Higher GCSE: Ratio problems

1. *p:q =* 5:3.
2. What is *p* as a fraction of the total?
3. What is *p* as a fraction of *q*?
4. What is *q* as a fraction of the total?
5. What is *q* as a fraction of *p*?
6. *c:d* = 2:7.

Which of the following statements is correct?

*c* is $\frac{2}{9}$ of *d* *c* is $\frac{7}{9}$ of *d c* is $\frac{2}{7}$ of *d* *c* is $\frac{7}{2}$ of *d*

*b*

*a*

*c*

 3.

*a*:*b* = 2:1. *a*:*c* = 2:3.

Write an expression, in terms of *a,* for the perimeter of the shape.

*x*

*y*

4.

*x:y* = 4:3.

1. Write an expression, in terms of *x*, for the perimeter of the shape.
2. Write an expression, in terms of y, for the perimeter of the shape.

5.

r

h

 *r:h =* 2:3.

Write an expression, in terms of *h*, for the volume of the cylinder.

6. Concrete is made using sand and cement in the ratio 5:2. How many buckets of cement would be needed to mix with 30 buckets of sand?

7. A recipe for biscuits uses butter to sugar in the ratio 5:3. How much sugar is needed with 210 grams of butter?

8. Tom is going to make some concrete by mixing sand, cement and gravel in the ratio 1:3:4. Tom wants to make 200kg of concrete mix.

He has 30kg of cement, 75kg of sand, and 105kg of gravel. Does Tom have enough materials to make the concrete mix?

9. Green paint is made by mixing blue paint and yellow paint in the ratio 4:3.

Ben has 22 litres of blue paint, and 18 litres of yellow paint.

What is the **maximum** amount of green paint he can make?

10. Bob and Steve share some money in the ratio 14:21.

Stacey says that Steve gets $\frac{3}{5}$ of the money.

Is Stacey correct? You must explain your answer.

11. In a bag there are 10 beads. They are red and white in the ratio 1:4.

a) What fraction of the beads are white?

Some more beads are now added to the bag so that $\frac{2}{3} $of the beads are now red.

b) What is the smallest number of beads that could have been added?

c) What is the new ratio of red to white beads?

12. One day in school, $\frac{1}{70} $of the students are absent. Of these, the number of girls to boys is in the ratio 5:3.

What fraction of all the students in the school are girls who are absent?

13. A circle has a radius of 4cm. Two diameters split the circle into four sectors, as shown.

A B

C D

Diagram not drawn accurately

Area of sector *A*: Area of sector *B* = 1:4

Work out the area of sector B, giving your answer in terms of π.

14. A bag contains blue, purple, pink and black beads.

$\frac{1}{6 }$ of the beads are blue.

There are 15 pink beads.

The ratio of purple to pink to black is 5:3:2.

How many beads are in the bag?

15. There are between 20 and 30 students in a class.

The ratio of boys to girls is 5:3. How many students are in the class?

16. At a show, the ratio of men to women is 2:5.

The ratio of women to children is 3:7.

What fraction of the show’s audience was made up of men?

17. Given that *d:e* = 5:3 and *e:f*  = 7:4. Find the ratio *d:e:f*, giving your answer in its simplest form.

18. *a, b* and *c* are positive integers.

*a:b* = 2:9 and *b:c* = 6:7.

What is the **smallest** possible value of *a + b + c* ?

19. Anna, Billy and Craig share some money.

Anna gets 1.5 times as much as Billy.

Billy gets 3 times as much as Charlie.

If they shared £68 in total, how much does Charlie have?

20. Aaron is mixing antifreeze and water. He has 14 litres of a mixture of antifreeze and water in the ratio 3:2. How much water must he add to make the ratio 1:1?

21. The ratio of shares owned by Nick and Macy is in the ratio 2:5. If Nick gives Macy 3 of his shares, then the ratio will be 1:6. How many shares do they have initially?

22. Alan, Becca and Charlie start a poker game with their money in the ratio 3:5:4.

One player wins $1500 from one of the other players, and they end the game with their money in the ratio 5:10:9.

How much money did each player start the game with?

23. A bag contains blue and red beads in the ratio 3:2.

7 blue and 8 red beads are added to the bag, and the ratio of blue to red beads is now 11:9.

How many beads were in the bag to start with?

24. In a box, there are apples and bananas in the ratio 4:3.

6 pieces of each fruit are added to the box, and the ratio of apples to bananas is now 6:5.

How many pieces of fruit were in the box to start with?

25. *x:y* = 3:4 *x* + *y* = 49

 What are the values of *x* and *y*?

26. *a:b* = 5:2 *a – b ­=* 36

What is the value of *a + b*?

27. *x:y* = 7:5 and 3*y* = 8*z*.

Write the ratio *x:z* in its simplest form.

28. In a box of chocolate, the number of dark to milk to white are in the ratio 2:3:1.

There are 14 **less** white chocolates than there are milk chocolates. How many of each chocolate are in the box?

29. At a concert, the ratio of men to women to children = 11:5:9.

There are 2,052 **more** men than women. Work out the number of children at the concert.

x

y

2w - 15

30.

 *x:y* = 1:3

 Find the value of *w*.