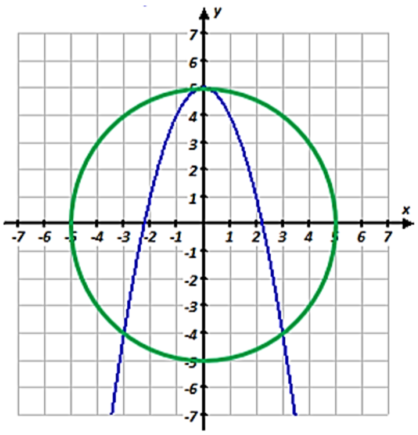
Systems of Equations with Conics Name: ______________________________ Block: __

Find all the solutions to the following conic system of equations by graphing.

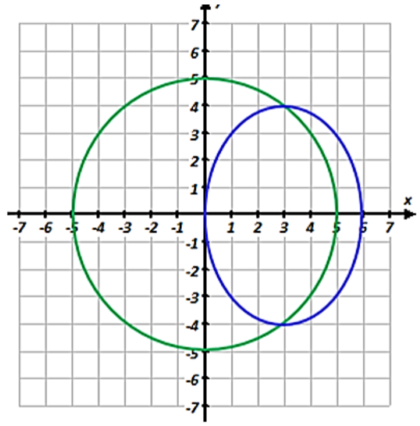
1.

$$x^2 + y^2 = 25$$
$$-x^2 + 5 = y$$



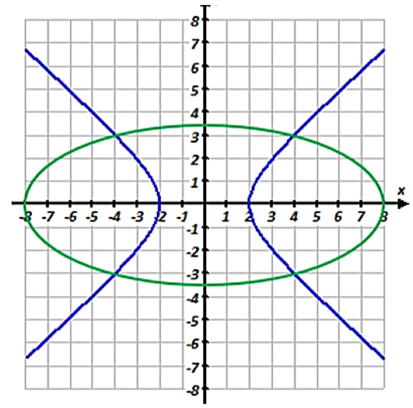
2.

$$x^2 + y^2 = 25$$
$$\frac{(x-3)^2}{9} + \frac{y^2}{16} = 1$$



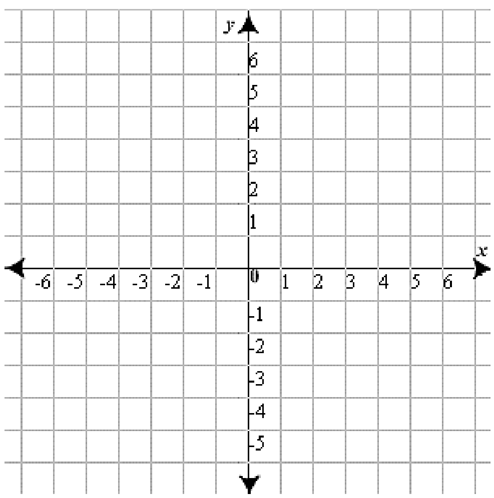
3.

$$\frac{x^2}{64} + \frac{y^2}{12} = 1$$
$$\frac{x^2}{4} - \frac{y^2}{3} = 1$$



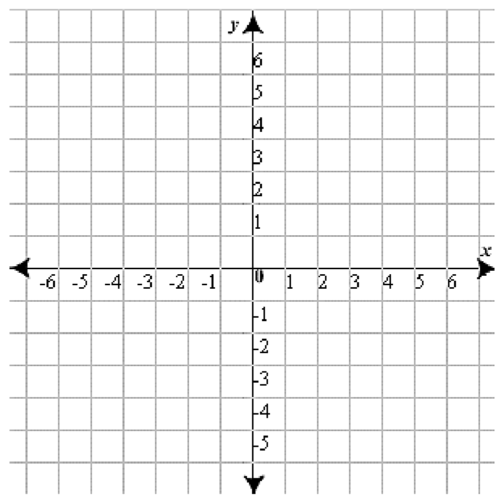
4.

$$y = x^2 - 2$$
$$x^2 + y^2 = 9$$



5.

$$\frac{x^2}{4} + \frac{(y-1)^2}{25} = 1$$
$$\frac{y^2}{16} - \frac{x^2}{4} = 1$$



Solve each system by the substitution method.

6.

$$\begin{cases} x + y = 2 \\ y = x^2 - 4 \end{cases}$$

7.

$$\begin{cases} y = x^2 - 4x - 10 \\ y = -x^2 - 2x + 14 \end{cases}$$

8.

$$\begin{cases} y^2 = x^2 - 9 \\ 2y = x - 3 \end{cases}$$

9.

$$\begin{cases} x + y = 1 \\ (x-1)^2 + (y+2)^2 = 10 \end{cases}$$

Solve each system by the addition method.

10.

$$\begin{cases} x^2 + y^2 = 13 \\ x^2 - y^2 = 5 \end{cases}$$

11.

$$\begin{cases} 4x^2 - y^2 = 4 \\ 4x^2 + y^2 = 4 \end{cases}$$

12.

$$\begin{cases} x^2 - 4y^2 = -7 \\ 3x^2 + y^2 = 31 \end{cases}$$

13.

$$\begin{cases} 3x^2 - 2y^2 = -5 \\ 2x^2 - y^2 = -2 \end{cases}$$

Solve each system by the method of your choice.

14.

$$\begin{cases} 3x^2 + 4y^2 = 16 \\ 2x^2 - 3y^2 = 5 \end{cases}$$

15.

$$\begin{cases} x + y^2 = 4 \\ x^2 + y^2 = 16 \end{cases}$$

16.

$$\begin{cases} 2x^2 + y^2 = 18 \\ xy = 4 \end{cases}$$

17.

$$\begin{cases} x^2 + 4y^2 = 20 \\ xy = 4 \end{cases}$$

18.

$$\begin{cases} x^2 + (y-2)^2 = 4 \\ x^2 - 2y = 0 \end{cases}$$

19.

$$\begin{cases} (x-1)^2 + (y = 1)^2 = 5 \\ 2x - y = 3 \end{cases}$$

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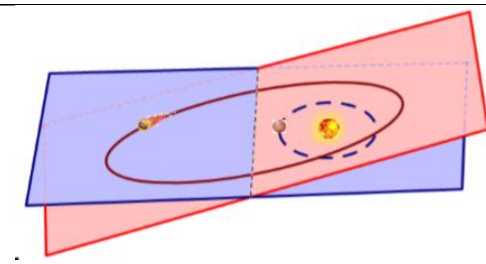
20. The comet 41P and Mars' Orbits come in very close proximity at times. Luckily, their orbits are not in the same plane as shown at the right. The two planes in which each other orbit just miss one another. However, if we look at a top down or orthogonal view of the two orbits we can find where their orthogonal projections intersect and when they could potentially be at one of their closest points to each other if Mars and 41P's timing is just right.



Consider laying out a coordinate grid that goes through the plane in which the orbit of Mars exists. Let's use Astronomical Units (AU) for measurements which represents the mean distance from the Earth to the Sun or roughly 150 million Km

- Let the Sun be located at roughly $(2,0)$ which would be a focal point of the comet's orbital projection
- 41P's orbit could be roughly described by $5.4x^2 + 9.5y^2 = 51.3$
- Mars' orbit could be roughly described by $(x-2)^2 + y^2 = 2.3$

At what coordinate points would the two orbits potentially almost intersect?