7.4 Adding & Subtracting with Unlike Denominators

Addition and subtraction of rational expressions works exactly the same as with fractions even when there are unlike denominators. We need to continue treating rational expressions

as if they are standard fractions. This means that before we can add or subtract, we need to find the *least common denominator*, or LCD.

Example 7.4.1. Find the LCD and calculate:

$$\frac{3}{4}+\frac{1}{5}$$

Example 7.4.2. Find the LCD of $\frac{3}{10x^2}$ and $\frac{7}{15x}$.

Example 7.4.3. Find the LCD of $\frac{2}{x+3}$ and $\frac{4}{x-3}$.

Example 7.4.4. Find the LCD of $\frac{9}{7x^2+28x}$ and $\frac{11}{x^2+8x+16}$.

Method for Addition/Subtraction

1. Find the LCD
2. Multiply each rational expression to change the denominator to the LCD
3. Add or subtract the new numerators, keep the LCD as the denominator
4. Simplify if needed

Example 7.4.5. Find the following:

$$\frac{3}{10x^2}+\frac{7}{15x}$$

Example 7.4.6. Find the following:

$$\frac{2}{x+3}+\frac{4}{x-3}$$

Example 7.4.7. Find the following:

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

Example 7.4.8. Find the following:

$$\frac{5}{y^2-5y}-\frac{y}{5y-25}$$

Example 7.4.9. Find the following:

$$\frac{4x}{x^2-25}+\frac{3}{5-x}$$