printed 65 photos in total. How many of each size were printed?

(3)

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3 A car uses fuel at a rate of 6.5 litres per 100 km. How many litres are needed for a 275 km journey? Give your answer to one decimal place.

(4)

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4 A baker mixes flour and water in the ratio 9:4. He needs at least 36 kg of mixture. What is the least whole number of kilograms of flour he must use?

(3)

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5 £1 = 1.6 dollars. Convert £400 to dollars.

(2)

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6 y is directly proportional to x. When x = 7, y = 63. Work out the value of y when x = 9.

(2)

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7 Write 0.35 as a fraction in its simplest form, then give it as a percentage.

(2)

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

x	**3**	**4**
y	24	?

Work out the missing value.

(2)

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9 One of a type of ticket costs £1.67. Work out the cost of 3 of them.

(1)

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10 A shop sells apples at a constant price each. 3 apples cost £14.43. How many apples can be bought for £28.86?

(3)

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11 In a survey, 60% of the people were vegetarians. There were 240 vegetarians. How many people were in the survey?

(3)

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12 A recipe for 12 people uses 75 ml of milk and 300 g of flour. Work out how much of each ingredient is needed for 14 people.

(3)

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13 Three friends share a takeaway in the ratio 2:3:4. The total bill is £54. How much does the friend with 3 parts pay?

(2)

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14 A lemonade recipe uses sugar and water in the ratio 1:7. If 4 litres of lemonade are needed, how many litres of sugar are required? (Assume the ratio parts add to the total volume.)

(3)

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15 A model car is built at a scale of 1:24. The model is 18 cm long. Work out the length of the real car, in metres.

(2)

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16 A fruit drink is made from juice and water in the ratio 2:9. Work out how many litres of water are needed for 4 litres of juice.

(2)

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17 A youth club has members in the ratio of juniors to seniors of 5:3. After 4 juniors leave and 2 seniors join, the ratio becomes 3:2. Work out how many members were in the club originally.

(4)

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18 A recipe uses flour and sugar in the ratio 4:1. For a larger batch using the same ratio, how many parts of sugar are needed for 20 parts of flour?

(1)

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19 A map has a scale of 1 cm to 5 km. Work out the real distance represented by 9 cm on the map.

(1)

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Mark scheme · 3.11 Proportional Reasoning Problem Set: Test Pack

Question 1

Scale 5:2 by 2 to give parts 10 and 4	M1
Simplified ratio 5:2 or 10:4 oe (5:2 stated as simplest)	A1

Answer: **Oats 10 parts, syrup 4 parts; ratio 5:2**

Question 2

Total parts 5+8 = 13, one part = 65/13 = 5	M1
Calculate A = 5 x 5 = 25 and B = 8 x 5 = 40	M1
25 A-size, 40 B-size cao	A1

Answer: **25 A-size, 40 B-size**

Question 3

Method: fuel = 6.5/100 x 275 or (275/100) x 6.5	M1
Compute 275 x 6.5 = 1787.5 then divide by 100 = 17.875	M1
Round to one decimal place shown method	M1
17.9 litres cao to one decimal place	A1

Answer: **17.9 litres**

Question 4

Flour:water = 9:4 so water = 4/9 of flour; total = flour + 4/9 flour = 13/9 flour, and 13/9 flour ≥ 36	M1
So flour ≥ 36 x 9/13 = 24.92...; the least whole number of kg of flour meeting this is 25 (24 kg gives total 34.7 kg, below 36 kg)	M1
25 kg cao	A1

Answer: **25 kg**

Question 5

400 x 1.6	M1
$640 cao	A1

Answer: **$640**

Question 6

y = kx with k = 63 ÷ 7 = 9	M1
81 cao	A1

Answer: **81**

Question 7

Convert decimal to fraction 35/100 and simplify to 7/20	M1
35% or 35% cao	A1

Answer: **7/20; 35%**

Question 8

24 ÷ 3 = 8	M1
32 cao	A1

Answer: **32**

Question 9

£5.01 cao	B1

Answer: **£5.01**

Question 10

£14.43 ÷ 3 = £4.81	M1
£28.86 ÷ £4.81	M1
6 cao	A1

Answer: **6**

Question 11

60% = 240 so 1% = 4	M1
4 x 100	M1
400 cao	A1

Answer: **400**

Question 12

scale factor 14/12 or amount for 1 person	M1
87.5 ml of milk	A1
350 g of flour	A1

Answer: **87.5 ml of milk, 350 g of flour**

Question 13

Total parts 2+3+4 = 9, one part = 54/9 = 6	M1
3 parts = £18 cao	A1

Answer: **£18**

Question 14

Total parts 1+7 = 8 so one part = 4/8 = 0.5 litres	M1
Sugar is 1 part so 0.5 litres	M1
0.5 litres cao	A1

Answer: **0.5 litres**

Question 15

method: 18*24 = 432 cm	M1
4.32 m cao	A1

Answer: **4.32 m**

Question 16

find the scale factor: 4/2 = 2	M1
18 litres cao	A1

Answer: **18 litres**

Question 17

set up: let multiplier be k, juniors = 5k, seniors = 3k; after change juniors = 5k-4, seniors = 3k+2	M1
equation (5k-4)/(3k+2) = 3/2 or 2(5k-4) = 3(3k+2)	M1
solve: 10k-8 = 9k+6 gives k = 14	M1
total members originally = 5k+3k = 8k = 8*14 = 112 cao	A1

Answer: **112**

Question 18

5 parts cao	B1

Answer: **5 parts**

Question 19

45 km cao	B1

Answer: **45 km**

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