3.11 Proportional Reasoning Problem Set: 30-minute Pack

Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 To make a diluted solution, a scientist mixes concentrate and water in the ratio 1:12. If she needs 780 ml of the diluted solution, how much concentrate should she use? Give your answer in ml.

(3)

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2 A classroom has a ratio of boys to girls of 7:5. After 3 boys leave and 2 girls join, the ratio becomes 4:3. How many pupils were in the class originally?

(4)

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3 Stretch: A painting mixture uses pigments A, B and C in the ratio A:B = 3:2 and B:C = 5:6. Find the ratio A:B:C. Then, if the painter needs 792 ml of pigment C, how much pigment A is required?

(4)

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

x	6	7
y	12	?

Work out the missing value.

(2)

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5 A map uses a scale where 1 cm represents 3 km. Measure the real distance represented by 7 cm on the map.

(2)

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6 A shop sells coffee in two sizes. Pack A is 400 g for £0.96. Pack B is 500 g for £2.15. Which pack is better value? You must show your working.

(3)

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7 A recipe for 8 people uses 50 ml of milk and 300 g of butter. Work out how much of each ingredient is needed for 20 people.

(3)

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8 One of a type of ticket costs £5.93. Work out the cost of 7 of them.

(1)

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9 £1 = 1.5 dollars. Convert £400 to dollars.

(2)

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10 Write 0.6 as a fraction in its simplest form.

(1)

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Mark scheme · 3.11 Proportional Reasoning Problem Set: 30-minute Pack

Question 1

Total parts 1+12 = 13, one part = 780/13 = 60	M1
Concentrate is 1 part so 60 ml	M1
60 ml cao	A1

Answer: **60 ml**

Question 2

Set up: let multiplier be k so boys = 7k, girls = 5k; after change boys 7k-3, girls 5k+2	M1
Equation (7k-3)/(5k+2) = 4/3 or 3(7k-3) = 4(5k+2)	M1
Solve: 21k -9 = 20k +8 gives k = 17	M1
Total pupils originally = 7k + 5k = 12k = 12 x 17 = 204 cao	A1

Answer: **204**

Question 3

Combine ratios: A:B = 3:2 and B:C = 5:6; make B equal by scaling: for B common multiply A:B by 5 gives 15:10, and B:C by 2 gives 10:12	M1
State combined ratio A:B:C = 15:10:12	M1
Find one part value: C corresponds to 12 parts so one part = 792/12 = 66	M1
A = 15 x 66 = 990 ml cao	A1

Answer: **A:B:C = 15:10:12; pigment A = 990 ml**

Question 4

12 ÷ 6 = 2	M1
14 cao	A1

Answer: **14**

Question 5

Scale method: 7 x 3 km	M1
21 km cao	A1

Answer: **21 km**

Question 6

price per gram or grams per penny for one pack	M1
same measure for the other pack (or both scaled to a common weight)	M1
Pack A, with a correct comparison	A1

Answer: **Pack A**

Question 7

scale factor 20/8 or amount for 1 person	M1
125 ml of milk	A1
750 g of butter	A1

Answer: **125 ml of milk, 750 g of butter**

Question 8

£41.51 cao	B1

Answer: **£41.51**

Question 9

400 x 1.5	M1
$600 cao	A1

Answer: **$600**

Question 10

3/5 cao	B1

Answer: **3/5**

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