

Helping with Fractions

The **NUMERATOR** (top number) tells you how many parts you have, the **DENOMINATOR** (bottom number) tells you how many parts the whole is split into.

PROPER fractions have a smaller numerator than denominator and are **LESS** than one whole, e.g.

$$\frac{3}{4}$$

IMPROPER fractions - the **NUMERATOR** (top number) is bigger than the **DENOMINATOR** (bottom number) and are **MORE** than one whole e.g.

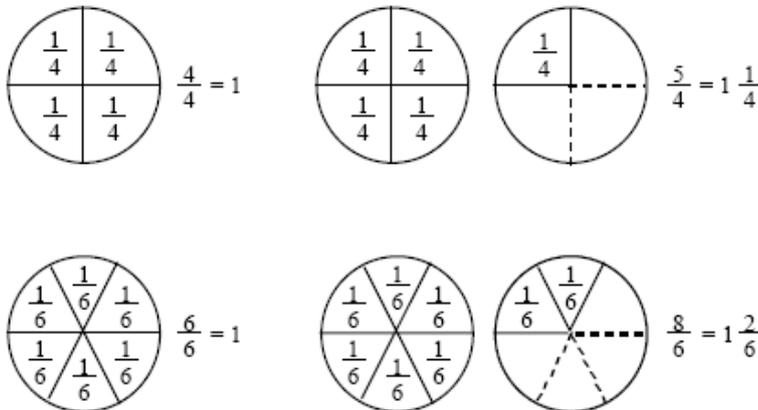
$$\frac{34}{6}$$

MIXED NUMBERS have wholes and fractions e.g.

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

CHANGING IMPROPER FRACTIONS TO MIXED NUMBERS

Improper fractions can be changed to **whole numbers** or **mixed numbers**.



Multiply the WHOLE by the denominator and then add the numerator,
e.g.

$$6\frac{3}{5} = \frac{(6 \times 5) + 3}{5} = \frac{33}{5}$$

Try these!

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

$$5\frac{2}{5}$$

$$5\frac{3}{5}$$

$$2\frac{3}{10}$$

$$3\frac{7}{10}$$

SIMPLIFYING FRACTIONS

Look for common factors:

e.g

$$\frac{25}{75} \text{ each number can be divided by 25}$$

$$25 \div 25 = 1, 75 \div 25 = 3$$

$$\text{so } \frac{25}{75} = \frac{1}{3}$$

You should try to reduce fractions to their simplest form, that is as close as you can get the numerator to 1.

Try these:

$$\frac{8}{40}$$

$$\frac{36}{90}$$

$$\frac{12}{30}$$

CONVERTING FRACTIONS TO DECIMALS

The denominator must be tenths, hundredths or thousandths.

e.g

$$\frac{36}{90} = \frac{4}{10} \text{ (numerator and denominator divide by 9 to give tenths) } = 0.4$$

Try these!

$$\frac{3}{5}$$

$$\frac{18}{45}$$

FINDING FRACTIONS OF NUMBERS/ AMOUNTS

Seven tenths of 50 = $\frac{7}{10}$ of 50 = $50 \div 10$ (to find $1/10$) = 5, then multiply by 7 to find $= 7 \times \frac{7}{10} \times 5 = 35$

Try these!

What is $\frac{4}{5}$ of 35 ?

What is $\frac{5}{6}$ of 12 km ?

Adding Fractions

When adding fractions with the same denominator, simply add the numerators:

e.g.

$$\begin{array}{l} \text{To add...} \\ \frac{1}{5} + \frac{2}{5} \end{array}$$

Just add up the numerators

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

When adding fractions with DIFFERENT denominators, find the common denominator first:

$$\begin{aligned}\frac{1}{3} + \frac{1}{5} \\ &= \frac{5}{15} + \frac{3}{15} \\ &= \frac{8}{15}\end{aligned}$$

For subtracting fractions, it is exactly the same - if the denominators are the same, then simply subtract the numerators. If the denominators are DIFFERENT, then find the common denominator and subtract the numerators only.

Multiplying fractions

When multiplying fractions:

Here's the Rule for Multiplying Fractions...

1. Multiply numerators.
2. Multiply denominators.
3. Simplify or reduce the results, if needed.

e.g. :

$$\frac{2}{5} \times \frac{6}{7} = \frac{2 \times 6}{5 \times 7} = \frac{12}{35}$$

$$\frac{1}{4} \times \frac{2}{3} = \frac{1 \times 2}{4 \times 3} = \frac{2}{12} = \text{reduces to } \frac{1}{6}$$

Multiplying fractions with mixed numbers:

Change the mixed number to an improper fraction and then multiply as usual; you may then need to turn the improper fraction answer into a mixed number to complete the question.

The diagram illustrates the process of multiplying mixed numbers. It shows the equation $1\frac{3}{4} \times 2\frac{1}{2} = ?$. Red arrows point from the whole numbers 1 and 2 to the numerators of the resulting improper fractions $\frac{7}{4}$ and $\frac{5}{2}$. To the right, two equations show the conversion: $1 \times 4 + 3 = 7$ and $2 \times 2 + 1 = 5$. Below, the multiplication is shown: $\frac{7}{4} \times \frac{5}{2} = \frac{35}{8} = 4\frac{3}{8}$.

$$1\frac{3}{4} \times 2\frac{1}{2} = ?$$

$1 \times 4 + 3 = 7$
 $2 \times 2 + 1 = 5$

$$\frac{7}{4} \times \frac{5}{2} = \frac{35}{8} = 4\frac{3}{8}$$

Multiplying fractions by whole numbers:

Put the whole number over one and multiply across the numerators and denominators; you may need to convert the improper fraction answer to a mixed number, e.g. :

$$5 \times \frac{1}{3} = \frac{5}{1} \times \frac{1}{3} = \frac{5}{3} = 1\frac{2}{3}$$

If you have a mixed number, turn it into an improper fraction FIRST! e.g.:

$$1\frac{3}{8} \times 3 = \frac{11}{8} \times \frac{3}{1} = \frac{33}{8} = 4\frac{1}{8}$$

Dividing fractions

If the number you are dividing by is a whole number, put it over one first. After that, flip it over and multiply as normal (you may need to simplify your answer), e.g. :

$$\begin{aligned} \frac{9}{17} \div 3 &= \frac{9}{17} \div \frac{3}{1} = \frac{9}{17} \times \frac{1}{3} = \frac{9 \times 1}{17 \times 3} \\ &= \frac{9}{51} = \frac{9 \div 3}{51 \div 3} = \frac{3}{17} \end{aligned}$$

If the number you are dividing by is already a fraction, simply flip and multiply, e.g:

$$\frac{1}{3} \div \frac{4}{5}$$

↑
flip the second fraction...
and multiply!

$$\frac{1}{3} \times \frac{5}{4}$$

If dividing a mixed number by a whole number, change the mixed number to an improper fraction FIRST, e.g. :

$$1\frac{2}{7} \div 5 = \frac{9}{7} \div \frac{5}{1} = \frac{9}{7} \times \frac{1}{5}$$
$$= \frac{9 \times 1}{7 \times 5} = \frac{9}{35}$$