

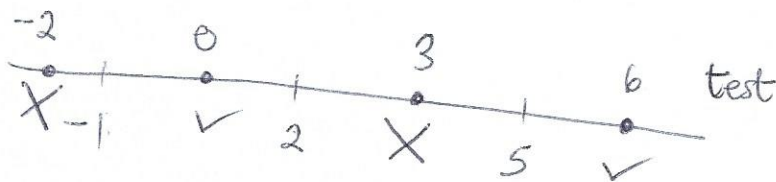
10/22/2018

# Solving Polynomial Inequalities.

$$(x-2)(x+1)(x-5) \geq 0$$

The equal-to will make your zeros included in the solution.

$$\begin{array}{l} (x-2) = 0 \\ x = 2 \end{array} \quad \begin{array}{l} x+1 = 0 \\ x = -1 \end{array} \quad \begin{array}{l} x-5 = 0 \\ x = 5 \end{array}$$



$$\begin{array}{c} (-2-2) \\ - \end{array} \begin{array}{c} (-2+1) \\ - \end{array} \begin{array}{c} (-2-5) \\ - \end{array} = -$$

$$\begin{array}{c} (0-2) \\ - \end{array} \begin{array}{c} (0+1) \\ + \end{array} \begin{array}{c} (0-5) \\ - \end{array} = +$$

$$\begin{array}{c} (6-2) \\ + \end{array} \begin{array}{c} (6+1) \\ + \end{array} \begin{array}{c} (6-5) \\ + \end{array} = +$$

$$[-1, 2] \cup [5, \infty)$$

Practice  $(x+4)(x-2) < 0$ .

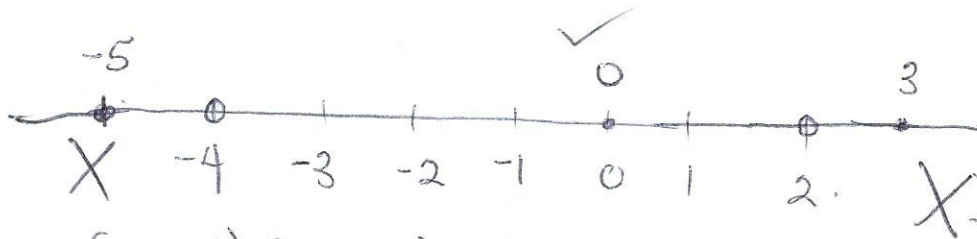
~~$$(x+4) < 0 \quad x-2 < 0$$~~

~~$$x < -4 \quad x < 2$$~~

$$x+4 = 0 \quad x-2 = 0$$

$$x = -4 \quad x = 2$$

-4, 2 not included.



$$(-5+4)(-5-2) = +$$

$$(0+4)(0-2) = -$$

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

$$[-4, 2]. \quad (-4, 2)$$

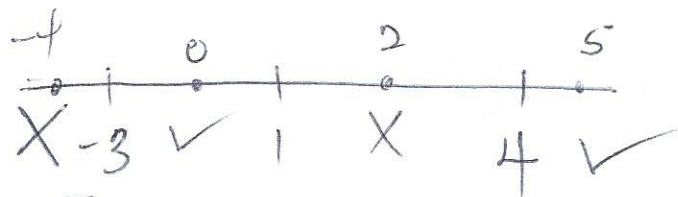
## Solving Rational Inequalities.

$$\frac{x+3}{x^2-5x+4} \geq 0.$$

$$\Rightarrow \frac{x+3}{(x-4)(x-1)} \geq 0 \quad \text{restrictions: never be included.}$$

$x \neq 4, x \neq 1$

$$\Rightarrow \frac{x+3}{(x-4)(x-1)} = 0 \quad \Rightarrow x+3=0 \quad \Rightarrow x=-3$$



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

$$\frac{0+3}{(0-4)(0-1)} = \frac{+}{- \cdot -} = \frac{+}{+} = +$$

$$\frac{2+3}{(2-4)(2-1)} = \frac{+}{- \cdot +} = -$$

$$\frac{5+3}{(5-4)(5-1)} = \frac{+}{+} = +$$

$$[-3, 1) \cup (4, \infty)$$

$$\text{Ex } \frac{3}{x-2} + 1 < \frac{2}{x+5}$$

restrictions:

$$x=2, x=-5$$

$$\frac{3}{x-2} + 1 - \frac{2}{x+5} < 0$$

$$\left( \frac{3}{x-2} + 1 - \frac{2}{x+5} = 0 \right) (x-2)(x+5)$$

$$3(x+5) + (x-2)(x+5) - 2(x-2) = 0$$

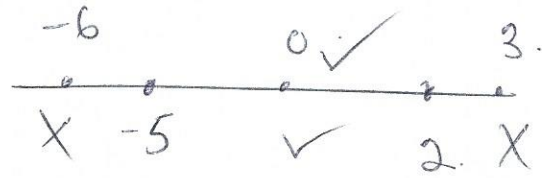
$$3x+15 + x^2+3x-10 - 2x+4 = 0$$

$$x^2 + 4x + 9 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-4 \pm \sqrt{4^2 - 4(1)(9)}}{2(1)}$$

$$= \frac{-4 \pm \sqrt{16 - 36}}{2}$$

$$= \frac{-4 \pm \sqrt{-20}}{2} \Rightarrow \text{no solution}$$



$$\frac{3}{-6-2} + 1 - \frac{2}{-6+5}$$

$$\frac{-3}{8} + 1 + 2 = +$$

$$\frac{3}{0-2} + 1 - \frac{2}{0+5}$$

$$-1.5 + 1 - \frac{2}{5} = -$$

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

$$3 + 1 - \frac{2}{8} = +$$

$(-5, 2)$