Fractions

Study Development Quickguide

## Simplifying fractions

For a fraction $\frac{a}{b}$ we simplify by doing the following:

1. Check to see if a and b have a common factor.
2. If no common factor exists (other than 1), the fraction is in its simplest form.
3. If a common factor (other than 1) does exist, divide the numerator and the denominator by it.
4. Repeat this process until there are no more common factors (other than 1).

## Operations on fractions

Adding fractions:

$\frac{a}{b}$ + $\frac{c}{d}$ = $\frac{a×d + c×b}{b×d}$

Subtracting fractions:

$\frac{a}{b}$ - $\frac{c}{d}$ = $\frac{a×d - c×b}{b×d}$

Multiplying fractions:

$\frac{a}{b}$ $×$ $\frac{c}{d}$ = $\frac{a×c}{b×d}$

Dividing fractions:

$\frac{a}{b}$ ÷ $\frac{c}{d}$ = $\frac{a}{b}$ $×$ $\frac{d}{c}$ = $\frac{a×d}{b×c}$

Fractions to a power:

$\left(\frac{a}{b}\right)^{y}$ = $\frac{a^{y}}{b^{y}}$

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## Comparing fraction size

‘Is $\frac{a}{b}$ larger than $\frac{c}{d}$?’

1. Calculate $\frac{a}{b}$ $×$ $\frac{d}{d}$ = $\frac{ad}{bd}$ , and $\frac{c}{d}$ $×$ $\frac{b}{b}$ = $\frac{bc}{bd}$.
2. Compare $\frac{ad}{bd}$ and $\frac{bc}{bd}$. Whichever fraction has the largest numerator is the larger fraction.
3. The corresponding fraction is also the larger fraction, since $\frac{a}{b}$ = $\frac{ad}{bd}$, and $\frac{c}{d}$ = $\frac{bc}{bd}$.

## Improper Fractions

To convert an improper fraction to a mixed fraction:

1. For an improper fraction $\frac{a}{b} $, calculate a ÷ b = c.
2. If c has values after the decimal point, disregard them. For example, if c = 5.457, we would write c’ = 5.
3. Calculate $\frac{a}{b}$ - $\frac{c' × b}{b}$ = $\frac{d}{b}$.
4. We therefore write $\frac{a}{b}$ as the mixed fraction: c’ $\frac{d}{b}$.

In order to turn a mixed fraction into an improper fraction, we do the following:

1. For a mixed fraction x $\frac{y}{z}$, we calculate (x $× $z) + y = w.
2. We then write the improper fraction as $\frac{w}{z}$.

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