

HAT 2/15/18
Solving Quadratic Systems

Name: _____

Find the points of intersection. A sketch will help you ensure you have found all points of intersection.

1.
$$\begin{aligned}x^2 - y &= 5 \\ -3x + y &= -7\end{aligned}$$

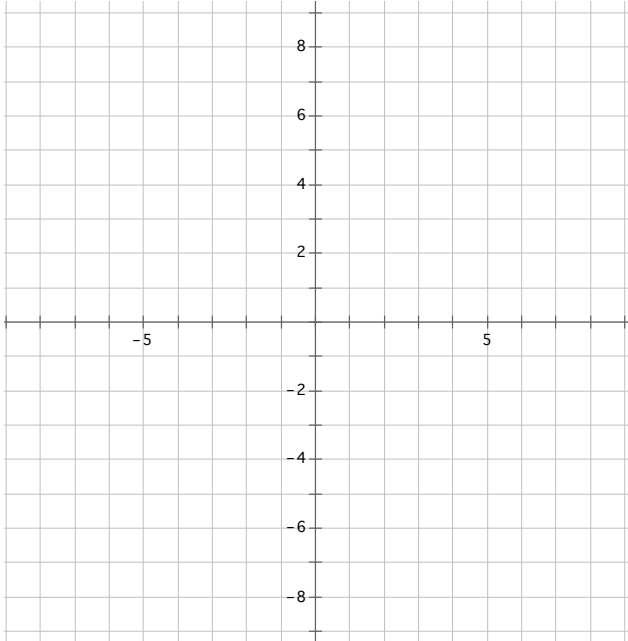
2.
$$\begin{aligned}9x^2 + 4y^2 &= 36 \\ -x + y &= -4\end{aligned}$$

3.
$$\begin{aligned}\frac{(x+1)^2}{8} + \frac{y^2}{4} &= 1 \\ y^2 &= -4x\end{aligned}$$

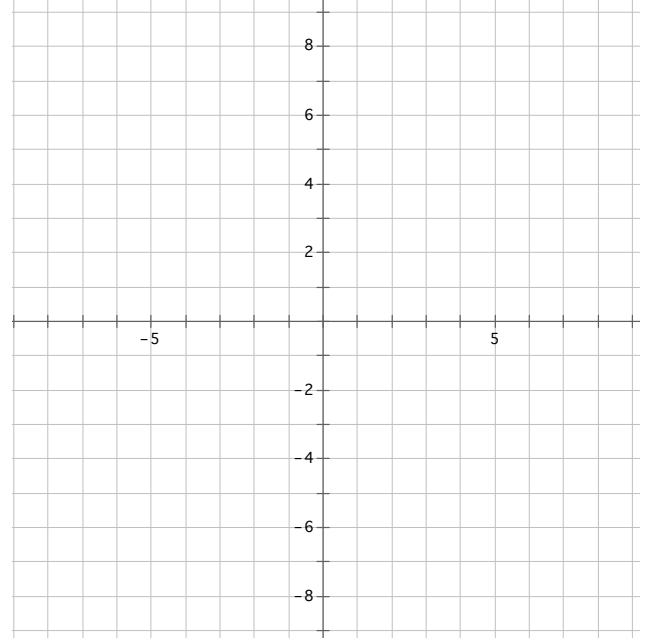
4.
$$\begin{aligned}x^2 + 4x + y^2 + 4 &= 4 \\ x^2 + y^2 - 2x &= 0\end{aligned}$$

Solve the system of inequalities by graphing.

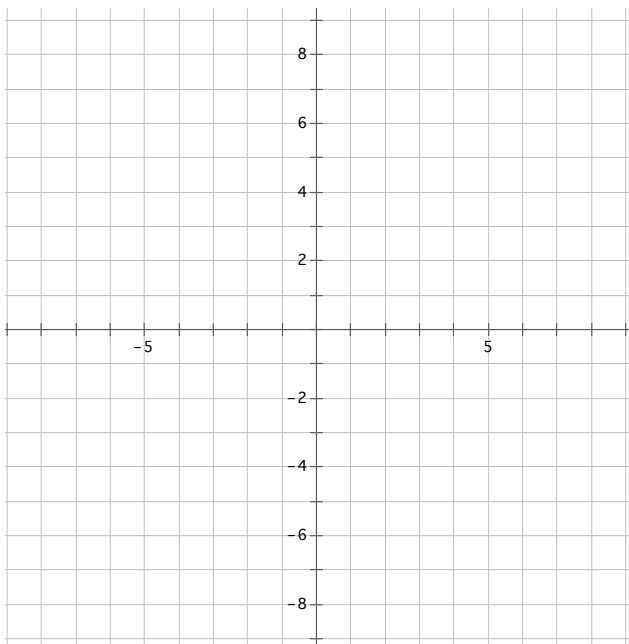
5. $x^2 + y^2 \leq 49$
 $x^2 - 4y^2 > 16$



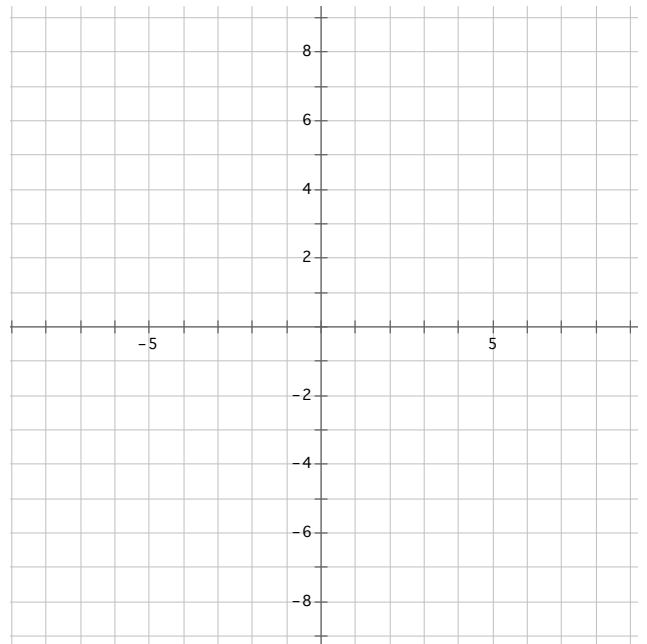
6. $x > y^2 + 1$
 $x^2 + y^2 \leq 9$



7. $8y^2 - 3x^2 \leq 24$
 $2y > x^2 - 8x + 14$



8. $12x^2 - 4y^2 \geq 48$
 $16(x-4)^2 + 25y^2 < 400$



Write a system of equations that satisfies each condition:

9. A parabola and an ellipse that intersect at 2 points.

10. A circle and an ellipse that intersect at 1 point.

11. A hyperbola and a circle that intersect at 4 points.

12. The shape of a paintball field is modeled by $x^2 + 4y^2 = 10,000$ in yards where the center of the field is at the origin. The teams are provided with short range walkie-talkies with a maximum range of 80 yards. Are the teams capable of hearing each other anywhere on the field?

13. Find all values of k for which the following system of equations has 2 solutions.

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \quad x^2 + y^2 = k^2$$

14. Lena is moving to a new city and needs for the location of her new home to satisfy the following conditions:
- If must be less than 10 miles from the office where she will work.
 - Because of the terrible smell of the local paper mill, it must be at least 15 miles away from the mill.

If the paper mill is located 9.5 miles east and 6 miles north of Lena's office, write and graph a system of inequalities to represent the area(s) where she should look for a new home.

15. Solve the system.

$$x^2 + 3y^2 = 16$$

$$3x^2 + y^2 = 16$$

$$y = -x$$