

Lesson #4: Solve Rational Equations and Inequalities

Example #1: Solve each of the following, Check your answers.

a) $\frac{6}{2x-1} = 5$ $x \neq \frac{1}{2}$

$$6 = 5(2x-1)$$

$$6 = 10x - 5$$

$$11 = 10x$$

$$\frac{11}{10} = x$$

LS	RS
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$$\frac{6}{2x-1}$$

$$5$$

$$= \frac{6}{2(\frac{11}{10})-1}$$

$\therefore LS = RS$

$$= \frac{6}{\frac{11}{5}-1}$$

$$\text{So } x = \frac{11}{10}$$

$$= \frac{6}{\frac{6}{5}}$$

$$= 6 \times \frac{5}{6}$$

$$= 5$$

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

restrictions: $x \neq -2, \frac{1}{3}$

$$(2x-5)(3x-1) = x(x+2)$$

$$6x^2 - 2x - 15x + 5 = x^2 + 2x$$

$$6x^2 - 17x + 5 = x^2 + 2x$$

$$5x^2 - 19x + 5 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a = 5$$

$$b = -19$$

$$c = 5$$

$$= \frac{19 \pm \sqrt{(-19)^2 - 4(5)(5)}}{2(5)}$$

$$= \frac{19 \pm \sqrt{261}}{10}$$

$$\text{So } x = \frac{19 \pm \sqrt{261}}{10}$$

$$x = 3.515$$

$$\text{OR}$$

$$x = 0.284$$

Example #2: Verify your answers from Example #1 using technology.

a) $y_1 = \frac{6}{2x-1}$

$$y_2 = 5$$

$$\text{POI } (1.1, 5)$$

$$\text{So } x = 1.1$$

b) $y_1 = \frac{2x-5}{x+2}$

$$y_2 = \frac{x}{3x-1}$$

$$x = 3.515$$

OR

$$x = 0.284$$