

**Objective:** To add and subtract rational expressions with like and unlike denominators.

**Warm Up:** Find the sum or difference of the following fractions.

a)  $\frac{1}{5} + \frac{2}{5} =$

b)  $\frac{1}{3} + \frac{2}{4} =$

c)  $\frac{15}{16} - \frac{3}{4} =$

d)  $\frac{18}{19} - \frac{2}{7} =$

### Fraction Rules:

$$\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b} \quad \text{OR} \quad \frac{a}{b} - \frac{c}{b} = \frac{a-c}{b}$$

If the denominators are not the same, then you need to multiply the **individual pieces** by an expression to get the same denominator.

**Example 1:** Simplify the expression by adding or subtracting rational expressions with like denominators.

a.  $\frac{7}{4x} + \frac{3}{4x}$

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

c.  $\frac{2x}{x+6} - \frac{5}{x+6}$

**Example 2:** Simplify the expression by adding or subtracting rational expressions with unlike denominators.

a.  $\frac{3}{4x^2} + \frac{2x}{12x}$

LCD:

b.  $\frac{5}{6x^2} + \frac{x}{4x^2-12x}$

LCD:

c.  $\frac{4}{x^2} - \frac{8x-1}{2x^3}$

LCD:

d.  $\frac{4}{x^3} + \frac{x}{6x^3+3x^2}$

LCD:

e.  $\frac{x+1}{x^2+4x+4} - \frac{2}{x^2-4}$

LCD:

f.  $\frac{x+1}{x^2+6x+9} - \frac{1}{x^2-9}$

LCD: