

TOPIC: ADDING AND SUBTRACTING RATIONAL EXPRESSIONS WITH DIFFERENT DENOMINATORS

Adding and Subtracting Rational Expressions with Unlike Denominators

◆ Recall: To add or subtract fractions, the fractions must have the *same* denominators.

► To $+/ -$ rational expressions, 1) **find** the LCD, 2) **rewrite** as equiv. expressions with LCD, 3) $+/ -$ numerators.

Recall	Add/Subtract Rational #s	New	Add/Subtract Rational Expressions
	$\frac{1}{30} + \frac{1}{20}$ LCD: 60 Equivalent Rational Numbers: $\frac{1}{30} \cdot \frac{2}{2} = \frac{2}{60}$ $\frac{1}{20} \cdot \frac{3}{3} = \frac{3}{60}$ Add or Subtract: $\frac{2}{60} + \frac{3}{60} = \frac{5}{60}$		$\frac{1}{30x} + \frac{1}{20x^2}$ LCD: $60x^2$ Equivalent Rational Expressions: $\frac{1}{30x} \cdot \frac{2x}{2x} = \frac{2x}{60x^2}$ $\frac{1}{20x^2} \cdot \frac{3}{3} = \frac{3}{60x^2}$ Add or Subtract: $\frac{2x}{60x^2} + \frac{3}{60x^2} = \frac{2x+3}{60x^2}$

EXAMPLE

Write the following as a single, fully simplified rational expression.

$$\frac{2}{x+4} - \frac{7}{x-8}$$

$$= \frac{2(\quad)}{(x+4)(\quad)} - \frac{7(\quad)}{(x-8)(\quad)}$$

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PRACTICE

Add the following expressions and simplify if possible.

(A) $\frac{2}{x^2 - 1} + \frac{3}{x + 1}$

(B) $\frac{x}{x^2 + 3x} + \frac{3}{x + 3}$

(C) $\frac{x^2}{x^2 - 4} + \frac{2x}{4 - x^2}$

PRACTICE

Subtract the following rational expressions and write the difference in simplest form if possible.

(A) $\frac{3}{x} - \frac{2}{x + 2}$

(B) $\frac{x + 2}{x^2 - 4} - \frac{1}{x - 2}$

(C) $\frac{x^2}{x^2 - 25} - \frac{5x}{25 - x^2}$

EXAMPLE

Perform the indicated operations and simplify the final answer if possible.

(A) $\frac{x}{x + 1} + \frac{1}{x} - \frac{1}{x(x + 1)}$

(B) $\frac{x - 1}{x^2 - 4} + \frac{2}{x + 2} - \frac{1}{x - 2}$