

Adding and Subtracting Rational Expressions...when they're factored for you.

Rule #1: Adding/subtracting needs a *common denominator*. Multiply by the missing denominator factors to get it.

<p>EXAMPLE</p> $\frac{15}{(7)(x)} + \frac{3}{(4)(x)}$ <p>Fraction 1's denominator factors are: 7 & x</p> <p>Fraction 2's denominator factors are: 4 & x</p> <p>#1 is missing a 4 & #2 is missing a 7</p> $\frac{15}{(7)(x)} \cdot \frac{(4)}{(4)} + \frac{3}{(4)(x)} \cdot \frac{(7)}{(7)}$ $= \frac{(15)(4)}{(7)(x)(4)} + \frac{(3)(7)}{(4)(x)(7)}$ $= \frac{60}{28x} + \frac{21}{28x} = \frac{81}{28x}$	<p>1. $\frac{13}{(8)(x)} + \frac{9}{(5)(x)}$</p>	<p>2. $\frac{10}{(3)(x)} + \frac{7}{(10)(x)}$</p>
<p>EXAMPLE</p> $\frac{4}{(3)(x+2)} - \frac{2}{(5)(x+2)}$ <p>Fraction 1's denominator factors are: 3 & x + 2</p> <p>Fraction 2's denominator factors are: 5 & x + 2</p> <p>#1 is missing a 5 & #2 is missing a 3</p> $\frac{4}{(3)(x+2)} \cdot \frac{(5)}{(5)} - \frac{2}{(5)(x+2)} \cdot \frac{(3)}{(3)}$ $\frac{(4)(5)}{(3)(x+2)(5)} - \frac{(2)(3)}{(5)(x+2)(3)}$ $\frac{20}{(15)(x+2)} - \frac{6}{(15)(x+2)}$ $\frac{15x+30}{15x+30} - \frac{15x+30}{15x+30}$ $\frac{14}{15x+30}$	<p>3. $\frac{7}{(2)(x-4)} + \frac{1}{(5)(x-4)}$</p>	<p>4. $\frac{3}{(4)(x-8)} - \frac{11}{(9)(x-8)}$</p>
<p>EXAMPLE</p> $\frac{12}{(7)(x-7)} + \frac{5}{(2)(x-7)}$ <p>Fraction 1's denominator factors are: 7 & x - 7</p> <p>Fraction 2's denominator factors are: 2 & x - 7</p> <p>#1 is missing a 2 & #2 is missing a 7</p> $\frac{12}{(7)(x-7)} \cdot \frac{(2)}{(2)} + \frac{5}{(2)(x-7)} \cdot \frac{(7)}{(7)}$ $\frac{(12)(2)}{(7)(x-7)(2)} + \frac{(5)(7)}{(2)(x-7)(7)}$ $\frac{24}{(14)(x-7)} + \frac{35}{(14)(x-7)}$ $\frac{14x-98}{14x-98} + \frac{14x-98}{14x-98}$ $\frac{59}{14x-98}$	<p>5. $\frac{13}{(6)(x+11)} - \frac{10}{(7)(x+11)}$</p>	<p>6. $\frac{5}{(8)(x+3)} + \frac{2}{(5)(x+3)}$</p>

<p>EXAMPLE</p> $\frac{2}{(3)(x+1)} + \frac{9}{4}$ <p>Fraction 1's denominator factors are: 3 & x + 1</p> <p>Fraction 2's denominator factor is: 4...there are no matches</p> <p>#1 is missing a 4 and #2 is missing both 3 & x + 1</p> $\frac{2}{(3)(x+1)} \cdot \frac{(4)}{(4)} + \frac{9}{4} \cdot \frac{(3)(x+1)}{(3)(x+1)}$ $\frac{(2)(4)}{(3)(x+1)(4)} + \frac{(9)(3)(x+1)}{(4)(3)(x+1)}$ $\frac{8}{(12)(x+1)} + \frac{(27)(x+1)}{(12)(x+1)}$ $\frac{8}{12x+12} + \frac{27x+27}{12x+12}$ $\frac{27x+35}{12x+12}$	<p>7. $\frac{5}{(7)(x-2)} + \frac{3}{2}$</p>	<p>8. $\frac{6}{11} + \frac{1}{(3)(x+5)}$</p>
<p>EXAMPLE</p> $\frac{1}{5} - \frac{8}{(9)(x-2)}$ <p>Fraction 1's denominator factor is: 5...there are no matches</p> <p>Fraction 2's denominator factors are: 9 & x - 2</p> <p>#1 is missing both 9 & x - 2 and #2 is missing a 5</p> $\frac{1}{5} \cdot \frac{(9)(x-2)}{(9)(x-2)} - \frac{8}{(9)(x-2)} \cdot \frac{(5)}{(5)}$ $\frac{(1)(9)(x-2)}{(5)(9)(x-2)} - \frac{(8)(5)}{(9)(x-2)(5)}$ $\frac{(45)(x-2)}{9x-18} - \frac{(45)(x-2)}{40}$ $\frac{45x-90}{9x-18} - \frac{45x-90}{40}$ $\frac{9x-58}{45x-90}$	<p>9. $\frac{2}{3} - \frac{12}{(5)(x+6)}$</p>	<p>10. $\frac{7}{8} + \frac{5}{(8)(x+7)}$</p>
<p>EXAMPLE</p> $\frac{2}{x+3} + \frac{4}{x}$ <p>There are no matches. Multiply each by the other denominator.</p> $\frac{2}{(x+3)} \cdot \frac{(x)}{(x)} + \frac{4}{x} \cdot \frac{(x+3)}{(x+3)}$ $\frac{2x}{(x+3)(x)} + \frac{(4)(x+3)}{(x)(x+3)}$ $\frac{2x}{x^2+3x} + \frac{4x+12}{x^2+3x}$ $\frac{2x+40}{45x-90}$	<p>11. $\frac{3}{x-1} - \frac{2}{x+1}$</p>	<p>12. $\frac{6}{x} + \frac{8}{x+7}$</p>