Topic 5 Systems of Equations and Inequalities

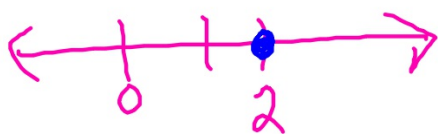# Mastery 8.7: Systems of Inequalities

Mastery Quiz 9 Corresponding Mastery Points:

- 8.7: Graph inequalities.
- 8.7: Graph systems nonlinear inequalities.

Systems of Equations have a <u>finite</u> number of solutions.

Systems of Inequalities have <u>infinite</u> Solutions. That is why we use a <u>graph and shading</u> to represent solutions to inequalities.
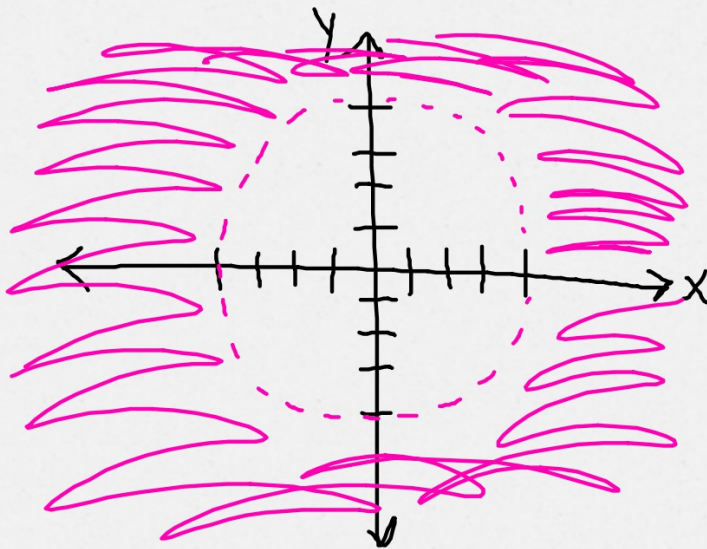
<u>Ex:</u> $X = 2$

$X < 2$

Example 1: Graphing a Strict Nonlinear Inequality in Two Variables

Graph the inequality $x^2 + y^2 > 16$

Circle with center @ (0,0) and radius of 4

Your Turn
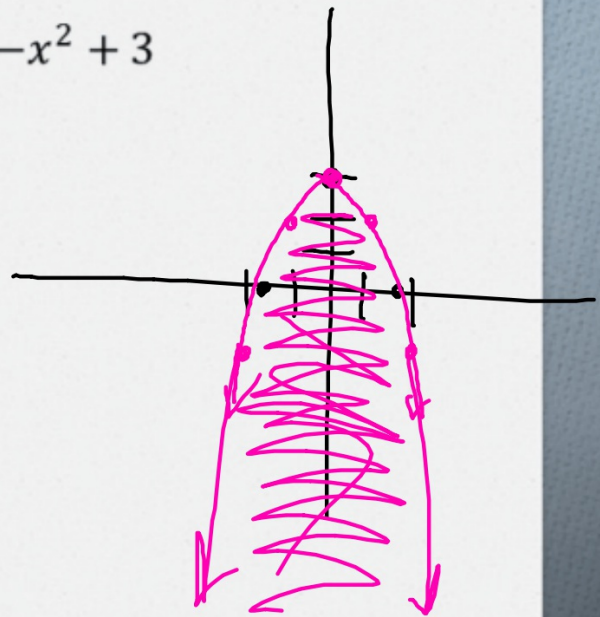
Graph the inequality $y \leq -x^2 + 3$

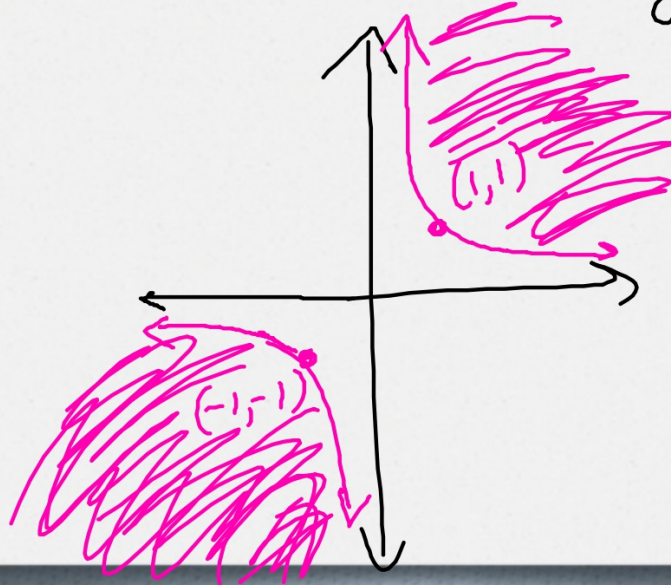vertex: $(0,3)$

x-ints: $-x^2 + 3 = 0$

$-x^2 = -3$

$x^2 = 3$

$x = \pm\sqrt{3}$

X	Y
-2	-1
-1	2
0	3
1	2
2	-1

Example 2: Graphing a Nonstrict Nonlinear Inequality in Two Variables

Graph the inequality $xy \geq 1$ $\rightarrow$ $y \geq \frac{1}{x}$
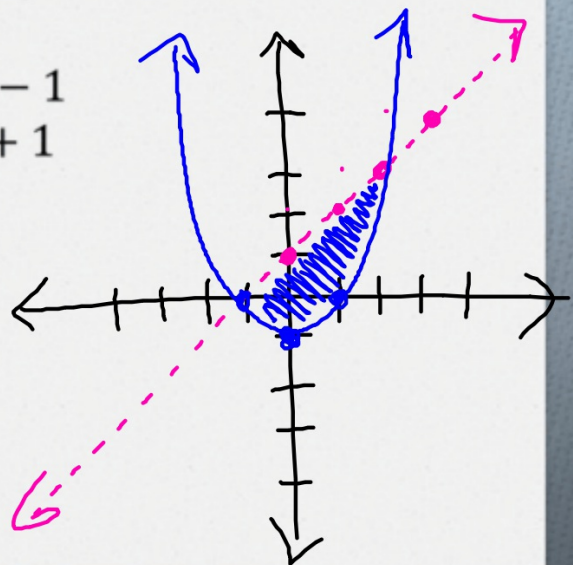
(hyperbola)

Example 3: Graphing a System of Inequalities

Graph the solution to the system of inequalities:

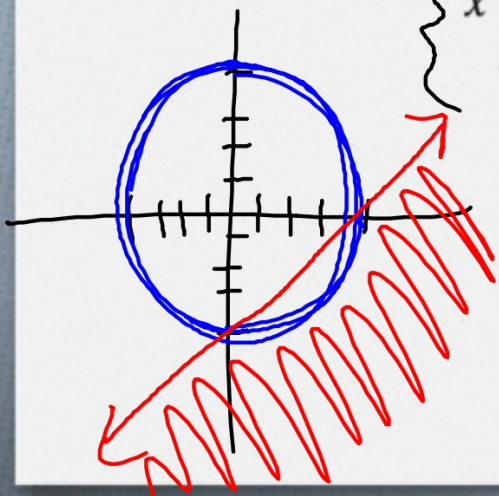$$\begin{cases} y \geq x^2 - 1 \\ y < x + 1 \end{cases}$$

vertex: $(0, -1)$

X-int's: $x^2 - 1 = 0$

$x^2 = 1$

$x = \pm 1$

Your Turn

Graph the solution to the system of inequalities:

$$\begin{cases} x^2 + y^2 \geq 16 \\ x - y \geq 4 \end{cases}$$
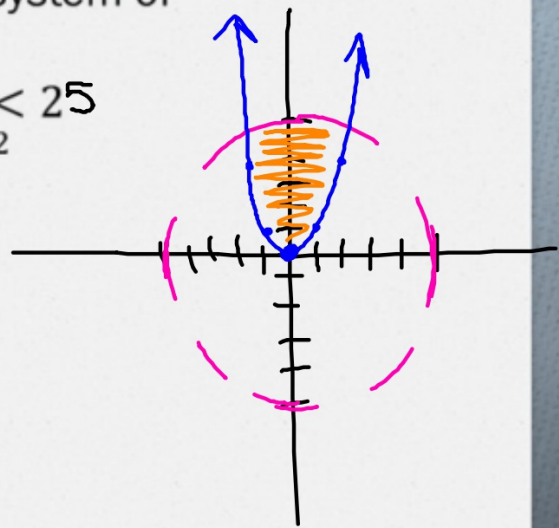
circle with center $(0,0)$ and $r=4$

$-y \geq -x + 4$

$y \leq x - 4$

Example 4: Solving a System of Nonlinear Inequalities

Graph the solution to the system of inequalities:

$$\begin{cases} x^2 + y^2 < 25 \\ y \geq x^2 \end{cases}$$

Your Turn

Graph the solution to the system of inequalities:

$$\begin{cases} xy \geq 6 \\ y \geq x^2 + 2 \end{cases}$$

X	Y
1	6
2	3
3	2
6	1
-1	-6
-2	-3
-3	-2
-6	-1