

Worksheet 2.7

Name

KEY

Name _____

For each rational equation, solve for x. Make sure to watch for extraneous solutions!

1. $\frac{1}{x-1} + 5 = \frac{11}{x-1} \quad x \neq 1$

$$1 + 5(x-1) = 11$$

$$1 + 5x - 5 = 11$$

$$5x - 4 = 11$$

$$5x = 15$$

$$\boxed{x = 3}$$

2. $\frac{3}{x+4} - 7 = \frac{-4}{x+4} \quad x \neq -4$

$$3 - 7(x+4) = -4$$

$$3 - 7x - 28 = -4$$

$$-7x - 25 = -4$$

$$-7x = 21$$

$$\boxed{x = -3}$$

3. $\frac{3}{2x-2} + \frac{1}{2} = \frac{2}{x-1} \quad x \neq 1$

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

$$3 + 1(x-1) = 2 \cdot 2$$

$$3 + x - 1 = 4$$

$$x + 2 = 4$$

$$\boxed{x = 2}$$

4. $\frac{3}{x+3} = \frac{5}{2x+6} + \frac{1}{x-2} \quad x \neq -3, 2$

$$\frac{3}{x+3} = \frac{5}{2(x+3)} + \frac{1}{x-2}$$

$$3 \cdot 2 \cdot (x-2) = 5 \cdot (x-2) + 2(x+3)$$

$$6x - 12 = 5x - 10 + 2x + 6$$

$$6x - 12 = 7x - 4$$

$$-x = 8$$

$$\boxed{x = -8}$$

$$5. \frac{2x}{x-1} + \frac{1}{x-3} = \frac{2}{x^2-4x+3} \quad x \neq 3, 1$$

$$2x(x-3) + x-1 = 2$$

$$2x^2 - 6x + x - 1 = 2$$

$$2x^2 - 5x - 3 = 0$$

$$(2x+1)(x-3) = 0$$

$$x = -\frac{1}{2}, \quad \cancel{x=3}$$

$$\boxed{x = -\frac{1}{2}}$$

$$6. \frac{x-3}{x} + \frac{3}{x+2} = \frac{-6}{x^2+2x} \quad x \neq 0, -2$$

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

$$x^2 - x - 6 + 3x = -6$$

$$x^2 + 2x = 0$$

$$x(x+2) = 0$$

$$x = 0, \quad \cancel{x=-2}$$

$$\boxed{\emptyset}$$

$$7. \frac{1}{x-4} - \frac{5}{x+2} = \frac{6}{x^2-2x-8} \quad x \neq 4, -2$$

$$x+2 - 5(x-4) = 6$$

$$x+2 - 5x+20 = 6$$

$$-4x + 22 = 6$$

$$-4x = -16$$

$$\cancel{x=4}$$

$$\boxed{\emptyset}$$

$$8. \frac{1}{x-3} - \frac{2}{x+1} = \frac{8}{x^2-2x-3} \quad x \neq 3, -1$$

$$(x+1) - 2(x-3) = 8$$

$$x+1 - 2x+6 = 8$$

$$-x + 7 = 8$$

$$-x = 1$$

$$\cancel{x=-1}$$

$$\boxed{\emptyset}$$