

1.9 - Solving Rational Functions

Solving Rational Equations

Rational equations involving fractions can be solved by multiplying each term in the equation by the LCD (Lowest Common Denominator) of all the terms of the equation.

Example 1 Solve $x + \frac{6}{x-8} = 0$ LCD = $x-8$

$$x(x-8) + \frac{6(x-8)}{x-8} = 0(x-8)$$

$$x^2 - 8x + 6 = 0$$

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

$$x^2 - 8x + 16 = 10$$

$$(x-4)^2 = 10$$

$$x-4 = \sqrt{10}$$

$$x = 4 \pm \sqrt{10}$$

$$\text{OR } x = \frac{8 \pm \sqrt{64-24}}{2}$$

$$= \frac{8 \pm \sqrt{4} \sqrt{10}}{2}$$

$$= \frac{8 \pm 2\sqrt{10}}{2} = 4 \pm \sqrt{10}$$

Example 2 Solve $\frac{4}{x^2-6x+8} = \frac{3x}{x-2} + \frac{2}{x-4}$ LCD = $(x-2)(x-4)$

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

$$4 = 3x(x-4) + 2(x-2)$$

$$4 = 3x^2 - 12x + 2x - 4$$

$$4 = 3x^2 - 10x - 4$$

$$0 = 3x^2 - 10x - 8$$

$$x^2 - 10x - 24$$

$$(x-12)(x+2)$$

$$(x-4)\left(x + \frac{2}{3}\right) = 0 \rightarrow$$

$$x-4=0$$

$$x + \frac{2}{3} = 0$$

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

Homework on back

Homework on back

Solve.

1. $\frac{20}{x+3} - 4 = 0$

2. $\frac{9x}{x-2} = 6$

3. $\frac{2x}{x+3} + \frac{3}{x-6} = \frac{27}{x^2-3x-18}$