Adding and Subtracting Rational Expressions

Summary

1. Adding & subtracting rational expressions is the algebraic version of adding and subtracting fractions.
2. You will **always** need a common denominator before adding or subtracting rational expressions.

Like denominators

To add or subtract fractions with **like denominators**, you keep the denominators and add (or subtract) the numerators.

Remember to distribute the sign to the numerator in the second fraction.

Example 1. Simplify each.

(a) $\dfrac{-8}{2x+7} + \dfrac{-9}{2x+7}$

(b) $\dfrac{5x^3}{3x-1} - \dfrac{6x^3}{3x-1}$

(c) $\dfrac{3x+3}{3x+2} + \dfrac{4x-2}{3x+2}$

(d) $\dfrac{2x+1}{6x^2} - \dfrac{7x-2}{6x^2}$

Unlike denominators

- Need a common denominator *before* adding or subtracting fractions.
- For instance

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

- **Factor the denominators completely**

Example 2. Simplify each.

(a) $\dfrac{5}{2x}+\dfrac{1}{4x}$

(b) $\dfrac{3x}{2x-1}+\dfrac{7}{5x+3}$

(c) $\dfrac{2x+1}{x-5}+\dfrac{2}{x}$

(d) $\dfrac{2}{x+3}+\dfrac{3}{x-1}$

(e) $\dfrac{3}{x-3}-\dfrac{7}{x+3}$

(f) $\dfrac{7x+3}{x-7}+\dfrac{1}{x+4}$