

5C: Systems of Inequalities with 2 Vars.

Graphing Systems of Inequalities

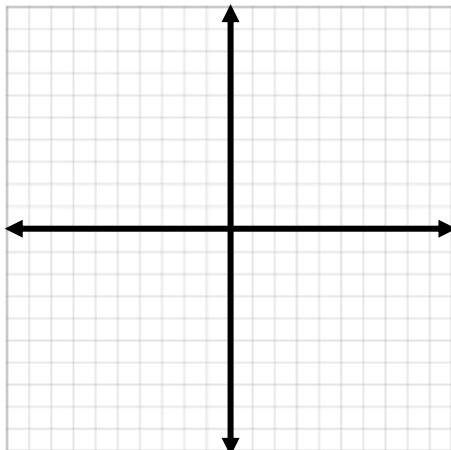
Steps for graphing inequalities:

1. Graph the equation represented by the inequality
2. Decide if it's dotted ($<$ or $>$) or solid ($\leq$ or $\geq$)
3. Test point(s) in the inequality to find the shaded region.

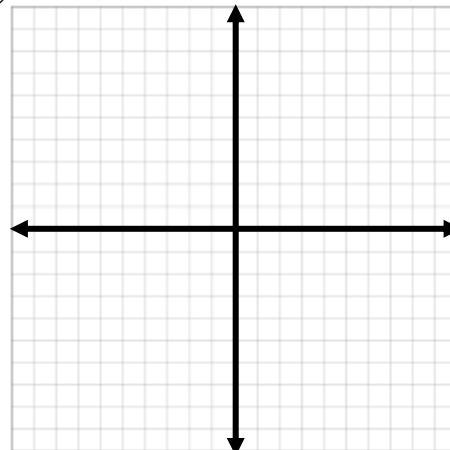
Systems of Inequalities: graph all inequalities and shade the overlapping regions, this represents the solutions to the system.

Example Solve the system of inequalities by graphing.

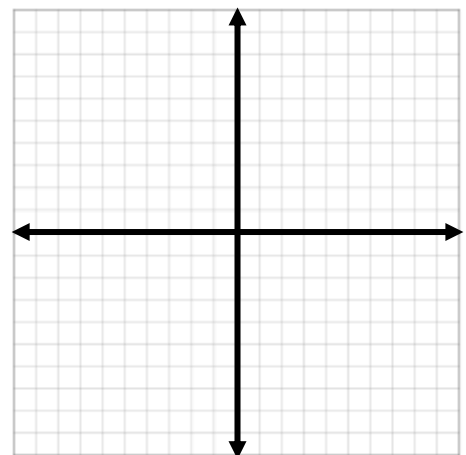
$$\begin{aligned} y &\leq x + 2 \\ y &> x^2 \end{aligned}$$



$$\begin{aligned} y &\geq x + 2 \\ y &< x^2 \end{aligned}$$



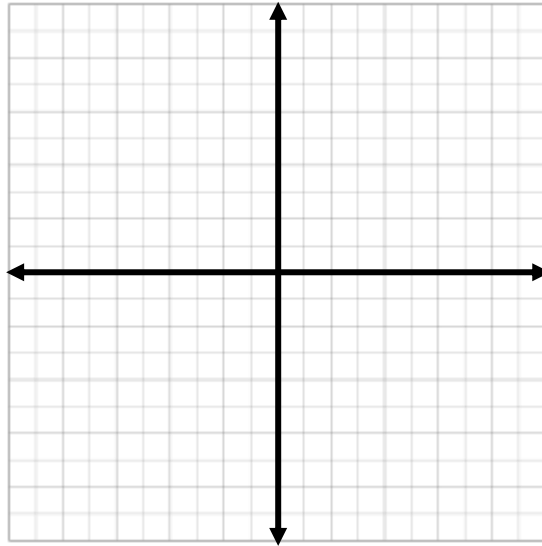
Explore Find all the integers coordinates (x, y) that satisfy the equation $x^2 + y^2 = 5^2$.
(Hint: think about the Pythagorean Theorem.)
Graph these points.
What shape would you get if you find all the non-integer solutions as well?



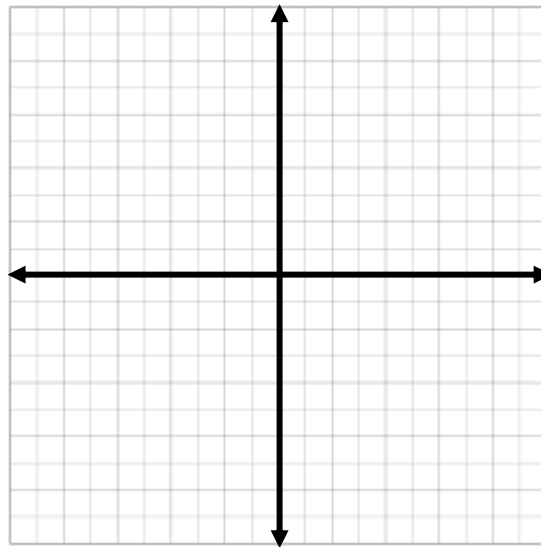
The **equation of a circle** centered at the origin with radius r is : $x^2 + y^2 = r^2$

Example Solve the system of inequalities by graphing.

$$\begin{aligned}x^2 + y^2 &\leq 36 \\ y &> x - 3 \\ y &< x + 3\end{aligned}$$



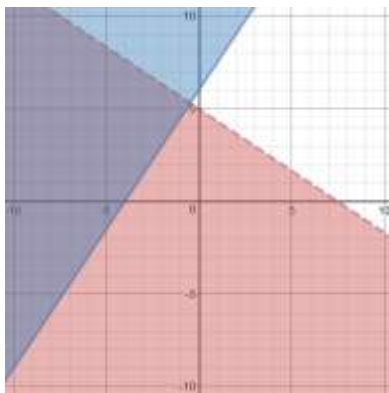
$$\begin{aligned}x^2 + y^2 &> 4 \\ y &\geq x^2\end{aligned}$$



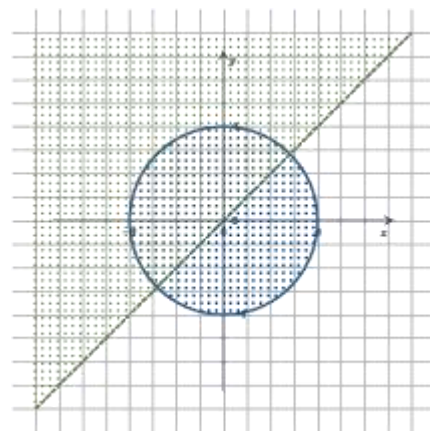
5C Assignment: Systems of Inequalities

Graph the system of inequalities and shade the solution.

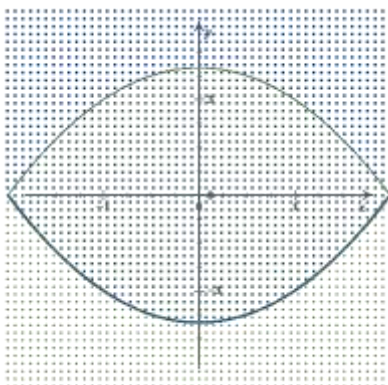
1. $2x + 3y < 15$
 $-6x + 4y \geq 24$



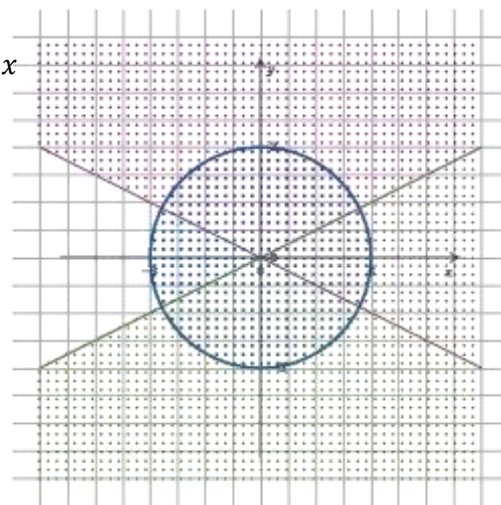
4. $x^2 + y^2 \leq 16$
 $y > x$



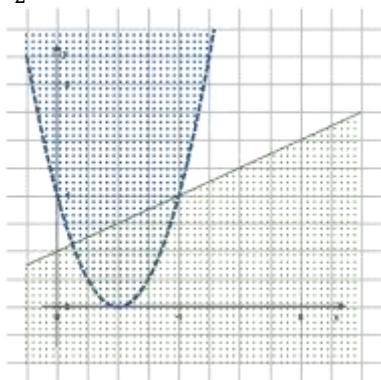
2. $y \geq x^2 - 4$
 $y \leq -x^2 + 4$



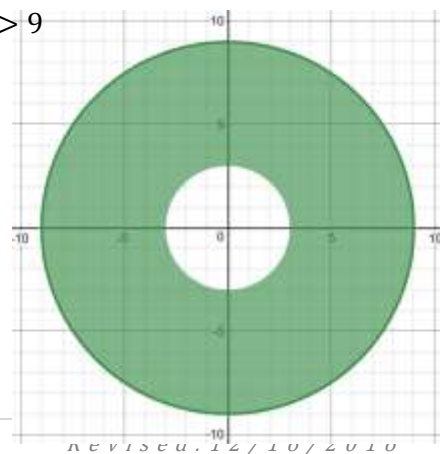
5. $x^2 + y^2 \leq 9$
 $y \leq \frac{1}{2}x$
 $y \geq -\frac{1}{2}x$



3. $y > (x - 2)^2$
 $y \leq \frac{1}{2}x + 2$

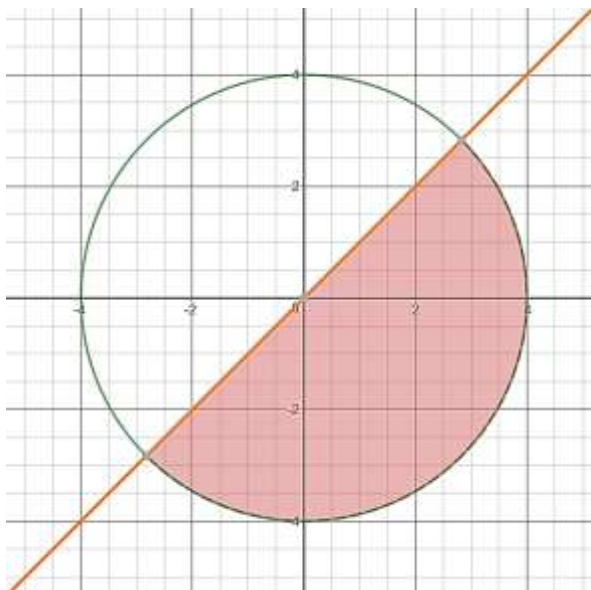


6. $x^2 + y^2 \leq 81$
 $x^2 + y^2 > 9$



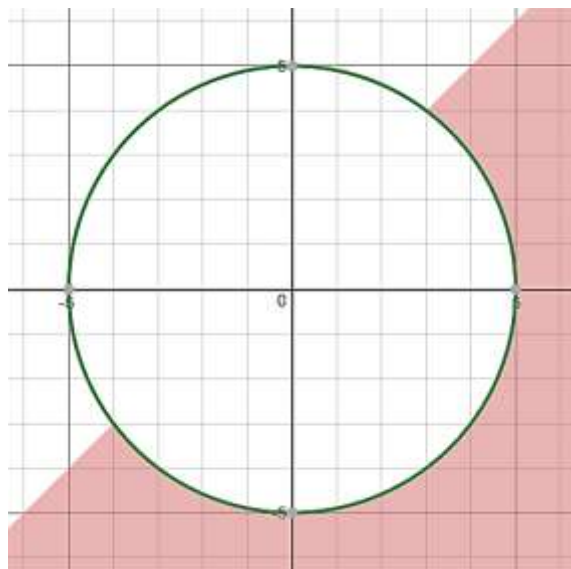
Write the system of inequalities represented by these graphs

6.



$$\begin{cases} x^2 + y^2 \leq 16 \\ y \leq x \end{cases}$$

7.



$$\begin{cases} x^2 + y^2 \geq 25 \\ y \leq x + 1 \end{cases}$$

8. Graph this system of inequalities. You will need to factor the first inequality. Shade the solution clearly.

$$y \geq x^4 - 5x^2 + 4$$

$$y < x^2 + 2$$

Check your graph on desmos by typing.

$$y \geq x^4 - 5x^2 + 4 \quad \{y < x^2 + 2\}$$

9. Use Desmos to find a system of inequalities that makes a cool logo or graphical design.

