



# Ratios - Worksheet

## What is a ratio?

A ratio is an expression to compare two values to illustrate how much larger one is to another.

Ratios can be written in different ways,

Use the ':' symbol i.e., 2:7 or

Use 'to' in between the numbers i.e., 2 to 7 or

Write it like a fraction i.e.,  $\frac{2}{7}$

## Reducing the ratio

This process is followed to express a ratio in its simplest form.

### Example

The ratio of male students to female students in a class is 25:35. That means for every 25 male students there are 35 female students.

But we can reduce this ratio to a simpler form. As we see both numbers have 5 in common, so we can reduce both the numbers by dividing them by '5'.

Then we get 5:7, so for every 5 male students, there are 7 female students in the class.

### Please note:

If there are 35 male students and 25 female students in the class, and the questions asks for male to female ratio, the number of male students should be on left side and the number of female students on the right side. The ratio should be 35:25 **not** 25:35.

If the ratio is written in a fraction form, the number of male students should go on top and the number of female students would be the denominator, that is,  $\frac{35}{25}$ .

Writing these expressions the other way around would mark your answer wrong.



## Solving Ratio Problems

### Example

A class has 25 students of which 15 are males and the rest are females. What is the ratio of males to female students?

### Answer

Total students = 25

Male students = 15

So, female students =  $(25-15) = 10$

Ratio of male to female students =  $15:10 = 3:2$  (reduced)

So, for every 3 male students there are 2 female students.

## Understanding relationship with the whole

### Example

A class has 25 students of which 15 are males. What proportion of the class is male?

### Answer

So the ratio of male students to the whole class is  $15:25$  or  $3:5$  (reduced)

Or, we could write it as a fraction,  $\frac{3}{5}$

So, we can say that  $\frac{3}{5}$  th of the class is male students.

## Understanding Proportion

A proportion is an equation that expresses two equivalent ratios.

That is,  $\frac{x}{y} = \frac{z}{p}$ ; and if one value is missing, you could solve the equation and find it.

### Example

A recipe says that to make 6 muffins you need 1 cup of butter. If you want to make 4 muffins, how much butter do you need to add to the mixture?

So, the ratio of butter to muffins,

$\frac{\text{butter1}}{\text{muffins1}} = \frac{\text{butter2}}{\text{muffins2}}$  (make sure you write both the ratios in the same format, that is either butter to muffins or muffins to butter)

So, from the question we get,  $\frac{1}{6} = \frac{z}{4}$

Now, we need to solve to get the value of **z**.

$$\frac{1}{6} \times 4 = \frac{z}{4} \times 4$$

$$\frac{4}{6} = z$$

$z = \frac{2}{3}$  ; So, you need **2/3<sup>rd</sup> cups** of butter to make 4 muffins.

## Practice Exercises

### Question 1

Reduce the following ratios:

No.	Ratios	Answer
1	35:25	
2	105:25	
3	12:6	
4	18:54	
5	27:81	

### Question 2

Change the ratios into fraction format:

No.	Ratios	Answer
1	35:25	
2	105:25	
3	12:6	
4	18:54	
5	27:81	

### Question 3

Kylie wants to buy a pack of stickers in which there would be 5 green stickers for every 15 red stickers. She found two packs, one of which has 20 green stickers and 45 red stickers. The other pack has 27 red stickers and 9 green stickers. Which pack she should choose?

### Question 4

James has two friends living in Perth, 4 in Brisbane and 3 in Melbourne. What is the ratio of his friend living in Melbourne to those who are living in Perth?

### Question 5

In a solution, 2 parts of glucose water need to be mixed in 3 parts of regular water. If you have 450ml of regular water, how much glucose water would you mix?

### Question 6

While making rice pudding, Alice's mum always puts 4 tablespoons of sugar in 1 L milk. Alice is following her mum's recipe to make rice pudding with 3L of milk. She has already put 5 tablespoons of sugar in the milk. How much more does she need to put in?



## Answers

### Answer 1

Reduce the following ratios:

No.	Ratios	Answer
1	35:25	7:5
2	105:25	21:5
3	12:6	2:1
4	18:54	1:3
5	27:81	1:3

### Answer 2

Change the ratios into fraction format:

No.	Ratios	Answer
1	35:25	$\frac{7}{5}$
2	105:25	$\frac{21}{5}$
3	3:18	$\frac{1}{6}$
4	12:96	$\frac{1}{8}$
5	27:81	$\frac{1}{3}$

### Answer 3

Kylie's desired green to red sticker ratio = 5:15 or 1:3 (reduced)

First pack, green stickers: red stickers = 20:45

If it's reduced, Green: Red = 4:9

Second pack, green stickers: red stickers = 9:27

If it's reduced, Green: Red = 1:3, which is equivalent to the desired ratio.

So, Kylie should buy the **second pack**.

### Answer 4

Number of friends living in Melbourne = 3

Number of friends living in Perth = 2

So, the ratio of friends from Melbourne to friends from Perth = **3:2**.

### Answer 5

Desired ratio; Glucose water: Regular water = 2:3

Now, in the mixture, 2:3= G: 450 (considering 'G' as the amount of Glucose water in the solution)

$$\frac{2}{3} = \frac{G}{450}$$



$$\frac{2}{3} \times 450 = \frac{G}{450} \times 450$$

$$G = 2 \times 150$$

$$G = 300$$

So, the mixture should have **300mls** of glucose water.

### Answer 6

Desired ratio; Milk: Sugar = 1:4

Now, in the mixture, 1:4= 3: S (considering 'S' as the amount of sugar that needs to go in total)

$$\frac{1}{4} = \frac{3}{S}$$

$$\frac{1}{4} \times S = 3$$

$$\frac{S}{4} \times 4 = 3 \times 4$$

$$S = 12$$

So, the rice pudding should have 12 tablespoons of sugar.

Alice has already put in 5 tablespoons. So, she needs to add **7 tablespoons** more of sugar.