

# C11 - 9.1 - Linear Inequalities In Two Variables Notes

Graph the following inequality

$$y > x - 2$$

1. Graph:  $y = x - 2$  (Dotted line)

2. Zero-zero test. (0,0)

- Substitute zero in for  $x$  and  $y$ .

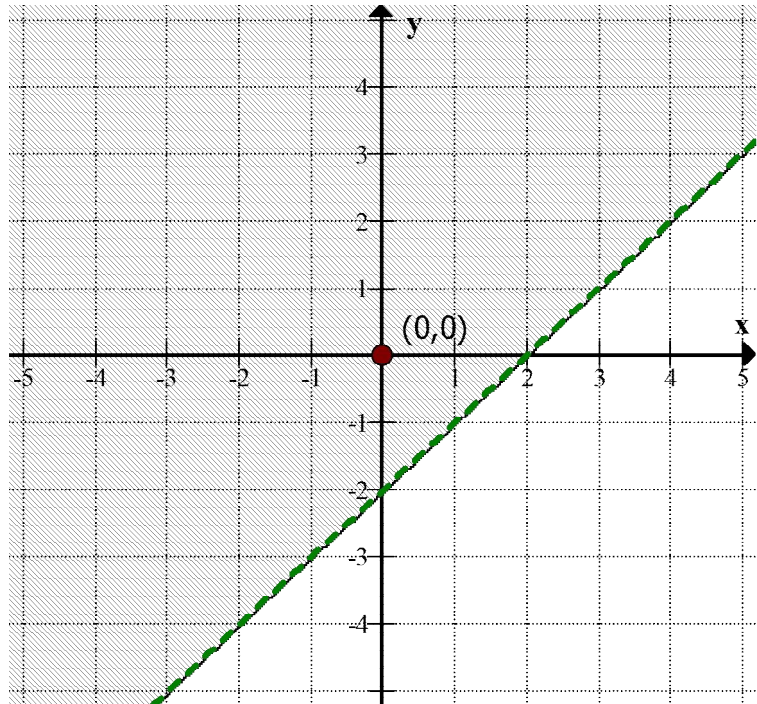
$$y > x - 2$$

$$0 > 0 - 2$$

$$0 > -2$$



Correct: Shade the (0,0) side of the line.



Notice: the (0,0) test only works if (0,0) is not on the line. If (0,0) is on the line we must choose a distinct point that is not on the line like (5,0).

$$y \leq x - 2$$

1. Graph  $y = x - 2$  (Solid Line)

2. Zero-zero test. (0,0)

- Substitute zero for  $x$  and  $y$ .

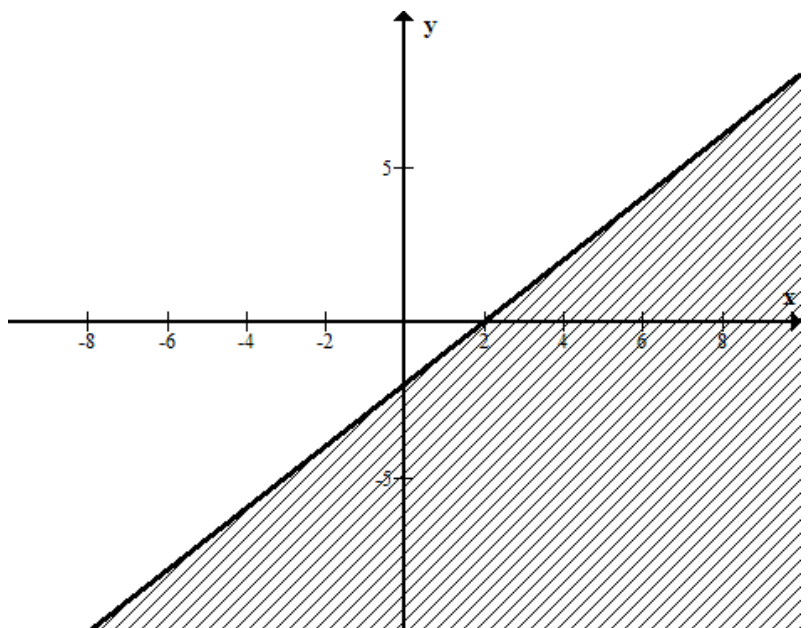
$$y \leq x - 2$$

$$0 \leq 0 - 2$$

$$0 \leq -2$$



Incorrect: Shade "Not" the (0,0) side of the line.



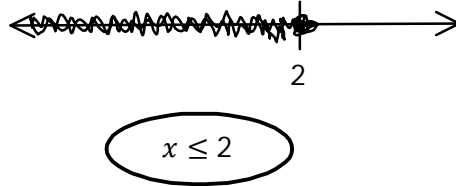
# C11 - 9.2 - Inequalities In One Variable Notes

Number Line

Graphically

$$x - 2 \leq 0$$

$$\begin{array}{r} x - 2 \leq 0 \\ +2 \quad +2 \\ \hline x \leq 2 \end{array}$$



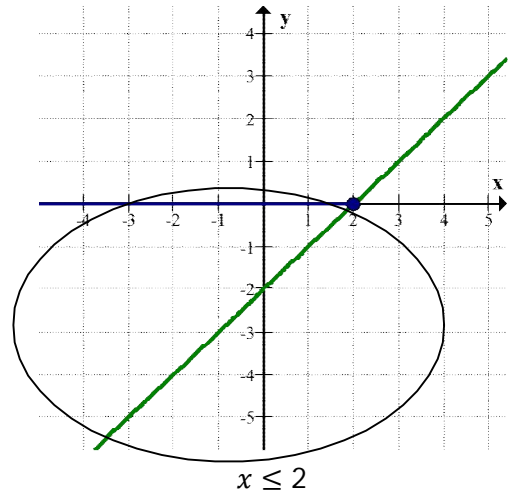
Check Answer

$$x = 0$$

$$x - 2 \leq 0$$

$$0 - 2 \leq 0$$

$$-2 \leq 0$$



$$-x^2 + 5x - 4 < 0$$

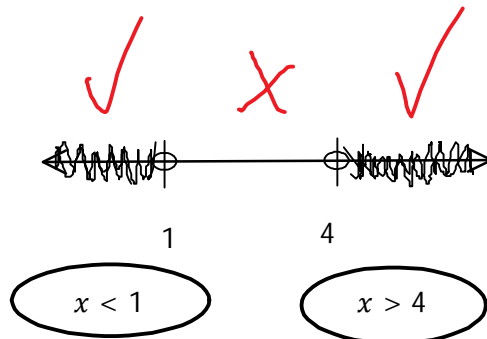
$$-x^2 + 5x - 4 < 0$$

$$-(x^2 - 5x + 4) < 0$$

$$(x - 4)(x - 1) > 0$$

$$\begin{array}{l} x - 4 = 0 \\ x = 4 \end{array}$$

$$\begin{array}{l} x - 1 = 0 \\ x = 1 \end{array}$$



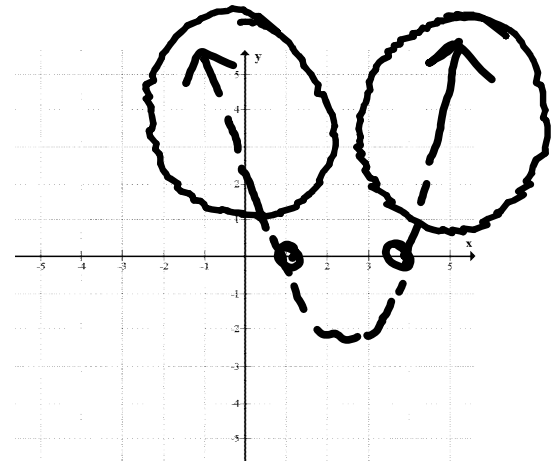
Check Answer

$$x = 0$$

$$-x^2 + 5x - 4 < 0$$

$$0 + 0 - 5 < 0$$

$$-5 < 0$$



The only time you may not check your answer with X equals zero is when the wrath goes through X equals zero

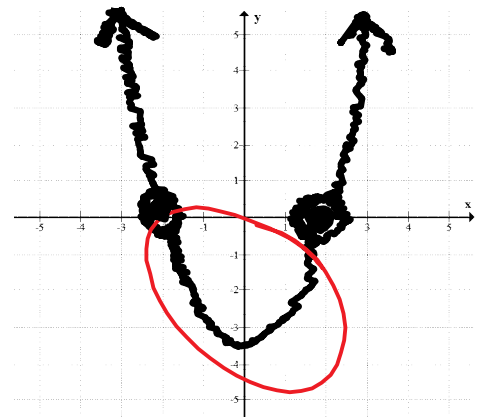
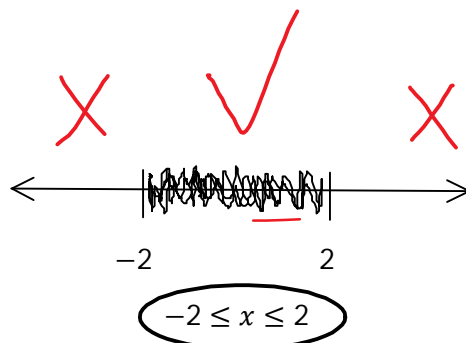
$$x^2 - 4 \leq 0$$

$$x^2 - 4 \leq 0$$

$$(x + 2)(x - 2) \leq 0$$

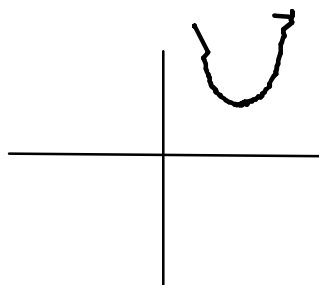
$$\begin{array}{l} x + 2 = 0 \\ x = -2 \end{array}$$

$$\begin{array}{l} x - 2 = 0 \\ x = 2 \end{array}$$



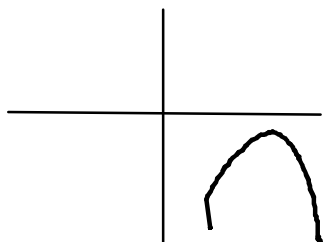
The answer is only shading a number line and domain. The graph is only to help. There is no y involved.

# C11 - 9.2 - Inequalities In One Variable Notes



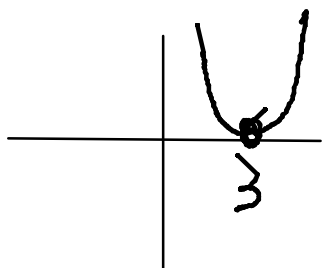
$$(x - 2)^2 + 1 \geq 0 \quad x \in \mathbb{R}$$

$$(x - 2)^2 + 1 \leq 0 \quad \neq$$



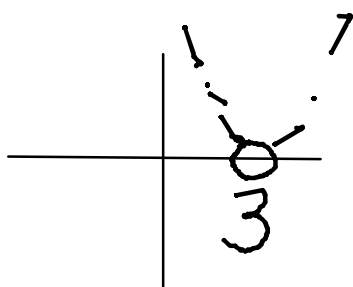
$$-(x - 2)^2 - 1 > 0 \quad \neq$$

$$-(x - 2)^2 - 1 < 0 \quad x \in \mathbb{R}$$



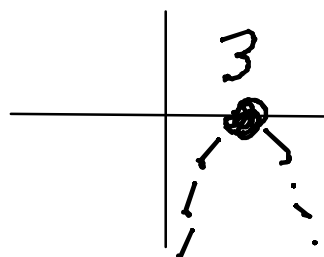
$$(x - 3)^2 \geq 0 \quad x \in \mathbb{R}$$

$$(x - 3)^2 \leq 0 \quad x = 3$$



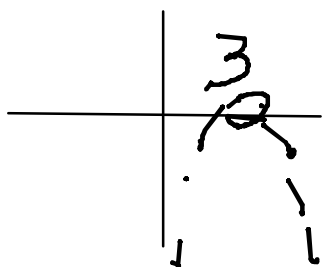
$$(x - 3)^2 > 0 \quad x < 3 \quad x > 3$$

$$(x - 3)^2 < 0 \quad \neq$$



$$-(x - 3)^2 \geq 0 \quad x = 3$$

$$-(x - 3)^2 \leq 0 \quad x \in \mathbb{R}$$



$$-(x - 3)^2 > 0 \quad \neq$$

$$-(x - 3)^2 < 0 \quad x < 3 \quad x > 3$$

# C11 - 9.3 - Quadratic Inequalities in Two Variables Notes

$$y \leq x^2 - 4$$

1. Graph:  $y = x^2 - 4$  (Solid line)

2. Zero-zero test. (0,0)

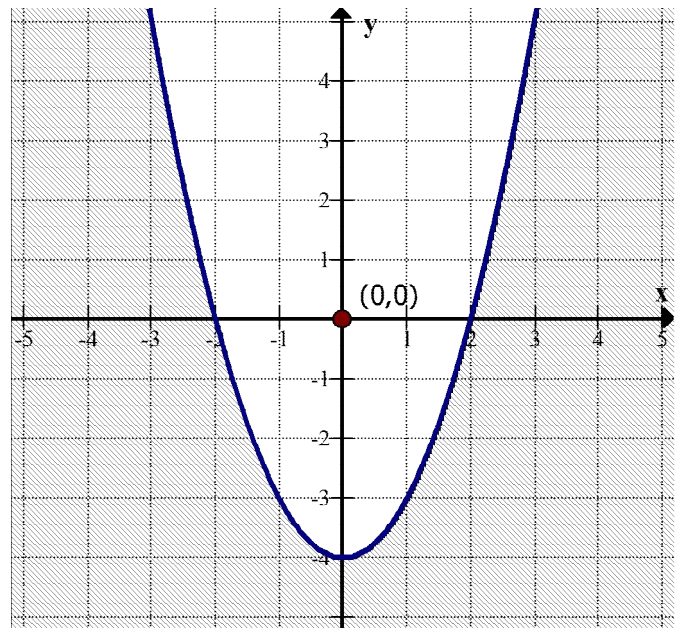
- Substitute zero in for  $x$  and  $y$ .

$$y \leq x^2 - 4$$

$$0 \leq 0^2 - 4$$

$$0 \leq -4 \quad \times$$

Incorrect: Shade "NOT" the (0,0) side of the line.



$$y > x^2 - 4$$

1. Graph  $y = x^2 - 4$  (Dotted Line)

2. Zero-zero test: (0,0)

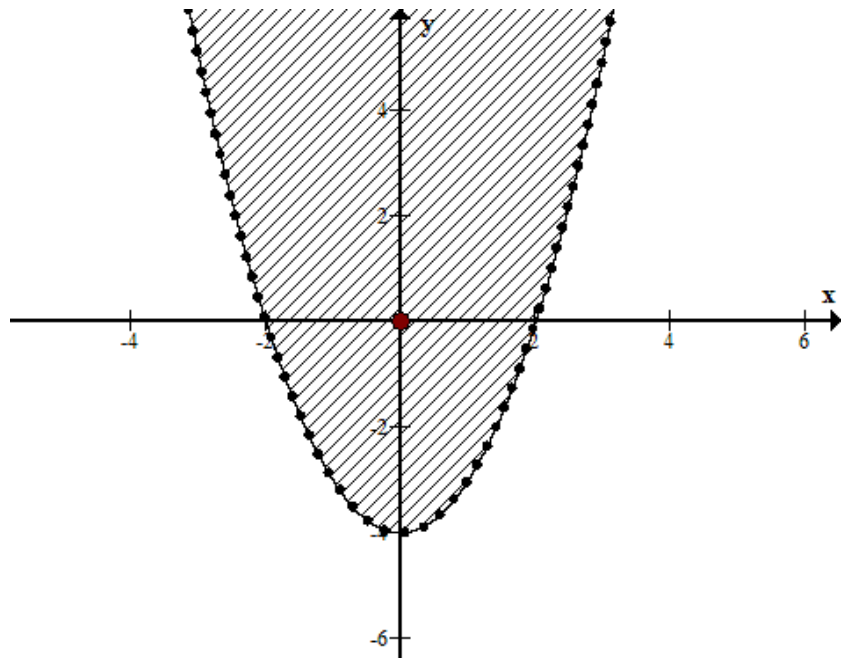
- Substitute zero for  $x$  and  $y$ .

$$y > x^2 - 4$$

$$0 > 0 - 4$$

$$0 > -4 \quad \checkmark$$

Correct: Shade the (0,0) side of the line.

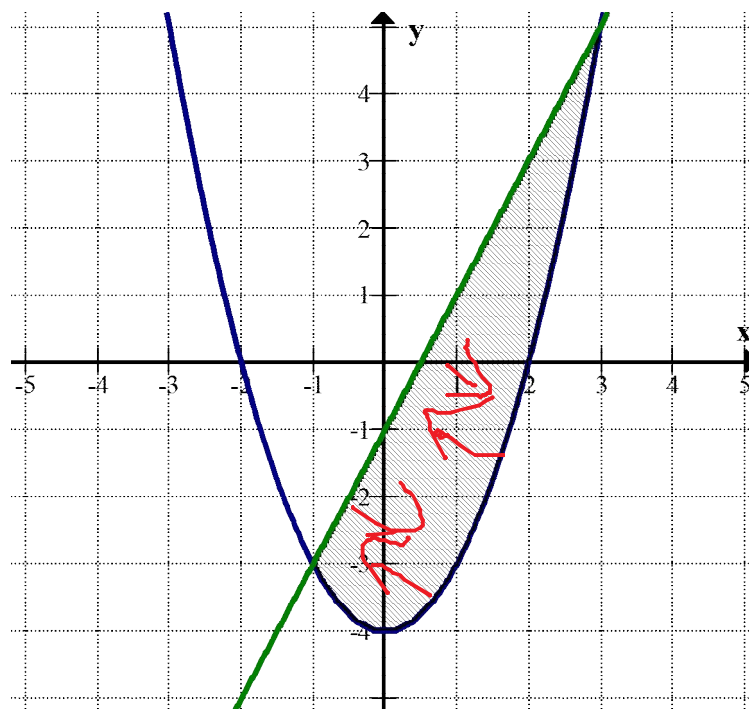
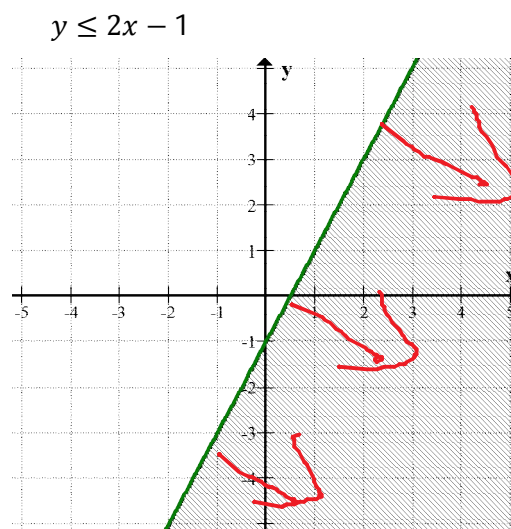
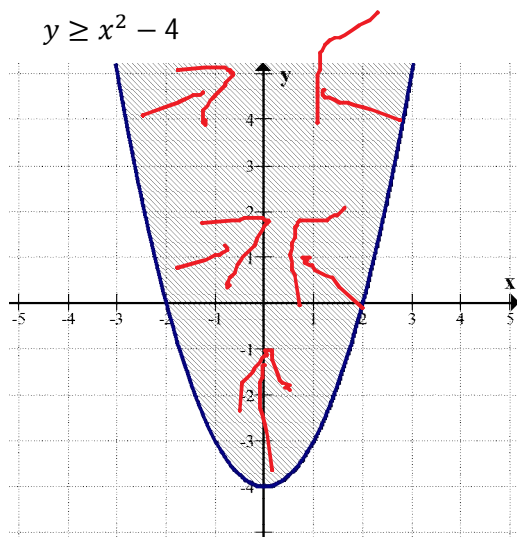


## C11 - 9.1,9.3 - Inequalities Systems Notes

Solve the following system by graphing:

$$y \geq x^2 - 4 \quad (1)$$

$$y \leq 2x - 1 \quad (2)$$



Notice: we have graphed each equation and shaded only the region which satisfies both inequalities using the (0,0) test.