Help with fractions!

1 ← Numerator

2 ← Denominator

Finding a fraction of an amount

To find a fraction of an amount we divide the number by the denominator and then multiply our answer by the numerator.

Example:

$\frac{3}{8}$ of 24 = 9

First 24 ÷ 8 = 3

Then 3 x 3 = 9

So the answer is 9

Changing an improper fraction to a mixed fraction

An improper fraction is a top heavy fraction.

E.g. $\frac{15}{7}$

If a fraction is top heavy it means it is more than one whole. Remember if the numerator is the same as the denominator then the fraction is whole.

So, $\frac{15}{7} = \frac{7}{7} + \frac{7}{7} + \frac{1}{7}$ = 2 whole and $\frac{1}{7}$

$\frac{15}{7} = 2\frac{1}{7}$ 'How many 7s fit into 15?' (2). So, 2 is our whole number. And our remainder is the new numerator

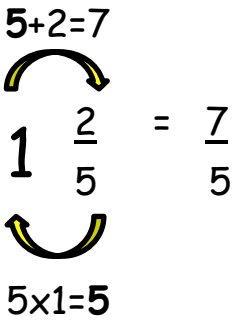
Changing a mixed fraction to an improper fraction

A mixed fraction contains some whole numbers and fractions.

E.g. $1\frac{2}{5}$

To change this into an improper fraction we have to multiply the denominator by the whole number and add the answer so the numerator.

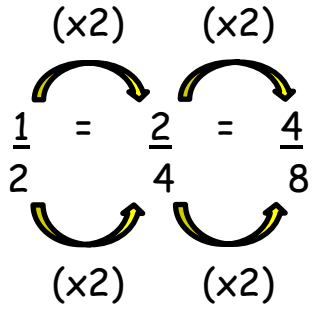
So,



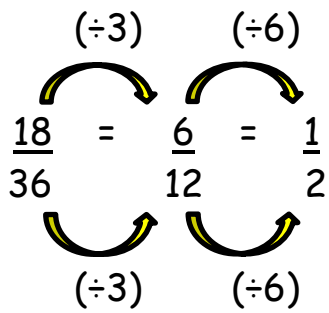
Finding equivalent fractions (Hint! Whatever you do to the numerator you must do to the denominator)

Equivalent fractions are fractions which have the same value. They are **equal**. You can make equivalent fractions by multiplying or dividing **both the numerator and the denominator** by the same amount. You only multiply or divide, **never add or subtract**, to get an equivalent fraction. Remember to only divide when the numerator and denominator would still be whole numbers.

E.g.



Or…



Simplifying fractions

Simplifying fractions means to make the fraction as simple as possible.
There are 2 methods for simplifying fractions.

Method 1:

Divide the numerator and denominator by the highest common factor. (This is the largest number you know that goes exactly into the numerator and denominator.)

E.g. $\frac{16}{24} = \frac{2}{3}$ (÷8 on both sides)

(Remember these fractions are equivalent!)

In this example the highest common factor is 8. So we divide both the numerator and denominator by 8 to get the fraction in its simplest form.

Method 2:

If you do not know the highest common factor - don't panic! You can divide the numerator and the denominator by a number you know will go into both of them exactly and then keep repeating the step until the fraction is in its simplest form. (A good starting point would be your easy times tables 2,3,5,10)

Look at this example:

$\frac{10}{20} = \frac{2}{4} = \frac{1}{2}$ (÷5, ÷2)

Or

$\frac{24}{108} = \frac{12}{54} = \frac{6}{27} = \frac{2}{9}$ (÷2, ÷2, ÷3)

Finding a common denominator

When ordering fractions or adding them we have to find a common denominator. Common Denominator means that the denominators in two (or more) fractions are common, or **the same**.

There are two methods for this.

Method 1: *Look at a set of fractions*

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{8}$

We need to find a common denominator for these fractions.
So, we look at the highest denominator which (in this example) is 8.
Then we see if the other denominators will all go into 8 without any remainders.
In this example they do!
So we need to change the other two fractions so that they have 8 as a common denominator as well.
Remember the rule: Whatever you do to the denominator you must do to the numerator!

$$\underset{(x4)}{\frac{1}{2}} = \frac{4}{8} \qquad \frac{1}{4} = \underset{(x2)}{\frac{2}{8}}$$

So the fractions, with the common denominator would be

$\frac{4}{8}$ $\frac{2}{8}$ $\frac{3}{8}$

Remember that these fractions still have the same value and are equivalent because we did the same to the denominator as we did to the numerator, therefore their value does not change.

Method 2: *Look at a set of fractions*

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

In this example the biggest denominator is 6. However, the other denominators will not go into 6 without any remainders. So we have to use a different method.

This time, we still use the biggest denominator which is 6, but we count up in our 6 x table until we find a number that the other denominators will also go into without remainders.
The number will be 30. So we have to change all of the fractions so that their denominators are 30.

(x6)		(x10)		(x5)
$\frac{2}{5} = \frac{12}{30}$	,	$\frac{1}{3} = \frac{10}{30}$	,	$\frac{3}{6} = \frac{15}{30}$
(x6)		(x10)		(x5)

So our answer would be:
$\frac{12}{30}$ $\frac{10}{30}$ $\frac{15}{30}$

Ordering fractions

Now that we know how to find a common denominator from a set of fractions, we can also order fractions.

For a question like this….
Order these fractions into ascending order.
$\frac{5}{6}$ $\frac{3}{4}$ $\frac{2}{8}$ $\frac{1}{2}$
We need to find the common denominator, which would be 24. Then we need to change the fractions to have 24 as a denominator

(x4)	(x6)	(x3)	(x12)
$\frac{5}{6} = \frac{20}{24}$	$\frac{3}{4} = \frac{18}{24}$	$\frac{2}{8} = \frac{6}{24}$	$\frac{1}{2} = \frac{12}{24}$
(x4)	(x6)	(x3)	(x12)

Remember as these fractions are equivalent (the same value) we can now order them in ascending order. However, we need to remember to write the answer with the fractions that were given to us in the question.
So our answer would be $\frac{2}{8}$ $\frac{1}{2}$ $\frac{3}{4}$ $\frac{5}{6}$ and **NOT** $\frac{6}{24}$ $\frac{12}{24}$ $\frac{18}{24}$ $\frac{20}{24}$

Adding fractions

Now that we know how to find a common denominator from a set of fractions, we can also add fractions.

REMEMBER WE DO NOT ADD FRACTIONS LIKE THIS!!!!

$\frac{1}{2} + \frac{2}{8} + \frac{3}{4} = \frac{6}{14}$

We **have** to find the common denominator

If we had:

$\frac{1}{6} + \frac{3}{4} + \frac{1}{3}$

We would find the common denominator which would be 12 and change all the fractions to have 12 as a denominator.

(x2) (x3) (x4)

$\frac{1}{6} = \frac{2}{12} \quad \frac{3}{4} = \frac{9}{12} \quad \frac{1}{3} = \frac{4}{12}$

(x2) (x3) (x4)

Now we can add the fractions as the denominators are the same.

$\frac{2}{12} + \frac{9}{12} + \frac{4}{12} = \frac{15}{12}$ or $1\frac{3}{12}$

So,

$\frac{1}{6} + \frac{3}{4} + \frac{1}{3} = \frac{15}{12}$ or $1\frac{3}{12}$

Hint: Remember we do not add the denominators together as they are all the same value. We are just adding the numerators (all the parts that we have) together.

As we know fractions, decimals and percentages are all closely linked and can be converted (changed) to be each other. So a **fraction** can be converted into a percentage and decimal, a **percentage** can be converted into a fraction or a decimal and a **decimal** can be converted into a percentage or fraction.

Before beginning the next section, there are some facts that you need to know. You have to learn this grid and just know the conversions.

Fraction	Decimal	Percentage
$\frac{1}{2}$	0.5	50%
$\frac{1}{4}$	0.25	25%
$\frac{3}{4}$	0.75	75%
$\frac{1}{5}$	0.2	20%
$\frac{1}{10}$	0.1	10%

Converting a fraction to a percentage

A percentage is part of 100.

If the fraction is $\frac{(\text{Something})}{100}$

Then the number on the top is going to be the percentage, as it is that much out of 100.

E.g. $\frac{40}{100}$ = 40%

However, for all other fractions this is what you do:

For example, if we had $\frac{4}{25}$

We have to find a number that we can multiply 25 by to make 100, and then we have to multiply the numerator by the *same* number.

$$\text{So, } \frac{4}{25} \overset{(\times 4)}{=} \frac{16}{100} = 16\%$$

Converting a fraction to a decimal

To convert a fraction to a decimal we use our place value knowledge to help us.

Think of this:

T	U	.	t	h	th	tth

If a denominator is 10, 100, 1000 you can use you place value knowledge, as you know what 10^{th}'s, 100^{th}'s and 1000^{th}'s are.

For example: $\frac{3}{10}$ is 3 10^{th}'s and we know (from using the place value chart) that this is 0.3 as a decimal.

Similarly to converting a fraction to a percentage, if the denominator was not 10, 100 or 1000 we have to find a number that we can multiply the denominator by to make 100, and then we have to multiply the numerator by the *same* number.

$$\text{E.g } \frac{4}{25} \overset{(\times 4)}{=} \frac{16}{100} = 0.16$$

Converting a percentage into a fraction

To convert a percentage into a fraction, you put the number over 100 (as it is that amount out of 100) and then simplify the fraction if you can.

$$\text{E.g.} \quad 65\% = \frac{65}{100} \overset{(\div 5)}{=} \frac{13}{20}$$

Converting a decimal into a fraction

To convert a decimal you have to again use place value to help you.

First of all look at the decimal.

If the numbers in the decimal goes up to the 10th's column then the answer is going to be that number over 10.

$$\text{E.g.} \quad 0.8 = \frac{8}{10}$$

If the numbers in the decimal goes up to the 100th's column then the answer is going to be that number over 100.

$$\text{E.g.} \quad 0.85 = \frac{85}{100} \overset{(\div 5)}{=} \frac{17}{20}$$

If the numbers in the decimal goes up to the 1000th's column then the answer is going to be that number over 1000.

$$\text{E.g.} \quad 0.848 = \frac{848}{1000} \overset{(\div 2)}{=} \frac{424}{500} \overset{(\div 2)}{=} \frac{212}{250} \overset{(\div 2)}{=} \frac{106}{125}$$