

Adding and Subtracting Rational Expressions

Same Denominator

To add or subtract rational #'s with the same denominators, just add or subtract numerators:

$$\text{ex: } \frac{3}{7} + \frac{2}{7} = \frac{3+2}{7} = \frac{5}{7} \qquad \frac{3}{7} - \frac{2}{7} = \frac{3-2}{7} = \frac{1}{7}$$

With rational expressions, it's the same.

Ex 1.

Add and simplify: $\frac{x^2-5x-15}{x^2+5x+6} + \frac{2x+5}{x^2+5x+6}$

Ex 2.

Subtract and simplify: $\frac{5x-y}{x^2-y^2} - \frac{4x-2y}{x^2-y^2}$

Different Denominators

Recall: When adding $\frac{1}{2}$ and $\frac{2}{3}$, we look for the _____, which is _____. Then we write equivalent fractions for both and add: $\frac{1}{2} + \frac{2}{3} = \frac{3}{6} + \frac{4}{6} = \frac{7}{6}$.

It's similar for rational expressions.

Ex 3.

Add and simplify: $\frac{7}{6x^2} + \frac{2}{9x}$

Ex 4.

Subtract and simplify: $\frac{7}{5x^2+15x} - \frac{9}{x^2+6x+9}$

Ex 5.

Add and simplify: $\frac{x}{x-4} + \frac{x-2}{x+4}$

Ex 6.

Simplify: $\frac{4x-7y}{x-3y} + \frac{x-2y}{3y-x}$

Ex 7.

Simplify: $\frac{y-1}{y-2} + \frac{y-6}{y^2-4} - \frac{y+1}{y+2}$

Practice

1. Subtract and simplify if possible: $\frac{y^2+3y-6}{y^2-5y+4} - \frac{4y-4-2y^2}{y^2-5y+4}$
2. Find the LCD of $\frac{5y}{y^2-9}$, $\frac{8}{y^2+6y+9}$, and $\frac{-5y}{2y^2+5y-3}$
3. Add and simplify if possible: $\frac{7x}{x^2+2x-8} + \frac{3}{x^2-3x+2}$
4. Subtract and simplify if possible: $\frac{2x-3}{x^2-5x+6} - \frac{x+4}{x^2-2x-3}$
5. Subtract and simplify if possible: $\frac{9x}{x^2-y^2} - \frac{10}{y-x}$

Q: What has four wheels and flies?