

8.6

Note Title

11/28/2006

Solving Rational Equations

Recall that to solve proportions we used the cross-product

$$\textcircled{\text{ex}} \quad \frac{x}{4} = \frac{6}{8}$$

$$\frac{x \nearrow 8}{4 \nwarrow 6} = \frac{\nearrow 6}{\nwarrow 8}$$

$$x \cdot 8 = 4 \cdot 6$$

$$\frac{8x}{8} = \frac{24}{8}$$

$$\textcircled{x = 3}$$

Do the same for rational expressions.

Solve

(EV)

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

$$\begin{aligned} x-2 &\neq 0 \\ x &\neq 2 \end{aligned}$$

$$\begin{aligned} x+1 &\neq 0 \\ x &\neq -1 \end{aligned}$$

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

don't forget the ().

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

$$5x + 5 = 3x - 6$$

$$\begin{array}{r} -3x \qquad -3x \\ 5x + 5 = 3x - 6 \end{array}$$

$$\begin{array}{r} 2x + 5 = -6 \\ -5 \qquad -5 \end{array}$$

$$\frac{2x}{2} = \frac{-11}{2}$$

$$x = -\frac{11}{2}$$

← since $-\frac{11}{2}$ is NOT 2 or -1 (from above) I know that $-\frac{11}{2}$ is my answer.

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

$x+3 \neq 0$
 $x \neq -3$

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

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

$$-2 = 2x^2 + 1x + 6x + 3$$

$$-2 = 2x^2 + 7x + 3$$

$$+2 \qquad \qquad \qquad +2$$

$$0 = 2x^2 + 7x + 5$$

$$0 = (2x+5)(x+1)$$

$$2x+5=0 \quad \text{or} \quad x+1=0$$

$$-5 \quad -5$$

$$-1 \quad -1$$

$$\frac{2x}{2} = \frac{-5}{2}$$

$$x = -1$$

$$x = -\frac{5}{2}$$

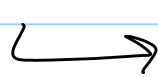
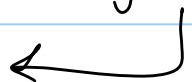
Since neither $-\frac{5}{2}$ or -1 is -3 (from above) my answers are $-\frac{5}{2}$ and -1

(ex.) Solve $\frac{2}{y-2} = \frac{4-y}{y-2}$

$$y-2 \neq 0$$

+2 +2

$$y \neq 2$$



$$y-2 \neq 0$$
$$y \neq 2$$

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

$$2(y-2) = (y-2)(4-y)$$

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

$$2y-4 = -y^2+6y-8$$

$$+y^2 \quad +y^2$$
$$y^2+2y-4 = 6y-8$$

$$-6y \quad -6y$$
$$y^2-4y-4 = -8$$

$$+8 \quad +8$$
$$y^2-4y+4 = 0$$

$$(y-2)(y-2) = 0$$

$$y-2=0$$

+2 +2

or

$$y-2=0$$

+2 +2

$$y=2$$

or

$$y=2$$

but above we

decided that $y \neq 2$

(because that's where we divided by

zero) so this problem has no answer.

