Section 8-5
Adding and Subtracting Rationals

Students will be able to add and subtract rational expressions.

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To add rationals with a common denominator, you keep the denominator the same and add the numerators. Then simplify if possible.

Add:

$$\frac{7x}{x-4} + \frac{4x+12}{x-4} = \frac{7x-4x+12}{(x-4)} = \frac{3(x+4)}{(x-4)}$$

$\frac{3(x+4)}{(x-4)}$ $x \neq 4$

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Different Denominators:

Add:

$\frac{1}{5} + \frac{1}{10} = \frac{3}{10}$

To add the following, you also have to find a common denominator, then add and simplify:

$\frac{5}{15x} + \frac{3}{15x} = \frac{8}{15x}$

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

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Simplify:

$$\frac{x}{x+6} - \frac{72}{x^2-36} = \frac{x^2-6x}{(x+6)(x-6)} - \frac{72}{(x+6)(x-6)}$$

$$\frac{(x+6)(x-12)}{(x+6)(x-6)} = \frac{x-12}{x-6}, \quad x \neq \pm 6$$

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Simplify:

$$\frac{6x}{(3x-1)(2x+5)} + \frac{-4x}{(2x+5)(3x-1)}$$

$$\frac{12x^2+30x-12x^2+4x}{(3x-1)(2x+5)} = \frac{34x}{(3x-1)(2x+5)}$$

$x \neq \frac{1}{3}, -\frac{5}{2}$

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Sometimes you will need to rewrite a complex fraction as a rational expression before you can add or subtract them.

Simplify:

$$\frac{2 \cdot a}{3 + \frac{5}{a} \cdot a} - \frac{2 \cdot a}{3 - \frac{5}{a} \cdot a}$$

$$\frac{(3a+5)2a}{(3a+5)(3a+5)} - \frac{2a(3a+5)}{3a-5(3a+5)} = \frac{6a^2-10a-6a^2-10a}{(3a+5)(3a-5)}$$

$$\frac{-20a}{(3a+5)(3a-5)}$$

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$$\frac{x - y}{x^{-1} - y^{-1}}$$

$$= \frac{xy \cdot x - y \cdot xy}{xy\frac{1}{x} - \frac{1}{y}xy}$$

$$\frac{x^2y - xy^2}{y - x} = \frac{xy(x-y)}{-(y-x)} = \frac{xy}{-1} = -xy$$

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Hwk: pg. 539 - 540
12 - 28 (4th), 29,
32 - 36 evens, 44

Mar 28-10:58 AM