

Chapter 2
Section 7

Graphing Nonlinear
Inequalities

DO NOW!

Pg 204 # 1-4

Steps to Graph:

1.) Find the Critical Values:

a.) Zeros- set = 0 and solve

b.) Undefined values: when $x = 0$ in the denominator

2.) Use the critical values to find the test intervals.

3.) Choose a test point in each interval to determine if it is a solution

Hint- Look for the positive or negative value of the answer

4.) Write the solution using the appropriate () or []

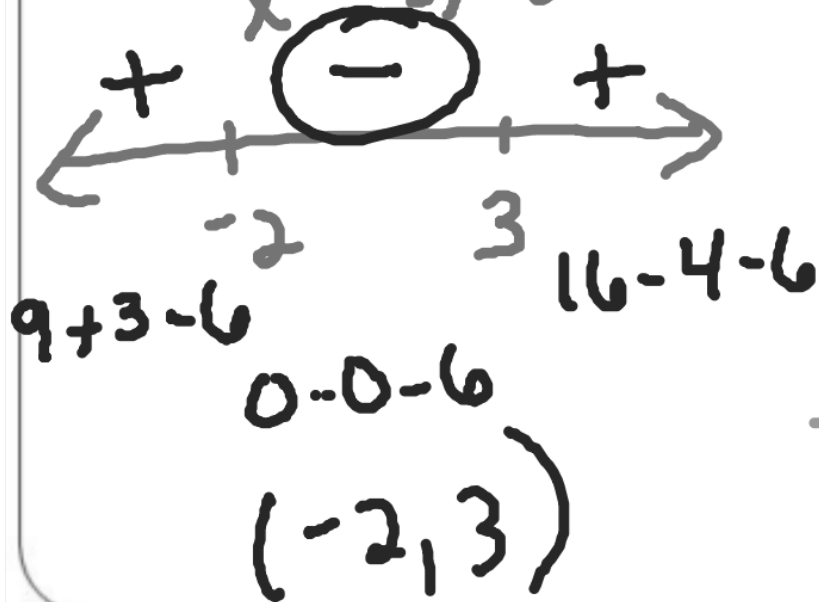
Polynomial Inequality Examples:

• 1. $x^2 - x - 6 < 0$

$$x^2 - x - 6 = 0$$

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

$$x = 3, -2$$



• 2.) $2x^3 - 3x^2 - 32x \geq -48$

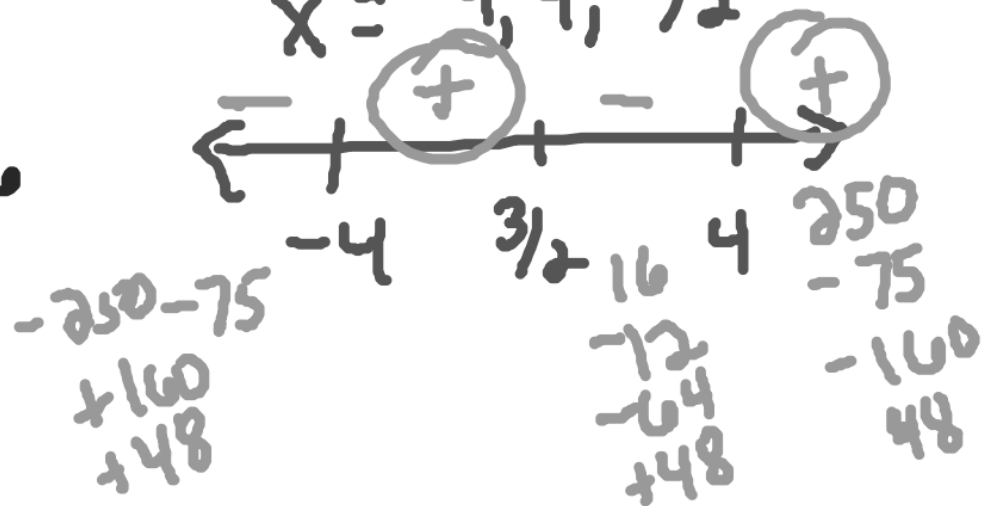
$$[-4, \frac{3}{2}] \cup [4, \infty)$$

$$2x^3 - 3x^2 - 32x + 48 \geq 0$$

$$x^2(2x - 3) - 16(2x - 3) = 0$$

$$(x^2 - 16)(2x - 3) = 0$$

$$x = -4, 4, \frac{3}{2}$$

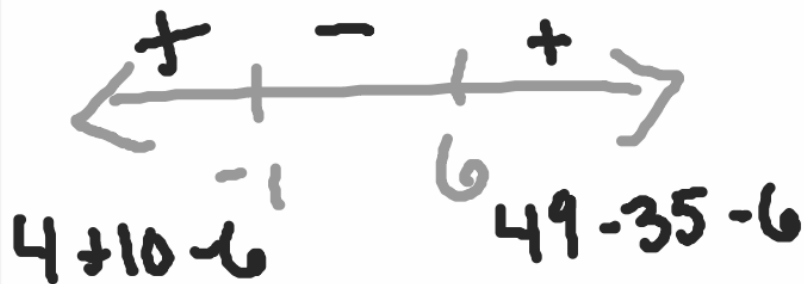


Examples- (cont)

• 3.) $x^2 - 5x - 6 < 0$

$$(x-6)(x+1) = 0$$

$$x = 6, -1$$



$$(-1, 6)$$

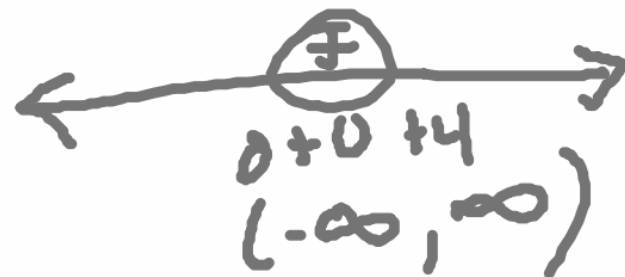
• 4.) $x^2 + 2x + 4 > 0$

$$x = \frac{-2 \pm \sqrt{4 - 4 \cdot 1 \cdot 4}}{2}$$

$$x = \frac{-2 \pm \sqrt{-12}}{2}$$

$$x = \frac{-2 \pm 2i\sqrt{3}}{2}$$

$$x = -1 \pm i\sqrt{3}$$

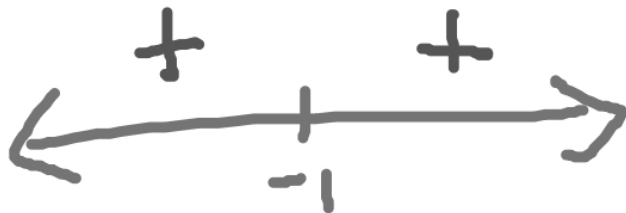


Examples-(cont)

- 5.) $x^2 + 2x + 1 \leq 0$

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

$$x = -1$$



$$4 - 4 + 1$$

$$[-1]$$

- 6.) $x^2 + 3x + 5 < 0$

Rational Inequality Examples

• 1.) $\frac{2x-7}{x-5} \leq 3$

$$\frac{2x-7}{x-5} - 3 \stackrel{(x-5)}{\cancel{=0}}$$

$$\frac{2x-7-3x+15}{x-5} \leq 0 \quad \neq 5 \left(\frac{-x+8}{x-5} = 0 \right) x-5$$

$$x-5$$

$$\frac{-x+8}{x-5} \leq 0$$

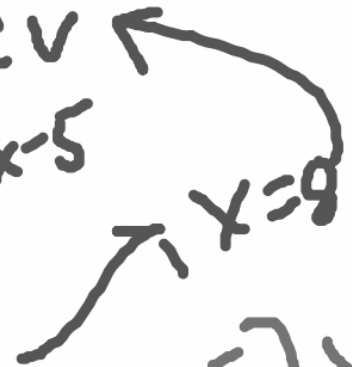
• 2.) $\frac{3x-5}{x-3} \leq 1$

$$x-5=0$$

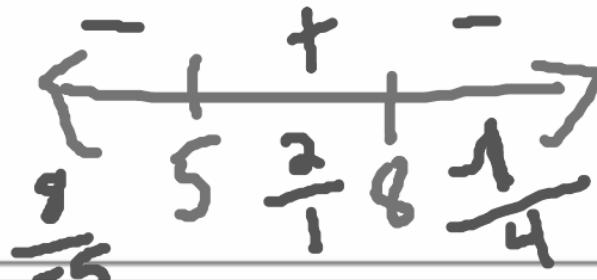
$$x=5 \rightarrow \text{CV}$$

$$\frac{-x+8}{x-5} = 0$$

$$-x+8=0$$



$$(-\infty, 5] \cup [8, \infty)$$



Classwork-

- Pg 191 Example 8
- Pg 202 Example 5

Homework

- Page 204 # 9-23 odd, 37-41 odd