

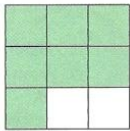
# Fractions

Levels 4-6

## Fractions

A **fraction** is a whole unit divided into equal parts.

For example,  $\frac{7}{9}$  means 7 parts out of 9:



Fractions are used every day. An example is shown below:



The top number is the **numerator**.  $\frac{1}{2}$

The bottom number is the **denominator**.

If the numerator is smaller than the denominator, it's called a **proper fraction**, for example,  $\frac{7}{11}$ .

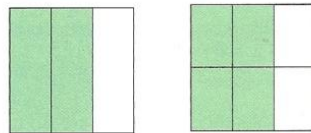
If the numerator is bigger than the denominator, it's called an **improper fraction**, for example,  $\frac{12}{7}$ .

A fraction that has a whole number and a fraction is called a **mixed number**, for example,  $3\frac{1}{2}$ .

## Equivalent Fractions

**Equivalent fractions** are fractions that have the same value.

Fractions can be changed into their equivalent by either multiplying or dividing the numerator and denominator by the same number.



From the diagram, it can be seen that  $\frac{2}{3} = \frac{4}{6}$ .

### Examples

Complete the equivalent fractions:

1  $\frac{3}{11} = \frac{?}{44}$

$\frac{3}{11} = \frac{12}{44}$  (Multiply the numerator and denominator by 4)

2  $\frac{50}{60} = \frac{5}{?}$

$\frac{50}{60} = \frac{5}{6}$  (Divide the numerator and denominator by 10)

## Simplifying Fractions

Fractions can be **simplified** if the numerator and denominator have a common factor. This process is called **cancelling**.

$\frac{20}{30} = \frac{2}{3}$  (10 is the highest common factor of 20 and 30, so dividing the numerator and denominator by 10 gives  $\frac{2}{3}$ .)

## Adding and Subtracting Fractions

Only fractions with the same denominator can be added or subtracted.

### Examples

1 Work out  $\frac{2}{3} + \frac{5}{6}$

The lowest common denominator (i.e. lowest common multiple of 3 and 6) is 6.

Therefore, change  $\frac{2}{3}$  into an equivalent fraction with a denominator of 6.

$\frac{2}{3} = \frac{4}{6}$  (x2)

Now, rewrite the sum:

$\frac{2}{3} + \frac{5}{6} = \frac{4}{6} + \frac{5}{6} = \frac{4+5}{6} = \frac{9}{6}$

$\frac{9}{6} = 1\frac{3}{6} = 1\frac{1}{2}$  (Simplify the fraction.)

$\frac{2}{3} + \frac{5}{6} = 1\frac{1}{2}$

2 Work out  $\frac{9}{10} - \frac{3}{5}$

$\frac{9}{10} - \frac{3}{5} = \frac{9}{10} - \frac{6}{10} = \frac{3}{10}$  (10 is the lowest common denominator of 5 and 10.)

## Fractions of Quantities

To find a fraction of a quantity, you multiply the fraction with the quantity.

### Examples

1 Find  $\frac{3}{8}$  of £24

Rewrite the question as  $\frac{3}{8} \times 24$

$24 \div 8 = 3$  (Divide 24 by 8; multiply by 3.)

$3 \times 3 = 9$

So,  $\frac{3}{8}$  of £24 is £9

2 In a town of 12 000 households,  $\frac{5}{6}$  recycle their rubbish.

Work out the number of households that recycle.

$\frac{5}{6}$  of 12 000 is:

$\frac{5}{6} \times 12\,000 = 10\,000$  households

## Quick Test

- The top number in a fraction is called the denominator. True or false?
- What is  $\frac{21}{6}$  written as a mixed number?  
A  $3\frac{1}{2}$  B  $6\frac{2}{3}$  C  $2\frac{1}{2}$  D  $3\frac{1}{2}$
- How would you work out  $\frac{1}{4}$  of £16?
- What is  $\frac{3}{5} + \frac{4}{10}$ ?  
A  $\frac{7}{15}$  B  $\frac{7}{10}$  C 1 D  $\frac{4}{10}$
- The answer to  $\frac{3}{5}$  of £20 is £12. True or false?

### KEY WORDS

Make sure you understand these words before moving on!

- Fraction
- Numerator
- Denominator
- Proper fraction
- Improper fraction
- Mixed number
- Equivalent fraction
- Simplify
- Cancel
- Highest common factor