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:

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

Subtracting fractions:

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

Multiplying fractions:

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

Dividing fractions:

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{a \times d}{b \times c}$$

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 $\frac{a}{b} \times \frac{d}{d} = \frac{ad}{bd}$, and $\frac{c}{d} \times \frac{b}{b} = \frac{bc}{bd}$.
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 $\frac{a}{b} - \frac{c' \times b}{b} = \frac{d}{b}$.
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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