Pre-Calculus 11 Addition and Subtraction of Rational Expressions (Binomial Denominators)

Steps for Adding or Subtracting (Different Denominators):

- Factor all expressions
- Find the LCD
- Write each expression over the LCD.
- Add or Subtract the numerators, keeping the denominators the same
- Simplify and State restrictions (what will make denominator equal to 0)
- **Note**: the LCD is the product which contains each factor that occurs the greatest number of times in any denominator.

Examples

1. $\frac{x}{2x-4} - \frac{5}{3x-6}$

LCD $6(x-2)$

$\frac{x}{2(x-2)} - \frac{5}{3(x-2)}$

$\frac{3x}{6(x-2)} - \frac{10}{6(x-2)}$

$\frac{3x-10}{6(x-2)}$ $\quad x \neq 2$

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

LCD $12(x+1)(x-3)$

$\frac{x}{6(x+1)} + \frac{5}{4(x-3)}$

$\frac{2x(x-3)}{12(x+1)(x-3)} + \frac{5(3)(x+1)}{12(x+1)(x-3)}$

$\frac{2x^2-6x+15x+15}{12(x+1)(x-3)}$

$\frac{2x^2+9x+15}{12(x+1)(x-3)}$ $x \neq -1, 3$

3. $\frac{6}{x+3}+\frac{5}{3+x}-\frac{3x}{x^2-9}$

$-(3+x)$

LCD $(x+3)(x-3)$

$\frac{6}{x+3}+\frac{-5}{x-3}-\frac{3x}{(x-3)(x+3)}$

$\frac{6(x-3)}{(x+3)(x-3)}-\frac{5(x+3)}{(x+3)(x-3)}-\frac{3x}{(x-3)(x+3)}$

$\frac{6x-18-5x-15-3x}{(x+3)(x-3)}$

$\frac{-2x-33}{(x+3)(x-3)}$ $x \neq \pm 3$

4. $\frac{1}{x^2-36} - \frac{1}{6x-x^2}$

$\frac{1}{(x-6)(x+6)} - \frac{1}{-x(-6+x)}$

LCD $x(x-6)(x+6)$

$\frac{1}{(x-6)(x+6)} + \frac{1}{x(x-6)}$

$\frac{x}{x(x-6)(x+6)} + \frac{x+6}{x(x-6)(x+6)}$

$\frac{2x+6}{x(x-6)(x+6)}$ $x \neq \pm 6, 0$

Assignment: Pg 566; #3a,b, 5a,b, 6, 7