



# Expressing a Quantity as a Percentage or Fraction of Another

## Prior Knowledge:

Before attempting this sheet, students should be able to:

- find equivalent fractions;
- convert between fractions and percentages.

## Expressing a Quantity as a Fraction of Another

To write one number as a fraction of another, divide one by the other.

In general, to write  $a$  as a fraction of  $b$ , write  $\frac{a}{b}$  and simplify if possible.

Always make sure the units are the same!

### Example 1

Write 5 as a fraction of 20.

We begin by writing this as  $\frac{5}{20}$  and then simplifying.

Both 5 and 20 can be divided by 5, giving us  $\frac{1}{4}$ .

### Example 2

A rescue shelter contains 8 cats and 6 dogs. Write the number of cats as a fraction of the total number of animals.

There are 8 cats but we also need to work out the total number of animals. As there are 6 dogs, the total is  $8 + 6 = 14$  animals.

As a fraction, this is  $\frac{8}{14}$ . To simplify this, we divide 8 and 14 by 2, giving us  $\frac{4}{7}$ .

## Expressing a Quantity as a Percentage of Another

It is useful to remember that **percent** comes from the words **per-** (meaning out of) and **-cent** (meaning 100). A percent is measured out of 100.

To write one number as a percentage of another, first write it as a fraction and then either:

- multiply by 100;
- or create an equivalent fraction whose denominator is 100.

### Example 1

Write 4 as a percentage of 5.

As a fraction, this is  $\frac{4}{5}$ .

Now, multiply by 100:

$$\frac{4}{5} \times 100 = \frac{4}{5} \times \frac{100}{1} = \frac{400}{5}$$

400 divided by 5 is 80 so this is 80%.

### Example 2

Write 7 as a percentage of 25.

As a fraction, this is  $\frac{7}{25}$ .

If we multiply the numerator and denominator by 4, that will give a denominator of 100.

$$\frac{7}{25} = \frac{28}{100}$$

Therefore, this is the same as 28%.

In a calculator exam, it's sometimes easier to use the first method!



**Your Turn**

1. Give each fraction in its simplest form.

a. Write 10 as a fraction of 18.

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b. Write 30 as a fraction of 70.

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c. Write 24 as a fraction of 40.

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d. Write 14 as a fraction of 56.

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e. Write 18 as a fraction of 27.

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2. In a box of 30 biscuits, 8 of them are plain. Write the amount of plain biscuits as a fraction of the total number of biscuits.

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3. Write 15 minutes as a fraction of 1 hour.

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4. A bag contains 12 red counters and 10 blue counters. Write the number of red counters as a fraction of the total number of counters.

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5. Write 800 grams as a fraction of 2 kilograms.

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6 a. Write 7 as a percentage of 10.

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b. Write 30 as a percentage of 50.

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c. Write 30 as a percentage of 200.

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d. Write 12 as a percentage of 15.

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7. A packet of crisps weighs 25g and contains 17g of carbohydrates. What percentage of the packet is carbohydrates?

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8. Alex scores 22 out of 50 on a test. What percentage is this?

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9. 9 out of 10 cats prefer Applaws cat food. What is this as a percentage?

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10. Bonnie scored 84 out of 200 in her physics test and 9 out of 20 in her maths test. In which test did she score a higher percentage?

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**Challenge**

John invests £300 in a bank account. After a year he has £321. What is the percentage increase in the amount of money in his account?

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