

Fractions

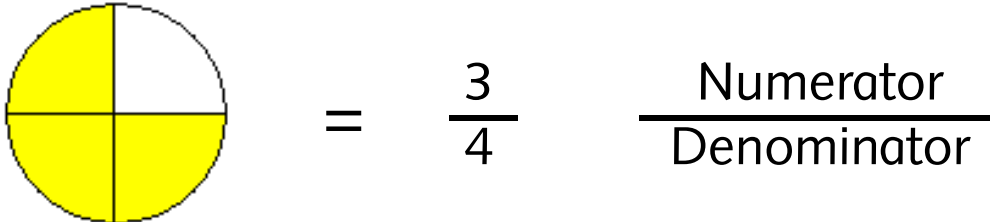


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What is a fraction?

A fraction is a part of a whole

For example: $\frac{3}{4}$ is 3 parts out of 4 as shown below

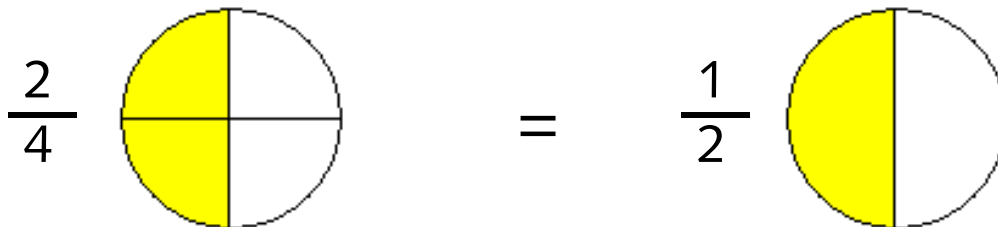


- The bottom number represents the number of the parts the whole has been divided into and is known as the **denominator**
- The top number represents the number of these parts there are and is known as the **numerator**

Equivalent fractions

Equivalent fractions are fractions that share the same value but have been written in a different way.

For example: You can see from the diagram below that both fractions represent the same proportion of the whole.



To convert one fraction into an equivalent fraction you either:

- **Multiply** the numerator and denominator by the same number

Or

- **Divide** the numerator and the denominator by the same number

Example 1. Complete the equivalent fraction

$$\frac{5}{8} = \frac{?}{32}$$

Here you must find out what number the denominator has been **multiplied** by. You can do this by dividing the larger denominator by the smaller denominator. In this case 32 divided by 8 equals four. So you now need to multiply the numerator by the same number, in this case 4. 5 multiplied by 4 equals 20. Therefore...

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$$\frac{5}{8} = \frac{20}{32}$$

Example 2. Complete the equivalent fraction

$$\frac{3}{21} = \frac{?}{7}$$

Here you must find out what the denominator has been **divided** by. 21 divided by the other denominator (7) equals 3. 3 divided by 3 equals 1. Therefore...

$$\frac{3}{21} = \frac{1}{7}$$

Try this

1. Complete the equivalent fractions

A) $\frac{9}{39} = \frac{\square}{13}$

Working

B) $\frac{3}{8} = \frac{\square}{56}$

Working

C) $\frac{4}{9} = \frac{\square}{72}$

Working

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Simplifying Fractions

Fractions can be simplified if the numerator and denominator have a common factor (a number they can both be divided by exactly).

To write a fraction in its simplest form you need to find the highest common factor. For example: Take the fraction

$$\frac{4}{8}$$

Both 4 and 8 can be divided by 2, which would give you $\frac{2}{4}$, but they could also be divided by 4. In this case 4 is the highest common factor. 4 divided by 4 equals 1 and 8 divided by 4 equals 2, therefore...

$$\frac{4}{8} = \frac{1}{2}$$

This process is known as **cancelling**. You may notice that these two fractions are equivalent fractions - they have the same value - but it makes calculations a lot easier if you write a fraction in its simplest form.

Try this

2. Simplify the following fractions

A) $\frac{4}{20} = \frac{\quad}{\quad}$

Working

B) $\frac{25}{55} = \frac{\quad}{\quad}$

Working

C) $\frac{27}{102} = \frac{\quad}{\quad}$

Working

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Adding and subtracting fractions

Before you can add or subtract one fraction from another you must make sure they both have the same denominator. The first step in adding or subtracting two fractions is to find their **lowest common denominator**. This is the denominator of lowest value that both fractions can share.

For example:

$$\frac{1}{2} + \frac{1}{4}$$

In this case the lowest common denominator that these fractions can share is 4. One of the fractions already has a denominator of 4 so that can remain unchanged, but the other fraction must be converted into its equivalent fraction which has a denominator of 4.

$$\frac{2}{4} + \frac{1}{4}$$

Now that our denominator is the same all that has to be done is to add the numerators.

$$\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

The rules are exactly the same for subtracting one fraction from another except one numerator is subtracted from the other rather than added together.

For example:

$$\frac{1}{2} - \frac{1}{4} = \frac{2}{4} - \frac{1}{4} = \frac{1}{4}$$

Remember - before you can start to add or subtract two fractions you must change them into their equivalent fractions until they share a common denominator.

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Try this

3. Perform the following sums

A) $\frac{1}{3} + \frac{1}{2} = \frac{\quad}{\quad}$

Working

B) $\frac{3}{8} + \frac{1}{6} = \frac{\quad}{\quad}$

Working

C) $\frac{3}{7} - \frac{1}{5} = \frac{\quad}{\quad}$

Working