HIGHER

3.4H Writing and Simplifying Ratio: Higher Tier Practice

Total Marks

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write the ratio 84:126 in its simplest form.

(Total for Question 1 is 2 marks)

2 A recipe uses flour and sugar in the ratio 5:2. Anna wants to make a batch using 800 g of flour. Work out how much sugar she must use.

(Total for Question 2 is 3 marks)

3 The lengths of three rods are in the ratio 3:4:7. The longest rod is 1.75 m. Work out the lengths of the other two rods. Give your answers in metres.

(Total for Question 3 is 4 marks)

4 A box contains red, green and blue counters in the ratio 2:3:5. Two counters are taken at random without replacement. Calculate the probability that both counters are blue. Give your answer as a fraction in simplest form.

(Total for Question 4 is 4 marks)

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5 Show that the ratio $(3x + 6) : (x + 2)$ simplifies to 3:1 for all values of x for which the expressions are defined. Explain your steps.

(Total for Question 5 is 5 marks)

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6 A section of a map is drawn so that 1 cm on the map represents 250 m in real life. Two towns are 9 km apart in real life. Express this distance on the map in centimetres and give the answer in the ratio map:real.

(Total for Question 6 is 4 marks)

7 A wine merchant mixes red and white wine in the ratio 7:3 by volume. He needs to prepare 50 litres of the mixture but realises the supplier only has 30 litres of red wine available. He will use all 30 litres of red and make up the remainder with white wine.

Calculate the ratio of red to white in the final 50 litre mixture, in simplest form.

(Total for Question 7 is 4 marks)

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8 A rectangle has its length and width in the ratio 5:2. A student claims that if the width is increased by 50% and the length is reduced by 20%, the area of the rectangle remains unchanged.

Determine whether the student is correct by calculating the new ratio of length to width after the changes and comparing the areas. Give your working and conclusion.

(Total for Question 8 is 4 marks)

Mark scheme · 3.4H Writing and Simplifying Ratio: Higher Tier Practice

Question 1

- **M1** divide both numbers by a common factor, e.g. show division by 42 or sequential common-factor division
- **A1** 2:3 cao
- **Answer: 2:3**

Question 2

- **M1** find one part: 800 divided by 5 = 160 g (method shown)
- **M1** multiply one part by 2 to find sugar: 160 * 2
- **A1** 320 g cao
- **Answer: 320 g**

Question 3

- **M1** recognise 7 parts correspond to 1.75 m and set up 1.75/7
- **M1** divide to find one part: 1.75 / 7 = 0.25 m
- **M1** multiply one part to get the other lengths: 3 * 0.25 and 4 * 0.25
- **A1** 0.75 m and 1.00 m cao
- **Answer: 0.75 m and 1.00 m**

Question 4

- **M1** use ratio to find total parts = 2 + 3 + 5 = 10, so probability first is blue = 5/10
- **M1** compute probability second is blue after one blue removed = 4/9 and multiply probabilities (5/10)*(4/9)
- **M1** simplify product: (5/10)*(4/9) -> (1/2)*(4/9) = 4/18
- **A1** 2/9 cao
- **Answer: 2/9**

Question 5

- **M1** factorise numerator: 3x + 6 = 3(x + 2)
- **M1** rewrite ratio as 3(x + 2) : (x + 2)
- **M1** cancel common factor (x + 2), showing cancellation step
- **B1** state domain restriction $x \neq -2$ so cancellation is valid for defined values
- **A1** 3:1 cao
- **Answer: 3:1**

Question 6

- **M1** convert 9 km to metres: 9 km = 9000 m and divide by 250 to find map distance
- **M1** calculate map distance = 9000 / 250 = 36 cm
- **A1** 36 cm cao
- **A1** ratio map:real = 36:9000 simplified to 1:250 cao
- **Answer: 36 cm; ratio 1:250**

Question 7

- **M1** find white used = 50 - 30 = 20 litres
- **M1** write the raw ratio 30:20
- **M1** simplify the ratio by dividing by common factor 10
- **A1** 3:2 cao
- **Answer: 3:2**

Question 8

- **M1** let length = 5k and width = 2k, then calculate new length and width: new length = 5k * 0.8 = 4k, new width = 2k * 1.5 = 3k
- **M1** state new ratio length:width = 4k:3k and simplify if required
- **M1** calculate original area = 5k * 2k = $10k^2$ and new area = 4k * 3k = $12k^2$
- **A1** conclude with a clear statement comparing areas and giving conclusion (areas are not equal so the student's claim is incorrect) cao
- **Answer: New length = 4k, new width = 3k so new ratio length:width = 4:3. Original area = $10k^2$, new area = $12k^2$. Since $10k^2$ is not equal to $12k^2$ the areas are not the same, so the student's claim is incorrect.**