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. \( \frac{3}{4x^2} + \frac{2x}{12x} \)

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

LCD: 

L C D: 

\[ \text{L C D:} \]

\[ \text{L C D:} \]

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

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

LCD: 

L C D: 

\[ \text{L C D:} \]

\[ \text{L C D:} \]
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: