3.5 Ratio: Test Pack

EDEXCEL 1MA1 · Calculator allowed · about 70 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write 3 to 8 as a ratio in its simplest form.

(Total for Question 1 is 1 mark)

2 Express the ratio 12:20 in its simplest form.

(Total for Question 2 is 1 mark)

3 In a club the ratio of boys to girls is 4:7. There are 42 more girls than boys.
How many boys and girls are there altogether?

(Total for Question 3 is 3 marks)

4 Write the ratio 18 : 24 in its simplest form.

(Total for Question 4 is 1 mark)

5 A model yacht club has 18 wooden hulls and 30 plastic hulls. The wooden:plastic ratio is 3 : n.
Work out n.

(Total for Question 5 is 2 marks)

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6 A prize fund of £180 is split between three charities in the ratio 2 : 3 : 4. Calculate the amount each charity receives.

(Total for Question 6 is 3 marks)

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7 A small business shares its profit between two partners, Tom and Sara, in the ratio 3 : 4. This year Tom receives £2100. Next year the total profit is expected to increase by 20%, but the partners will keep the same ratio. Work out how much Sara will receive next year.

(Total for Question 7 is 4 marks)

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8 The ratio $(3x + 1) : (2x + 5)$ is equivalent to 2 : 3. Find the value of x.

(Total for Question 8 is 4 marks)

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9 Two similar cylinders have radii in the ratio 2 : 5.

(a) State the ratio of their surface areas. **(1)**

(b) State the ratio of their volumes. **(1)**

(Total for Question 9 is 2 marks)

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10 A chemical solution is made by mixing liquid P and liquid Q in the ratio 7 : 3. Liquid Q costs £1.50 per litre and liquid P costs £2.40 per litre. Mia needs 18 litres of the mixture and wants to minimise cost.

Work out the total cost of the 18 litres of mixture. Give your answer to the nearest penny.

(Total for Question 10 is 6 marks)

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11 Paint A is made from blue and white paint in the ratio 2 : 3. Paint B is made from blue and white paint in the ratio 5 : 1. 400 ml of Paint A is mixed with 300 ml of Paint B to make Paint C. Find the ratio of blue to white paint in Paint C, giving your answer in its simplest form.

(Total for Question 11 is 5 marks)

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12 A company blends two teas, Assam and Ceylon, to make a house blend. Assam costs £8 per kg and Ceylon costs £14 per kg. The company wants to make a blend that costs exactly £10 per kg by mixing Assam and Ceylon in the ratio a : c.

(a) Show that a : c = 2 : 1. **(3)**

(b) The company has 24 kg of Assam and 20 kg of Ceylon in stock. Using the ratio from part (a), work out the maximum mass of house blend that can be made, and state how much Ceylon, if any, will be left over. **(3)**

(Total for Question 12 is 6 marks)

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13 Two variables x and y are inversely proportional. When x = 6, y = 10.

(a) Find y when x = 15. **(3)**

(b) Express y in terms of x and show that if x is tripled then y is divided by 3. **(4)**

(c) The original product xy is increased by 50 percent. y is reduced by 20 percent from its original value. Find the new x. Give your answer to 2 decimal places. **(8)**

(Total for Question 13 is 15 marks)

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Mark scheme · 3.5 Ratio: Test Pack

Question 1

3:8 cao **B1**

Answer: 3:8

Question 2

3:5 cao **B1**

Answer: 3:5

Question 3

7 - 4 = 3 parts represent 42 **M1**

one part = 14 **M1**

154 **A1**

Answer: 154

Question 4

3 : 4 (cao) **B1**

Answer: 3 : 4

Question 5

identify common factor: divide both parts by 6 or scale 18:30 to 3:x **M1**

5 cao **A1**

Answer: 5

Question 6

total parts = 2 + 3 + 4 = 9 **M1**

180 / 9 = 20 (value of one part) **M1**

£40, £60 and £80 (cao) **A1**

Answer: £40, £60, £80

Question 7

one part this year = 2100 / 3 = 700 **M1**

Sara this year = 4 x 700 = £2800 **A1**

multiplies Sara's amount by 1.2 (oe) **M1**

£3360 (cao) **A1**

Answer: £3360

Question 8

sets up 3(3x + 1) = 2(2x + 5) (oe cross multiplication) **M1**

expands both sides: 9x + 3 = 4x + 10 **M1**

rearranges to 5x = 7 **M1**

x = 1.4 (oe, cao) **A1**

Answer: x = 1.4

Question 9

(a) 4 : 25 (cao) **B1**

(a) Answer: 4 : 25

(b) 8 : 125 (cao) **B1**

(b) Answer: 8 : 125

Question 10

find total parts 7+3 = 10 and amount per part = 18/10 = 1.8 litres **M1**

find litres of P = 7 * 1.8 = 12.6 L and Q = 3 * 1.8 = 5.4 L **M1**

find cost contributions: cost P = 12.6 * 2.40, cost Q = 5.4 * 1.50 **M1**

compute cost P = 30.24 and cost Q = 8.10 **M1**

sum = 38.34 cao to nearest penny **A1**

clear presentation: show all steps and final answer £38.34 **C1**

Answer: £38.34

Question 11

Paint A: blue = 160 ml, white = 240 ml (using 400/5 = 80 per part) **M1**

Paint B: blue = 250 ml, white = 50 ml (using 300/6 = 50 per part) **M1**

total blue = 160 + 250 = 410 ml and total white = 240 + 50 = 290 ml **M1**

simplifies 410 : 290 by dividing both parts by 10 **M1**

41 : 29 (cao) **A1**

Answer: 41 : 29

Question 12

(a) sets up (8a + 14c) / (a + c) = 10 (oe) **M1**

(a) rearranges to 8a + 14c = 10a + 10c, leading to 4c = 2a **M1**

(a) a : c = 2 : 1 (cso) **A1**

(a) Answer: a : c = 2 : 1

(b) uses the ratio 2:1 with 24 kg of Assam: one part = 24/2 = 12 **M1**

(b) Ceylon needed = 12 kg, total blend = 24 + 12 **M1**

(b) 36 kg of blend made, with 8 kg of Ceylon left over (cao) **A1**

(b) Answer: 36 kg of blend made; 8 kg of Ceylon left over

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Question 13

(a) use inverse proportion: xy = k, find k = 6*10 = 60 then y = 60/15 **M1**

(a) 4 cao **A1**

(a) answer stated as 4 with working **B1**

(a) Answer: 4

(b) substitute k = 60 to give y = 60/x **M1**

(b) replace x by 3x to get $y_{new} = 60/(3x) = (60/x)/3$ **M1**

(b) conclude y is divided by 3 **A1**

(b) clear algebraic statement y = 60/x and demonstration $y_{new} = y/3$ **B1**

(b) Answer: y = 60/x, tripling x gives $y_{new} = 60/(3x) = y/3$

(c) original product k = 60; increased by 50% gives new product $k_{new} = 1.5 * 60 = 90$ **M1**

(c) y reduced by 20%: $y_{new} = 0.8 *$ original $y = 0.8 * 10 = 8$ **M1**

(c) use $x_{new} * y_{new} = k_{new}$ so $x_{new} = k_{new} / y_{new}$ **M1**

(c) substitute values $x_{new} = 90 / 8$ **M1**

(c) 11.25 cao **A1**

(c) give answer to 2 dp = 11.25 and show clear working **C1**

(c) special case: if candidate uses fractional manipulation and gets 90/8 = 11.25 **SC1**

(c) final answer stated with units if required **B1**

(c) Answer: 11.25

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