

8.6 SOLVING RATIONAL EQUATIONS

Ex: Solve $\frac{-2}{x^2-2} = \frac{2}{x-4}$

Multiply by LCD of $(x^2-2)(x-4)$

$$(x^2-2)(x-4) \frac{-2}{x^2-2} = \frac{2}{x-4} (x^2-2)(x-4)$$

$$-2(x-4) = 2(x^2-2)$$

$$-2x+8 = 2x^2-4$$

$$2x^2+2x-12 = 0$$

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

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

$$x = -3, 2$$

It is **NECESSARY** TO CHECK THE "SOLUTIONS"

✓ $x = -3$

$$\frac{-2}{(-3)^2-2} = \frac{2}{-3-4}$$

$$\frac{-2}{7} = \frac{2}{-7}$$

✓

✓ $x = 2$

$$\frac{-2}{2^2-2} = \frac{2}{2-4}$$

$$\frac{-2}{2} = \frac{2}{-2}$$

✓

Ex: Solve $\frac{2}{x} = \frac{3}{x-2} - 1$

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

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

$$2x - 4 = 3x - x^2 + 2x$$

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$$x = 4, -1$$

To check ... $x=4$

$$\frac{2}{4} = \frac{3}{4-2} - 1$$

$$\frac{1}{2} = \frac{3}{2} - 1$$

$$\frac{1}{2} = \frac{1}{2}$$

✓

$x = -1$

$$\frac{2}{-1} = \frac{3}{-1-2} - 1$$

$$-2 = -1 - 1$$

$$-2 = -2$$

✓

Ex: Solve $\frac{x}{x-1} + x = \frac{4x-3}{x-1}$

$$\frac{x}{x-1} (x-1) + x(x-1) = \frac{4x-3}{x-1} (x-1)$$

$$x + x^2 - x = 4x - 3$$

$$x^2 - 4x + 3 = 0$$
$$(x-1)(x-3) = 0$$

$$x = 1, 3$$

TO CHECK

$$x = 1$$

$$\frac{1}{0} + 1 = \frac{1}{0}$$

NO

$$x = 3$$

$$\frac{3}{2} + 3 = \frac{9}{2}$$

$$\frac{9}{2} = \frac{9}{2}$$

$$\boxed{x = 3}$$