

## Multiplying, Dividing, Adding, and Subtracting Fractions

Multiplying  $\left(\frac{a}{b}\right)\left(\frac{c}{d}\right) = \left(\frac{ac}{bd}\right)$

eg  $\left(\frac{2}{9}\right)\left(\frac{5}{3}\right) = \boxed{\frac{10}{27}}$

eg  $\left(\frac{-3}{5}\right)\left(\frac{7}{3}\right) = \frac{-21}{15} = \frac{-7(3)}{5(3)} = \boxed{\frac{-7}{5}}$

or  $\left(\frac{-\cancel{3}}{5}\right)\left(\frac{7}{\cancel{3}}\right) = \left(\frac{-1}{5}\right)\left(\frac{7}{1}\right) = \frac{-7}{5}$

Dividing  $\left(\frac{a}{b}\right) \div \left(\frac{c}{d}\right) = \left(\frac{a}{b}\right) \times \left(\frac{d}{c}\right) = \frac{ad}{bc}$

eg  $\left(\frac{12}{5}\right) \div \left(\frac{4}{35}\right) = \left(\frac{\cancel{12}^3}{5}\right) \times \left(\frac{\cancel{35}^7}{\cancel{4}_1}\right) = \frac{3(7)}{(1)(1)} = \boxed{21}$

## Adding / Subtracting

$\left(\frac{a}{b}\right) + \left(\frac{c}{d}\right)$  Common (same) denominator

$\left(\frac{a}{b}\right)\left(\frac{d}{d}\right) = \frac{ad}{bd}$ ,  $\left(\frac{c}{d}\right)\left(\frac{b}{b}\right) = \frac{cb}{bd}$

$\frac{a}{b} + \frac{c}{d} = \frac{ad}{bd} + \frac{cb}{bd} = \frac{ad+cb}{bd}$   
Same!

Cross Mult  $\frac{a}{b} + \frac{c}{d} = \frac{ad+cb}{bd}$

$$\text{eg } \frac{2}{5} + \frac{1}{3} = \frac{2(3) + 1(5)}{5(3)} = \frac{11}{15}$$

$$\text{eg } \frac{7}{5} - \frac{9}{10} = \frac{7(10) - 9(5)}{5(10)} = \frac{25}{50} = \frac{1}{2}$$

$$\text{or } \frac{7}{5} = \left(\frac{7}{5}\right) \frac{2}{2} = \frac{14}{10} \Rightarrow \frac{7}{5} - \frac{9}{10} = \frac{14}{10} - \frac{9}{10} = \frac{5}{10} = \frac{1}{2}$$