Lesson 8.5 Warm Up (Clickers)

1. Add: <u>3</u> + <u>2</u> <u>5</u> 7

2. Simplify: <u>4x - 12</u> 8x + 24

3. Locate point(s) of discontinuity. Then find the asymptotes: $y = \frac{x+2}{(x+2)(x-3)}$

Lesson 8.5 Adding & Subtracting Rational Expressions

<u>Essential Understanding</u>: To operate with rational expressions, you can use much of what you know about operating with fractions.

To add or subtract rational expressions, you first find a common denominator--preferably the least common multiple (LCM) of the denominators.

To find the LCM of several expressions factor the expressions (numbers or polynomials) completely. The LCM is the product of the prime factors, each raised to the greatest power that occurs in any of the expressions.

Ex. What is the LCM of $12x^2y(x^2 + 2x + 1)$ and

 $18xy^{3}(x^{2} + 5x + 4)?$

Ex. What is the LCM of the expressions:

2x + 4 and x² - 6?

1 What is the LCM of the expression: $x^2 + 3x - 4$ and $x^2 + 2x - 8$

Recall how to add and subtract fractions. We will use the same rules when adding and subtracting rational expressions.

Ex. What is the sum of the two rational expressions in simplest form? State any restrictions on the variable.

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

Ex. What is the sum of the two rational expressions in simplest form? State any restrictions on the variable.

$$\frac{x+1}{x-1} + \frac{-2}{x^2 - x}$$

Ex. What is the difference of the two rational expressions in simplest form? State any restrictions on the variable.

$$\frac{x+2}{x^2-2x} - \frac{x+2}{2x-4}$$

2 Find the sum: $\frac{4}{x^2+3x} + \frac{x-2}{x^2+6x+9}$ 3 Find the difference: $\frac{x+1}{x^2+2x-8} - \frac{x}{4x-8}$

A <u>complex fraction</u> is a rational expression that has at least one fraction in its numerator or denominator or both. Here are some examples.

$$\frac{\frac{1}{x} + \frac{1}{y}}{\frac{1}{xy}} \qquad \frac{\frac{x+3}{2}}{\frac{2}{x-4}} \qquad \qquad \frac{\frac{x+3}{x^2-2x+1} + \frac{x}{x^2-3x+2}}{\frac{x}{x^2-4x+4} - \frac{2}{x^2-4}}$$

Ex. What is a simpler form of the complex fraction?

$$\frac{\frac{1}{x} + \frac{x}{y}}{\frac{1}{y} + 1}$$

Ex. What is a simpler form of the complex fraction?

$$\frac{x}{\frac{1}{x} + \frac{1}{y}}$$

4 What is a simpler form of the complex fraction?

$$\frac{3x - \frac{1}{y}}{\frac{y^2}{x} + x}$$