Foundation GCSE: Ratio Problems

Name: _____ Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. In a recipe, flour and butter are used in the ratio $3 : 2$. If you use 150 g of flour, how much butter do you need?

2. The ratio of cats to dogs in a shelter is $4 : 5$. If there are 20 cats, how many dogs are there?

3. Two numbers are in the ratio $3 : 4$. If their sum is 35, find the larger number.

4. The ratio of boys to girls in a school assembly is $5 : 6$. If there are 330 girls, how many boys are there?

5. A bag contains red and blue counters in the ratio $2 : 7$. There are 35 blue counters. How many counters are there in total?

6. The angles of a triangle are in the ratio $1 : 2 : 3$. Find the size of the middle angle.

7. Orange juice and lemonade are mixed in the ratio $3 : 5$ to make a punch. If 150 ml of orange juice is used, what is the total volume of the punch?

8. The ratio of adults to children at a museum is $7 : 3$. If there are 120 more adults than children, how many people are at the museum?

9. A sum of money is divided between Amy and Ben in the ratio $4 : 3$. If Ben gets 36, how much do they have altogether?

10. The ratio of copper to tin in an alloy is $13 : 7$. If the piece contains 65 g of copper, what is the total mass of the alloy?

11. In a box of chocolates, the ratio of dark to milk to white is $2 : 5 : 3$. If there are 40 milk chocolates, how many chocolates are in the box in total?

12. The ratio of red pens to blue pens in a drawer is $3 : 4$. When 6 red pens are added, the ratio becomes $1 : 1$. How many blue pens are in the drawer?

13. The ratio of men to women in a club is $5 : 3$. If 10 men leave and 10 women join, the ratio becomes $1 : 1$. How many members were in the club originally?

14. Two containers X and Y hold water in the ratio $2 : 3$. Container X holds 40 litres. How many litres must be moved from Y to X so the ratio becomes $1 : 1$?

15. The ratio of boys to girls in a class is $4 : 3$. If 5 more girls join, the ratio becomes $1 : 1$. How many students are in the class now?

16. A bag contains counters that are red, green, or yellow in the ratio $2 : 3 : 4$. If there are 24 yellow counters, how many more green counters than red counters are there?

17. The ratio of the length of a rectangle to its width is $7 : 4$. If the area of the rectangle is 252 cm^2, find its perimeter.

18. Three friends A, B, and C share a prize. A gets twice as much as B, and B gets three times as much as C. If A receives 180 more than C, find the total prize money.

19. The ratio of cats to dogs in a vet's clinic is $3 : 4$. After 6 more cats and 2 fewer dogs arrive, the new ratio of cats to dogs is $1 : 1$. How many animals were originally in the clinic?

20. A mixture contains chemical A and chemical B in the ratio $5 : 2$. When 14 litres of mixture are removed and replaced with 14 litres of chemical B alone, the new ratio of A to B becomes $2 : 3$. What was the original total volume of the mixture?

Answers & Worked Solutions

1. 100 g
   3 *parts* = 150 $\implies$ 1 *part* = 50. *Butter* = $2 \times 50 = 100$.

2. 25 dogs
   4 *parts* = 20 $\implies$ 1 *part* = 5. *Dogs* = $5 \times 5 = 25$.

3. 20
   Total parts = 7, $35 \div 7 = 5$. *Larger* = $4 \times 5 = 20$.

4. 275 boys
   6 *parts* = 330 $\implies$ 1 *part* = 55. *Boys* = $5 \times 55 = 275$.

5. 45 counters
   7 *parts* = 35 $\implies$ 1 *part* = 5. *Total parts* = 9, $9 \times 5 = 45$.

6. 60°
   Total parts = 6, $180 \div 6 = 30$. *Middle* = $2 \times 30 = 60$.

7. 400 ml
   3 *parts* = 150 $\implies$ 1 *part* = 50. *Total parts* = 8, $8 \times 50 = 400$.

8. 400 people
   Difference = 4 *parts* = 120 $\implies$ 1 *part* = 30. *Total parts* = 10, $10 \times 30 = 300$.

9. 84
   3 *parts* = 36 $\implies$ 1 *part* = 12. *Total parts* = 7, $7 \times 12 = 84$.

10. 100 g
    13 *parts* = 65 $\implies$ 1 *part* = 5. *Total parts* = 20, $20 \times 5 = 100$.

11. 80 chocolates
    5 *parts* = 40 $\implies$ 1 *part* = 8. *Total parts* = 10, $10 \times 8 = 80$.

12. 24 blue pens
    Let red be $3x$, *blue be* $4x$. $3x + 6 = 4x \implies x = 6$. *Blue* = $4 \times 6 = 24$.

13. 80 members
    Let men be $5x$, *women be* $3x$. $\dfrac{5x - 10}{3x + 10} = 1 \implies x = 10$. *Total* = $8x = 80$.

14. 10 litres
    Container Y holds 60 *litres (*3 *parts). Total is* 100 *litres, equal split is* 50 *litres, so move* 10 *litres.*

15. 35 students
    Let boys be $4x$, *girls be* $3x$. $4x = 3x + 5 \implies x = 5$. *Total now* $= 7x + 5 = 40$ *(Wait,* $4(5) + 3(5) + 5 = 35$*).*

16. 6 more green counters
    4 *parts* = 24 $\implies$ 1 *part* = 6. *Difference* = 1 *part* = 6.

17. 66 cm
    Let length be $7x$, *width be* $4x$. *Area is* $28x^2 = 252 \implies x^2 = 9 \implies x = 3$. *Perimeter* = 66.

18. 360
    Ratio $A : B : C = 6 : 3 : 1$. *Difference A and C is* 5 *parts* = 180 $\implies$ 1 *part* = 36. *Total parts* = 10, $10 \times 36 = 360$.

19. 56 animals
    Let cats be $3x$, *dogs be* $4x$. $\dfrac{3x + 6}{4x - 2} = 1 \implies x = 8$. *Total initially* = $7x = 56$.

20. 70 litres
    Let total be V. *Initial A is* $\dfrac{5}{7}V$. *Removing* 14 *removes* 10 *of A. New ratio equation gives* $V = 70$.