



## EP.M106 Combined Ratio and Fraction Problems

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 55 minutes

Total Marks

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Name: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**Answer ALL questions. Show all your working.**

- 1** A and B share a bag of sweets in the ratio 2:3. What fraction of the sweets does A receive?

- ☐ A)  $\frac{2}{3}$
- ☐ B)  $\frac{2}{5}$
- ☐ C)  $\frac{3}{5}$
- ☐ D)  $\frac{1}{3}$
- ☐ E)  $\frac{1}{5}$

(Total for Question 1 is 1 mark)

- 2** There are 20 students in a club. The ratio of boys to girls is 4:1. How many girls are there?

- ☐ A) 4
- ☐ B) 5
- ☐ C) 8
- ☐ D) 16
- ☐ E) 12

(Total for Question 2 is 1 mark)

- 3** A and B share money in the ratio 5:3. If A receives £25, how much does B receive?

- ☐ A) £10
- ☐ B) £15
- ☐ C) £20
- ☐ D) £30
- ☐ E) £40

(Total for Question 3 is 1 mark)

4 A recipe uses flour and sugar in the ratio 3:2. If the total mixture is 25 g, how much sugar is used?

- ☐ A) 5 g
- ☐ B) 7.5 g
- ☐ C) 10 g
- ☐ D) 12.5 g
- ☐ E) 15 g

(Total for Question 4 is 1 mark)

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5 Amy has  $\frac{3}{7}$  of a cake and Ben has the rest. What is the ratio Amy:Ben?

- ☐ A) 3:4
- ☐ B) 3:7
- ☐ C) 4:3
- ☐ D) 3:10
- ☐ E) 7:3

(Total for Question 5 is 1 mark)

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6 Three friends share £60 in the ratio 2:3:1. How much does the middle friend receive?

- ☐ A) £10
- ☐ B) £15
- ☐ C) £20
- ☐ D) £30
- ☐ E) £35

(Total for Question 6 is 1 mark)

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7 Alfie and Priya share sweets in the ratio 7:5. They have 48 sweets in total. How many sweets does Priya have?

- ☐ A) 14
- ☐ B) 16
- ☐ C) 20
- ☐ D) 25
- ☐ E) 30

(Total for Question 7 is 1 mark)

**8** A mixture contains alcohol and water in the ratio 1:9. What fraction of the mixture is alcohol?

- ☐ A)  $\frac{1}{9}$
- ☐ B)  $\frac{1}{10}$
- ☐ C)  $\frac{1}{5}$
- ☐ D)  $\frac{9}{10}$
- ☐ E)  $\frac{1}{8}$

(Total for Question 8 is 1 mark)

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**9** There are 24 tiles in two colours in the ratio red:blue = 5:1. How many red tiles are there?

- ☐ A) 4
- ☐ B) 5
- ☐ C) 12
- ☐ D) 20
- ☐ E) 18

(Total for Question 9 is 1 mark)

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**10** A and B share money in the ratio 4:7. After A receives an extra £24, the ratio becomes 5:8. How much did A have originally?

(Total for Question 10 is 2 marks)

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**11** A bowl contains sugar and water in the ratio 2:5. When 21 g of water is added the ratio becomes 2:7. How much sugar was in the bowl originally?

(Total for Question 11 is 2 marks)

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**12** Three drinks A, B and C are mixed in the ratio 3:4:5. The total mixture is 480 ml. How much of drink B is used?

(Total for Question 12 is 2 marks)

- 13** A wins  $\frac{3}{8}$  of a prize fund of £240. The remaining money is split between B and C in the ratio 2:3. How much does C receive?

(Total for Question 13 is 2 marks)

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- 14** Two numbers are in the ratio 2:5. If 9 is added to each number, the ratio becomes 11:14. Find the original two numbers.

(Total for Question 14 is 2 marks)

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- 15** A and B share money in the ratio 5:3. A gives £6 to B and the new ratio becomes 7:5. How much did A have originally?

(Total for Question 15 is 2 marks)

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- 16** A, B and C share an amount. A has  $\frac{1}{3}$  of the total and B has  $\frac{1}{4}$  of the total. What is the ratio A:B:C?

(Total for Question 16 is 2 marks)

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- 17** B pays A £12 so that after the payment the ratio of A:B becomes 3:4. Before the payment A and B were in the ratio 2:3. How much money did A have at the start?

(Total for Question 17 is 3 marks)

- 18** A, B and C share £480 in the ratio 4:5:7. C is then given an extra £30 (from outside) so that C's new amount becomes twice A's original amount. What was A's original share?

(Total for Question 18 is 3 marks)

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- 19** Two numbers are in the ratio 2:7. If 6 is added to each number the ratio becomes 4:9. Find the original two numbers.

(Total for Question 19 is 3 marks)

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- 20** A pile of cards is split into three piles in the ratio 4:6:9. The middle pile has 30 more cards than the smallest pile. How many cards were there in the pile originally?

(Total for Question 20 is 3 marks)

## Mark scheme · EP.M106 Combined Ratio and Fraction Problems

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### Question 1

- **B1** correct option B ( $\frac{2}{5}$ ) cao
- **Answer: B)  $\frac{2}{5}$**  (A receives 2 out of 5 equal parts of the sweets.) The total ratio parts =  $2+3 = 5$  so A has  $\frac{2}{5}$  of the sweets. (Distractors: A) swapped parts; C) B's fraction; D)  $\frac{1}{3}$  arises from confusion with thirds; E)  $\frac{1}{5}$  is a place-value slip.)

### Question 2

- **B1** correct option A (4) cao
- **Answer: A) 4** (Total parts  $4+1 = 5$ , each part =  $20/5 = 4$ , girls = 1 part = 4.)

### Question 3

- **B1** correct option B (£15) cao
- **Answer: B) £15** (One part =  $25/5 = £5$ , B has 3 parts =  $3 \times £5 = £15$ .)

### Question 4

- **B1** correct option C (10 g) cao
- **Answer: C) 10 g** (Total parts  $3+2 = 5$  so sugar =  $\frac{2}{5}$  of 25 = 10 g.)

### Question 5

- **B1** correct option A (3:4) cao
- **Answer: A) 3:4** (Amy has  $\frac{3}{7}$  so Ben has  $\frac{4}{7}$ ; ratio Amy:Ben = 3:4.)

### Question 6

- **B1** correct option D (£30) cao
- **Answer: D) £30** (Total parts  $2+3+1=6$ , each part =  $£60/6 = £10$ , middle friend 3 parts = £30.)

### Question 7

- **B1** correct option C (20) cao
- **Answer: C) 20** (Total parts  $7+5 = 12$ , one part =  $48/12 = 4$ , Priya has 5 parts =  $5 \times 4 = 20$ .)

### Question 8

- **B1** correct option B ( $\frac{1}{10}$ ) cao
- **Answer: B)  $\frac{1}{10}$**  (Total parts  $1+9 = 10$ , alcohol is 1 out of 10 parts.)

### Question 9

- **B1** correct option D (20) cao
- **Answer: D) 20** (Total parts  $5+1 = 6$ , one part =  $24/6 = 4$ , red =  $5 \times 4 = 20$ .)

### Question 10

- **M1** form equation  $(4k + 24)/(7k) = 5/8$  or equivalent method
- **A1** £256 cao
- **Answer: £256** (Let  $A = 4k$ ,  $B = 7k$ .  $(4k + 24)/(7k) = 5/8$  gives  $32k + 192 = 35k$  so  $k = 64$ ,  $A = 4k = 256$ .)

### Question 11

- **M1** use  $2k/(5k + 21) = 2/7$  or equivalent and solve for k
- **A1** 21 g cao
- **Answer: 21 g** ( $2k/(5k + 21) = 2/7 \Rightarrow 7 \cdot 2k = 2 \cdot (5k + 21) \Rightarrow 14k = 10k + 42 \Rightarrow k = 10.5$ , sugar =  $2k = 21$  g.)

### Question 12

- **M1** find one part =  $480/12$  or equivalent
- **A1** 160 ml cao
- **Answer: 160 ml** (Total parts  $3+4+5 = 12$ , one part =  $480/12 = 40$ , B =  $4 \times 40 = 160$  ml.)

### Question 13

- **M1** calculate remainder after A:  $240 - (3/8 \times 240) = 150$  or equivalent
- **A1** £90 cao
- **Answer: £90** ( $A = 3/8 \times £240 = £90$ , remainder £150 split 2:3 so C gets  $3/5$  of 150 = £90.)

### Question 14

- **M1** form equation  $(2k + 9)/(5k + 9) = 11/14$  or equivalent
- **A1** 2 and 5 cao
- **Answer: 2 and 5** (Solve  $14(2k + 9) = 11(5k + 9)$  giving  $k = 1$ , so numbers  $2k = 2$  and  $5k = 5$ .)

### Question 15

- **M1** form equation  $(5k - 6)/(3k + 6) = 7/5$  or equivalent
- **A1** £90 cao
- **Answer: £90** (Solve  $5(5k - 6) = 7(3k + 6)$  gives  $k = 18$  so  $A = 5k = £90$ .)

### Question 16

- **M1** convert fractions to common denominator and express amounts as integers (e.g.  $4/12, 3/12, 5/12$ )
- **A1** 4:3:5 cao
- **Answer: 4:3:5** ( $A = 1/3 = 4/12, B = 1/4 = 3/12$ , rest =  $5/12$  so ratio 4:3:5.)

### Question 17

- **M1** let  $A = 2k, B = 3k$  and form equation  $(2k + 12)/(3k - 12) = 3/4$  or equivalent
- **M1** solve linear equation to find  $k = 84$
- **A1** £168 cao
- **Answer: £168** (Let  $A = 2k, B = 3k$ . After B pays A £12:  $(2k + 12)/(3k - 12) = 3/4$ . Solve  $4(2k + 12) = 3(3k - 12)$ :  $8k + 48 = 9k - 36$  so  $k = 84$ .  $A = 2k = £168$ .)

### Question 18

- **M1** use total to find  $k$  ( $480 = 16k$ ) or use equation  $7k + 30 = 2 \times 4k$  to find  $k$
- **M1** solve  $k = 30$
- **A1** £120 cao
- **Answer: £120** (Let shares  $4k, 5k, 7k$ . From  $7k + 30 = 2(4k)$  we get  $k = 30$ , so  $A = 4k = £120$ . Check: total  $16k = £480$ .)

### Question 19

- **M1** form equation  $(2k + 6)/(7k + 6) = 4/9$  or equivalent
- **M1** solve  $9(2k + 6) = 4(7k + 6)$  leading to  $k = 3$
- **A1** 6 and 21 cao
- **Answer: 6 and 21** (Let numbers be  $2k$  and  $7k$ .  $9(2k + 6) = 4(7k + 6)$  gives  $k = 3$  so numbers  $2k = 6$  and  $7k = 21$ .)

### Question 20

- **M1** let one unit =  $x$  so  $6x - 4x = 30$  and form equation  $2x = 30$
- **M1** solve  $x = 15$  and compute total units  $4+6+9 = 19$
- **A1** 285 cao
- **Answer: 285 cards** (If one unit =  $x$  then middle minus smallest =  $6x - 4x = 2x = 30$  so  $x = 15$ . Total =  $19x = 19 \times 15 = 285$ .)