GCSE Maths – Number

Ratio Problems

Worksheet

NOTES

SOLUTIONS

This worksheet will show you how to work out different types of ratio problems. Each section contains a worked example, a question with hints and then questions for you to work through on your own.

Section A

Worked Example

Bananas are shared between Team A and Team B in a ratio of $2:4$. What fraction of the total bananas does Team B get?

Step 1: Work out the denominator of the fraction by adding together each number in the ratio.

We need to find the total number of 'parts', which is done by finding the sum of the parts belonging to each group.

$$2 + 4 = 6$$

The denominator is 6.

Step 2: Use the specific part number for the appropriate group as the numerator.

We want to find the number of parts belonging to Team B here. We take the part of the ratio that represents team B as the numerator.

The numerator is 4.

Step 3: Write out the final fraction, simplifying if possible.

The fraction of bananas that team B gets is $\frac{4}{6}$.

This can be simplified to $\frac{2}{3}$ by dividing the numerator and denominator by the highest common factor – in this case, divide by 2.

Guided Example

A factory produces cement. The factory provides cement to construction sites 1 and 2 in a ratio of $7:3$. What fraction of total cement does construction site 2 receive?

Step 1: Work out the denominator of the fraction by adding together each number in the ratio.

Step 2: Use the specific part number for the appropriate group as the numerator.

Step 3: Write out the final fraction, simplifying if possible.

Now it's your turn!
If you get stuck, look back at the worked and guided examples.

1) Naoki and Oscar share sweets from a bag in the ratio $4 : 8$. What fraction of the total sweets does Naoki get?

2) Tom is mixing red and blue paint together in a ratio of $5 : 7$. What fraction of the total paint is red paint?

3) Seeds are to be planted in fields A, B and C in a ratio of $15 : 5 : 10$. What fraction of the total seeds are planted in field A?

4) Siobhan is counting marbles. There are orange, green and yellow marbles in a ratio of $4 : 7 : 10$. What fraction of the total marbles are green?

Section B

Worked Example

In a bag of apples, $\frac{6}{13}$ of the apples are red and the rest are green. Write out the ratio for red to green apples.

Step 1: Write out the known parts of the ratio.

We know that 6 parts belong to the red apple group. Since there are an unknown number of green apples, we can say there are x green apples. So, the ratio becomes

$$red\ apples : green\ apples = 6 : x$$

Step 2: Write out and solve an equation to calculate the unknown parts.

We can write out what we know as:

$$6 + x = 13$$

since we know that the sum of all parts of the ratio is the denominator of the fraction $\frac{6}{13}$. Rearranging this, we can see that $x = 7$.

Step 3: Write out the ratio.

The ratio for red to green apples is $6 : 7$.

Guided Example

John has several model trains. $\frac{3}{7}$ of the trains are green and the rest are blue. Write out the ratio for green trains to blue trains.

Step 1: Write out the known parts of the ratio.

Step 2: Write out and solve an equation to calculate the unknown parts.

Step 3: Write out the ratio.

Now it's your turn!
If you get stuck, look back at the worked and guided examples.

5) There are cows on a field. $\frac{1}{5}$ of the cows are red, and the rest are white. Calculate the ratio for red cows to white cows on the field.

6) Omar has a bag of sweets. $\frac{4}{11}$ of the sweets are red, whilst the rest are orange. Calculate the ratio for red sweets to orange sweets.

7) A florist sells two types of flowers: roses and tulips. $\frac{8}{15}$ of the flowers in the shop are roses and the rest are tulips. Write out the ratio for roses to tulips.

8) At an elephant sanctuary, $\frac{6}{16}$ of the elephants are female and the rest are male. Write out the ratio for females to males.

Section C

Worked Example

In a bag of fruit, $\frac{1}{10}$ of the fruit are oranges, $\frac{6}{20}$ are bananas and the rest are apples. Write the ratio for oranges to bananas to apples.

Step 1: Convert the known fractions so that they all have the same denominator.

We can divide the numerator and denominator of $\frac{6}{20}$ by 2 to get the same denominator as the first fraction:

$$\frac{6}{20} \div \frac{2}{2} = \frac{3}{10}$$

Step 2: Write out and solve an equation to calculate the unknown parts.

We can write out what we know as:

$$1 : 3 : x$$
$$1 + 3 + x = 10$$

since we know that the sum of all parts of the ratio is the common denominator of the fractions.

Rearranging this, we can see that $x = 6$.

Step 3: Write out the ratio.

The ratio for oranges to bananas to apples is $1 : 3 : 6$.

Guided Example

Taron is birdwatching in his garden. $\frac{4}{15}$ of the birds he sees are magpies, $\frac{1}{5}$ are wrens and the rest are sparrows. Write out the ratio for magpies to wrens to sparrows.

Step 1: Convert the known fractions so that they all have the same denominator

Step 2: Write out and solve an equation to calculate the unknown parts.

Step 3: Write out the ratio.

Now it's your turn!
If you get stuck, look back at the worked and guided examples.

9) A takeaway sells fish, chips and sausages. On one particular evening, $\frac{11}{32}$ of total sales are fish, $\frac{3}{8}$ are chips and the rest are sausages. Calculate the ratio for sales of fish to chips to sausages.

10) A GP surgery offers appointments on Mondays, Tuesdays and Wednesdays. On a particular week, they hold 60 appointments. $\frac{1}{3}$ of these were on Monday, $\frac{1}{5}$ were on Tuesday and the rest were on Wednesday. Write out the ratio for appointments on Monday to Tuesday to Wednesday.

11) A bag of counters contains pink, purple, red and blue counters. $\frac{1}{20}$ of the counters are pink, $\frac{1}{10}$ are purple, $\frac{1}{4}$ are red and the rest are blue. Write out the ratio for pink to purple to red to blue counters.

12) In a fish tank, $\frac{5}{25}$ of the fish are blue, $\frac{1}{10}$ are red, $\frac{2}{5}$ are orange and the rest are yellow. Calculate the ratio for blue to red to orange to yellow fish.

Section D

Worked Example

At a theme park, the ratio of adults to children is $4:5$. In the group of children, and the ratio of boys to girls is $7:11$. What fraction of people in the theme park are boys?

Step 1: Calculate the fraction for the first given ratio.

We are looking to find the fraction that represents children here. Following the same method as above, we look for the part that represents children (the numerator) and the sum of all parts (the denominator).

$$\frac{5}{4+5}=\frac{5}{9}$$

Step 2: Calculate the fraction for the second ratio.

Next, we want to find the fraction of all children that are boys. Apply the same method as above:

$$\frac{7}{7+11}=\frac{7}{18}$$

Step 3: Multiply the two fractions together to find the fraction of total people that are boys.

$$\frac{5}{9}\times\frac{7}{18}=\frac{35}{162}$$

Guided Example

Luke has white sheep and cows at his farm. The ratio of white sheep to cows is $2:1$. The cows are either black and white, or red, in the ratio $4:5$. What fraction of all animals at the farm are red?

Step 1: Calculate the fraction for the first given ratio.

Step 2: Calculate the fraction for the second ratio.

Step 3: Multiply the two fractions together to find the fraction of total animals that are red.

Now it's your turn!
If you get stuck, look back at the worked and guided examples.

13) Shannon sells beige and white paint in the ratio $6:1$. The beige paint comes in either matte or glossy and is sold in the ratio $3:2$. What fraction of all paint sold is matte beige?

14) A shop sells wine and beer in a ratio $4:3$. The wine is either red or white and is sold in a ratio $7:6$. What fraction of all alcohol sold at the shop is red wine?

15) In a two-week period, the ratio of sunny days to rainy days is $5:2$. On the sunny days, the ratio of days with cloud to clear days is $1:9$. What fraction of total days in the two-week period are sunny with cloud?

16) In a garden, the ratio of trees to flowers is $3:11$. The flowers are either daisies or buttercups in a ratio of $9:5$. What fraction of all plants in the garden are buttercups?