Section 9-6: Solving Rational Equations.

1. Solve. $\frac{x-6}{x-6} \cdot \frac{8}{2x+5} = \frac{3}{x-6} \cdot \frac{(2x+5)}{2x+5}$

$8(x-6) = 3(2x+5)$

$8x - 48 = 6x + 15$

$-6x \quad -6x$

$2x - 48 = 15$

$+48 \quad +48$

$2x = 63$

$x = 31.5$

2. Solve.

$$\frac{-4}{5x+10} = \frac{2}{x+2}$$

Extraneous Solutions

solutions that don't make the original equation true

$-4(x+2)$

$-4x - 8 = 10x + 20$ NO SOL

$-28 = 14x$

$-2 = x$

Since x = -2 makes the denominator of the original equation zero it is NOT a solution.

3. Solve. $\frac{3}{x+5} = \frac{12}{x^2-25}$

Below are two ways to solve this equation.

$\frac{3}{x+5} = \frac{12}{x^2-25}$

$3x^2 - 75 = 12x + 60$

$\frac{3x^2 - 12x - 135}{3} = \frac{0}{3}$

$x^2 - 4x - 45 = 0$

-45, $-9 \times +5$, -4

$(x-9)(x+5) = 0$

$x = 9, -5$

$\frac{(x-5)}{(x-5)} \cdot \frac{3}{x+5} = \frac{12}{x^2-25}$

$(x+5)(x-5)$

$3(x-5) = 12$

$3x - 15 = 12$

$+15 \quad +15$

$3x = 27$

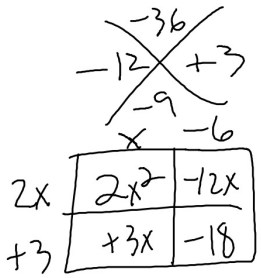
$x = 9$

4. Solve.

$$\frac{6}{6}\cdot\frac{2}{x}+\frac{x}{3}\cdot\frac{2x}{2x}=\frac{3x+10}{2x}\cdot\frac{3}{3}$$

$$\frac{12}{6x}+\frac{2x^2}{6x}=\frac{9x+30}{6x}\rightarrow 12+2x^2=9x+30$$

$$2x^2-9x-18=0$$



$$(x-6)(2x+3)=0$$

$$x=6,\ \frac{-3}{2}$$

5. Solve.

$$\frac{(x-2)}{(x-2)}\cdot\frac{x}{x^2-100}=\frac{1}{x^2-12x+20}\cdot\frac{(x+10)}{(x+10)}$$

$$\frac{x}{(x+10)(x-10)}=\frac{1}{(x-2)(x-10)}\cdot\frac{(x+10)}{(x+10)}$$

$$x(x-2)=x+10$$

$$x^2-2x=x+10$$

$$x^2-3x-10=0\rightarrow(x-5)(x+2)=0$$

$$x=5,\ -2$$

6. Solve.

$$\frac{4}{x-5}+\frac{38}{x^2+3x-40}=\frac{x}{x+8}$$