

Section 2.7: Solving Rational Equations in one Variable

Clearing Fractions

Ex. 1 Solve the following equations:

a. $\frac{x}{1} + \frac{3}{x} = \frac{4}{1}$ $x \neq 0$

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

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

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

$$x = 3, 1$$

b. $\frac{x-2}{3} + \frac{x+5}{3} = \frac{1}{3}$

$$x-2+x+5=1$$

$$2x+3=1$$

$$-3 \quad -3$$

$$2x = -2$$

$$x = -1$$

c. $x + \frac{1}{x-4} = 0$ $x \neq 4$ d. $x + \frac{10}{x} = 7$

$$x^2 - 4x + 1 = 0$$

$$x = \frac{4 \pm \sqrt{16 - 4(1)(1)}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{12}}{2} = \frac{4 \pm 2\sqrt{3}}{2}$$

$$x = 2 \pm \sqrt{3}$$

Solving Rational Equations:

Ex. 2 Solve the following equations. Check your answer for extraneous solutions.

a. $\frac{2x}{x-1} + \frac{1}{x-3} = \frac{2}{x^2-4x+3}$ b. $\frac{3x}{x+5} + \frac{1}{x-2} = \frac{7}{x^2+3x-10}$

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

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

$$(2x^2 - 6x) + (x - 3) = 0$$

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

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

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

c. $\frac{x+1}{3x-6} + \frac{5x}{6} = \frac{1}{x-2}$

d. $x - \frac{3x}{x+2} = \frac{6}{x+2}$

$$y = \frac{(x+1)}{(3x-6)}$$

$$y = \frac{(5x)}{6} + \frac{1}{(x-2)}$$

Ex. 3 How much pure acid must be added to 70 mL of a 30% acid to reach a mixture of 45% acid?

Ex. 4 How much pure orange juice must be added to 100 mL of a 75% juice drink to reach a drink of 95% juice?

Ex. 5 You want to put a rectangular pool in your backyard, and you have 200 square meters. To decrease costs, find the least perimeter of a rectangle with these dimensions and area of the pool.