Rules for Fractions

Addition

- same denominators -

$$\frac{A}{B} + \frac{C}{B} = \frac{A + C}{B}$$

Example:

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

- different denominators -

$$\frac{A}{B} + \frac{C}{D} = \frac{A \cdot D}{B \cdot D} + \frac{C \cdot B}{D \cdot B} = \frac{AD + CB}{BD}$$

Example:

$$\frac{2}{3} + \frac{4}{5} = \frac{2 \cdot 5}{3 \cdot 5} + \frac{4 \cdot 3}{5 \cdot 3} = \frac{10 + 12}{15} = \frac{22}{15}$$

Subtraction

- same denominators -

$$\frac{A}{B} - \frac{C}{B} = \frac{A - C}{B}$$

Example:

$$\frac{2}{5} - \frac{1}{5} = \frac{2 - 1}{5} = \frac{1}{5}$$

- different denominators -

$$\frac{A}{B} - \frac{C}{D} = \frac{A \cdot D}{B \cdot D} - \frac{C \cdot B}{D \cdot B} = \frac{AD - CB}{BD}$$

Example:

$$\frac{3}{4} - \frac{2}{5} = \frac{3 \cdot 5}{4 \cdot 5} - \frac{2 \cdot 4}{5 \cdot 4} = \frac{15 - 8}{20} = \frac{7}{20}$$

Multiplication & Division

$$\frac{A}{B} \times \frac{C}{D} = \frac{AC}{BD}$$

Example:

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$$

$$\frac{A}{B} : \frac{C}{D} = \frac{A}{B} \times \frac{D}{C} = \frac{AD}{BC}$$

Example:

$$\frac{2}{3} : \frac{4}{5} = \frac{2}{5} \times \frac{5}{4} = \frac{10}{20}$$