

4:6: Solving Rational Equations

- Steps: 1) Factor & determine LCD
- 2) state restrictions
- 3) multiply EVERYTHING by LCD
- 4) clean up & solve

Ex 1) $\frac{2}{x+2} + \frac{5}{x-2} = \frac{6}{x^2-4}$

$\hookrightarrow \sqrt{x^2} = x$ $(x+2)(x-2)$
 $\sqrt{4} = 2$

LCD: $(x+2)(x-2)$

$x+2 \neq 0$ $x-2 \neq 0$
 $x \neq \pm 2$

$\frac{2}{\cancel{x+2}} \cdot \cancel{(x+2)(x-2)} + \frac{5}{\cancel{x-2}} \cdot \cancel{(x+2)(x-2)} = \frac{6}{\cancel{(x+2)(x-2)}} \cdot \cancel{(x+2)(x-2)}$

$2(x-2) + 5(x+2) = 6$

$2x - 4 + 5x + 10 = 6$

$7x + \cancel{6} = 6$
 $\quad \quad \quad -6$

$\frac{7x}{7} = \frac{0}{7}$
 $x = 0$

$$\text{EX 2)} \quad \frac{7}{x^2-5x} + \frac{2}{x} = \frac{3}{2x-10}$$

$$\begin{array}{c} x^2-5x \\ \overline{x} \quad \overline{x} \\ \downarrow \quad \downarrow \\ x(x-5) \end{array}$$

$$\begin{array}{c} 2x-10 \\ \overline{2} \quad \overline{2} \\ \downarrow \quad \downarrow \\ 2(x-5) \end{array}$$

LCD: $x(x-5)2$

$x \neq 5, 0$

$$\frac{7}{x(x-5)} \cdot \frac{x(x-5)2}{x(x-5)} + \frac{2}{x} \cdot \frac{x(x-5)2}{x(x-5)} = \frac{3}{2(x-5)} \cdot \frac{x(x-5)2}{x(x-5)}$$

$$7(2) + 2(x-5)2 = 3x$$

$$14 + \cancel{4x} - 20 = 3x$$

$$\quad \quad \quad -4x$$

$$\frac{-6}{-1} = \frac{-x}{-1}$$

$$\boxed{x=6}$$