

Solve for x.

$$\boxed{\text{ex}} \quad y \cdot z = \frac{w(x-4)}{y}$$

$$\frac{yz}{w} = \frac{w(x-4)}{w}$$

$$4 + \frac{yz}{w} = x - 4 + 4$$

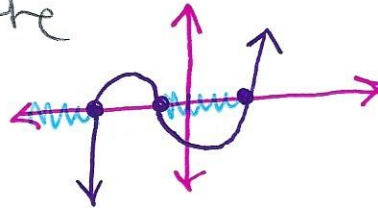
$$\boxed{x = \frac{yz}{w} + 4}$$

Review Inequalities

<	≤	≥	>
less than	less than or equal too	Greater than or equal too	Greater than

Solving Polynomial Inequalities

- x-intercepts make the inequality = 0



4 values are below

- function needs to be in factor form.

$$\boxed{\text{ex}} \quad (x-2)(x+3)^2(x+5) \geq 0$$

$$x = 2 \quad x = -3 \quad x = -5$$



4 values are above

- Pick a test points. (were looking for the test values to give us a positive answer.)

$$-6 \Rightarrow (-6-2)(-6+3)^2(-6+5) \geq 0$$

$$(-)(+)(-) \stackrel{+}{\geq} 0 \quad \checkmark$$

$$0 \Rightarrow (0-2)(0+3)^2(0+5) \geq 0$$

$$(-)(+)(+) \times$$

$$-4 \Rightarrow (-4-2)(-4+3)^2(-4+5) \geq 0$$

$$(-)(+)(+) \times$$

$$3 \Rightarrow (3-2)(3+3)^2(3+5)$$

$$\checkmark (+)(+)(+) \geq 0$$

Solution: $(-\infty, 5] \cup \{-3\} \cup [2, \infty)$

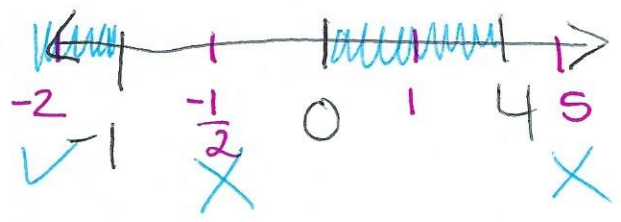
Ex: Solve $x^3 - 3x^2 - 4x < 0$

step 1: factor form

$$x(x^2 - 3x - 4) < 0$$

$$(x)(x - 4)(x + 1) < 0$$

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



Test values, when you plug them in your looking for negatives because of the "<0"

$$-2 \Rightarrow (-2)(-2-4)(-2+1) < 0$$

$$(-) (-) (-) < 0$$

$$(-) \checkmark$$

$$-\frac{1}{2} \Rightarrow (-\frac{1}{2})(-\frac{1}{2}-4)(-\frac{1}{2}+1) < 0$$

$$(-) (-) (+)$$

$$(+)\checkmark < 0$$

$$1 \Rightarrow (1)(1-4)(1+1) < 0$$

$$(+)(-)(+)$$

$$(-) \checkmark$$

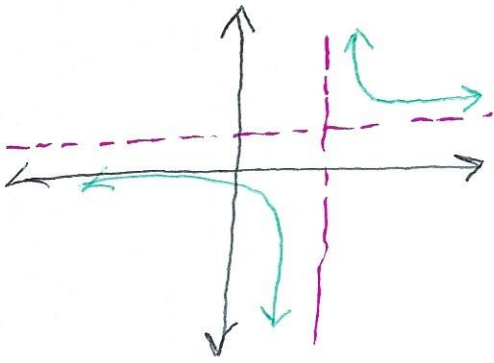
$$5 \Rightarrow (5)(5-4)(5+1) < 0$$

$$(+)(+)(+) \times$$

Solution

$$(-\infty, -1) \cup (0, 4)$$

Rational functions



ex $\frac{x+2}{(x-3)(x+4)} \geq 0$

x-intercept

Vertical A.

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

$(x-3)(x-4)$

$x=3 \quad x=4$

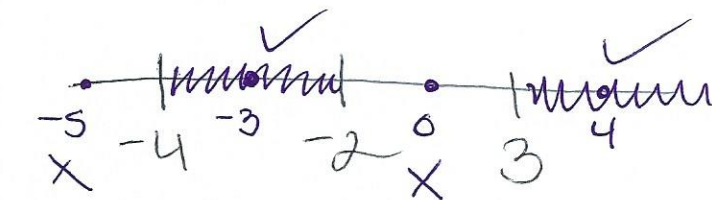
not included
in the solution

$x+2 \geq 0$

$x+2=0$ included

$x=-2$

Looking for positive values because of ≥ 0



solution
 $(-4, -2] \cup (3, \infty)$

Test values

$-5 \Rightarrow \frac{-5+2}{(-5-3)(-5+4)} = \frac{(-)}{(-)(-)} = (-) \times$

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

$0 \Rightarrow \frac{0+2}{(0-3)(0+4)} = \frac{(+)}{(-)(+)} = (-) \times$

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