

8.3

Adding Rational Expressions w/ Like Denominators

Add rational expressions just like adding fractions

In general

$$\frac{a}{d} + \frac{b}{d} = \frac{a+b}{d} \quad (d \neq 0)$$

$$\text{ex. } \frac{2x}{5} + \frac{6x}{5} = \frac{2x+6x}{5} = \frac{8x}{5}$$

$$\text{ex. } \frac{2x+3}{7x} + \frac{5x+4}{7x} = \frac{7x+3+4}{7x}$$

Might need to simplify.

$$\text{ex. } \frac{x^2+24}{3x+9} + \frac{11x}{3x+9} = \frac{x^2+11x+24}{3(x+3)} = \frac{(x+8)(x+3)}{3(x+3)} = \frac{x+8}{3}$$

Subtracting Rational Expressions w/ Like Denominators

Like adding (above) but w/ subtraction

$$\frac{a}{d} - \frac{b}{d} = \frac{a-b}{d} \quad (d \neq 0)$$

$$\text{ex. } \frac{4x}{9} - \frac{x}{9} = \frac{3x}{9} = \frac{x}{3}$$

$$\text{ex. } \frac{4x+7}{18x} - \frac{2x-3}{18x} = \frac{4x+7-(2x-3)}{18x} = \frac{2x+10}{18x} = \frac{2(x+5)}{2(9x)} = \frac{x+5}{9x}$$

Opposite Denominators

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$$\begin{aligned} \text{(ex.) } \frac{6x+5}{x-2} + \frac{4x}{2-x} &= \frac{6x+5}{x-2} + \frac{4x}{-(x-2)} \\ &= \frac{6x+5}{x-2} + \frac{4x}{-(x-2)} \cdot \frac{-1}{-1} \\ &= \frac{6x+5}{x-2} + \frac{-4x}{x-2} \\ &= \frac{(6x+5) + (-4x)}{x-2} \\ &= \frac{2x+5}{x-2} \end{aligned}$$