

Solving Rational Equations

$$\frac{7}{x-2} = \frac{11}{2x-10}$$

$$\begin{aligned} 7(2x-10) &= 11(x-2) \\ 14x-70 &= 11x-22 \\ 3x &= 48 \\ x &= 16 \end{aligned}$$

$$5x \left[\frac{15}{x} + \frac{4}{5} = \frac{7}{x} \right]$$

$$\begin{aligned} 75 + 4x &= 35 \\ 4x &= -40 \\ x &= -10 \end{aligned}$$

$$x(x+7) \left[\frac{12}{x+7} = 1 - \frac{12}{x} \right]$$

$$12x = x(x+7) - 12(x+7)$$

$$12x = x^2 + 7x - 12x - 84 \quad x(x+7) \cdot \left(\frac{12}{x}\right) = 12(x+7)$$

$$\begin{aligned} 12x &= x^2 - 5x - 84 \\ -12x &\quad -12x \end{aligned}$$

$$0 = x^2 - 17x - 84$$

$$0 = (x-21)(x+4)$$

$$\begin{aligned} x-21=0 & \quad x+4=0 \\ x=21 & \quad x=-4 \end{aligned}$$

Check:

$$\frac{7}{14} \stackrel{?}{=} \frac{11}{22}$$

$$\frac{5x \cdot 15}{1 \cdot x} = 75$$

$$\frac{5x \cdot 4}{1 \cdot 8} = 4x$$

$$\frac{5x \cdot 7}{1 \cdot x} = 35$$

Check:

$$\frac{15}{-10} + \frac{4}{5} = \frac{2}{-10}$$

$$-1.5 + 0.8 = -0.7$$

$$x(x+7) \cdot \frac{12}{(x+7)} = 12x$$

$$\begin{aligned} 84/1 \\ 42/2 \\ 21/4 \end{aligned}$$

$$\text{Checks: } \frac{12}{x+7} = 1 - \frac{12}{x}$$

$$\frac{12}{28} = 1 - \frac{12}{21}$$

$$\frac{3}{7} = 1 - \frac{4}{7}$$

$$\frac{12}{3} = 1 - \frac{12}{-4}$$

$$4 = 1 + 3$$