

# Fraction Study Notes

No Denominator can be a zero!

Addition	$\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$	$\frac{1}{2} + \frac{3}{5} = \frac{5}{10} + \frac{6}{10} = \frac{5+6}{10} = \frac{11}{10}$
Subtraction	$\frac{a}{b} - \frac{c}{d} = \frac{ad - bc}{bd}$	$\frac{1}{2} - \frac{3}{5} = \frac{5}{10} - \frac{6}{10} = \frac{-1}{10}$
Multiplying Fractions	$\frac{a}{b} * \frac{c}{d} = \frac{ac}{bd}$	$\frac{3}{4} * \frac{3}{5} = \frac{9}{20}$
Division of Fractions  (b, c, d cannot be zero)	$\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a}{b} * \frac{d}{c} = \frac{ad}{bc}$	$\frac{\frac{3}{4}}{\frac{1}{2}} = \frac{3}{4} * \frac{2}{1} = \frac{6}{4} = \frac{3}{2}$
Multiplying a fraction by a whole number (turn the whole number into a fraction and proceed as above)	$a * \left(\frac{b}{c}\right) = \frac{a}{1} * \frac{b}{c} = \frac{ab}{c}$	$3 * \left(\frac{4}{5}\right) = \frac{3}{1} * \frac{4}{5} = \frac{12}{5}$
Dividing a Fraction by a whole number (again, turn the whole number in to a fraction and proceed as above)	$\frac{\left(\frac{a}{b}\right)}{c} = \frac{\frac{a}{b}}{\frac{c}{1}} = \frac{a}{b} * \frac{1}{c} = \frac{a}{bc}$	$\frac{\frac{3}{4}}{2} = \frac{\frac{3}{4}}{\frac{2}{1}} = \frac{3}{4} * \frac{1}{2} = \frac{3}{8}$
Dividing a whole number by a fraction (again, turn the whole number in to a fraction and proceed as above)	$\frac{a}{\left(\frac{b}{c}\right)} = \frac{\frac{a}{1}}{\frac{b}{c}} = \frac{a}{1} * \frac{c}{b} = \frac{ac}{b}$	$\frac{3}{\left(\frac{2}{5}\right)} = \frac{\frac{3}{1}}{\frac{2}{5}} = \frac{3}{1} * \frac{5}{2} = \frac{15}{2}$
Sign Changes	$\frac{(a - b)}{(c - d)} = \frac{(b - a)}{(d - c)}$	$\frac{(3 - 4)}{(5 - 6)} = \frac{(4 - 3)}{(6 - 5)}$
Division of a sum	$\frac{ab + ac}{a} = b + c. \quad a \neq 0$	$\frac{3 * 4 + 3 * 5}{3} = 4 + 5. \quad 3 \neq 0$
Separating a sum	$\frac{a + b}{c} = \frac{a}{c} + \frac{b}{c}$	$\frac{2 + 4}{5} = \frac{2}{5} + \frac{4}{5}$