

Adding and Subtracting Rational Expressions

Find the LCD for each set of rational expressions

1. $\frac{4x+12}{(x+3)(x+2)}$ and $\frac{5x+15}{10x+20}$
 $\frac{5x+15}{10(x+2)}$

LCD: $10(x+2)(x+3)$

2. $\frac{-11}{(x-7)(x+4)}$ and $\frac{2}{(x-6)(x+4)}$

Add or subtract the given expressions, simplifying each result and stating the combined excluded values

3. $\frac{1}{1+x} + \frac{1-x}{x}$ $x \neq -1, 0$

$$\frac{x}{x} \cdot \frac{1}{(1+x)} + \frac{(1+x)}{(1+x)} \cdot \frac{(1-x)}{x} =$$

$$\frac{x}{x(1+x)} + \frac{1-x^2}{x(1+x)} = \frac{-x^2+x+1}{x(1+x)}$$

4. $\frac{x+4}{(x+2)(x-2)} + \frac{-2x-2}{(x+2)(x-2)}$

5. $\frac{1}{(x+4)(x-1)} - \frac{1}{(x-1)(x-2)}$ $x \neq -4, 1, 2$

$$\frac{(x-1)(x-2)}{(x+4)(x-1)(x-1)(x-2)} - \frac{(x+4)(x-1)}{(x+4)(x-1)(x-1)(x-2)} =$$

$$\frac{(x^2-3x+2) - (x^2+3x-4)}{(x+4)(x-1)(x-1)(x-2)} = \frac{-6x+6}{(x+4)(x-1)(x-1)(x-2)} = \frac{-6(x-1)}{(x+4)(x-1)(x-1)(x-2)}$$

6. $\frac{3x}{x+9} + \frac{7}{x}$

$$\frac{-6}{(x+4)(x-1)(x-2)}$$

8. $\frac{x-1}{x+2} - \frac{x}{x-3}$

$$\frac{3x}{x+9} \cdot \frac{x}{x} + \frac{7(x+9)}{x(x+9)}$$
 $x \neq -9, 0$

$$\frac{3x^2}{x(x+9)} + \frac{7x+63}{x(x+9)} = \frac{3x^2+7x+63}{x(x+9)}$$

29. Match each expression with the correct excluded value(s).

a. $\frac{3x + 5}{x + 2}$ C no excluded values

b. $\frac{1 + x}{x^2 - 1}$ _____ $x \neq 0, -2$

c. $\frac{3x^4 - 12}{x^2 + 4}$ _____ $x \neq 1, -1$

d. $\frac{3x + 6}{x^2(x + 2)}$ A $x \neq -2$

31. **Communicate Mathematical Ideas** Write a rational expression with excluded values at $x = 0$ and $x = 17$.