


## 11.8 Solving Rational Equations

$$\frac{5}{y+2} = \frac{y}{3} \quad y \neq -2$$
$$5 \cdot 3 = y(y+2)$$
$$15 = y^2 + 2y$$
$$\begin{array}{r} 15 \\ -15 \\ \hline 0 \end{array} \quad \begin{array}{r} -15 \\ -15 \\ \hline 0 \end{array}$$
$$0 = y^2 + 2y - 15$$
$$0 = (y+5)(y-3)$$

$y = -5, 3$



$$3x \left( \frac{2}{x} + \frac{1}{3} = \frac{4}{x} \right)$$

$x \neq 0$

$$\begin{array}{r} 6 + x = 12 \\ -6 \quad -6 \\ \hline x = 6 \end{array}$$

$$\frac{3x}{1} \left( \frac{2}{x} \right) + \frac{3x}{1} \left( \frac{1}{3} \right)$$
$$3x \left( \frac{4}{x} \right)$$

$$15x \left( \frac{2}{5x} = -\frac{3}{15} + \frac{1}{x} \right) \quad x \neq 0$$

$$\begin{array}{r} 6 = -3x + 15 \\ -15 \quad \quad \quad -15 \\ \hline \end{array}$$

$$\frac{-9 = -3x}{-3}$$

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$$\frac{-9}{-3} = \frac{-3x}{-3}$$
$$3 = x$$

$$\begin{aligned}
 & \frac{(y+4)}{(y-3)} + 1 = \frac{-10}{y^2+y-12} \\
 & \frac{(y+4)}{(y-3)} + \frac{1}{1} = \frac{-10}{(y+4)(y-3)} \\
 & y \neq 3, -4 \\
 & -4y - 16 + y^2 + y - 12 = -10 \\
 & y^2 - 3y - 28 = -10 \\
 & \quad \quad \quad +10 \quad \quad +10 \\
 & \hline
 & y^2 - 3y - 18 = 0 \\
 & (y-6)(y+3) = 0 \\
 & y = 6, -3
 \end{aligned}$$

$$\frac{(x-7)}{(x-2)} \left( \frac{3}{(x-7)} + \frac{1}{1} \right) = \frac{8}{x^2 - 9x + 14}$$

$x \neq 2, 7$

$$3x - 6 + x^2 - 9x + 14 = 8$$

$$x^2 - 6x + 8 = 8$$

$$\begin{array}{r} x^2 - 6x + 8 = 8 \\ -8 \quad -8 \\ \hline \end{array}$$

$$x = 0$$

$$\begin{array}{r} x - 6 = 0 \\ +6 \quad +6 \\ \hline x = 6 \end{array}$$

$$x^2 - 6x = 0$$

$$x(x - 6) = 0$$

$$x = 0, 6$$

$$\left( \frac{x-6}{x+4} + 1 = \frac{5x}{x^2-2x-24} \right)$$

$$8x - 48 + x^2 - 2x - 24 = 5x \quad x \neq 6, -4$$

$$\begin{array}{r} x^2 + 6x - 72 = 5x \\ -5x \\ \hline \end{array}$$

$$x^2 + x - 72 = 0$$

$$(x+9)(x-8) = 0$$

$$x = -9, 8$$

