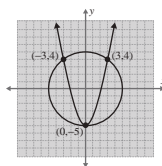
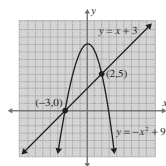
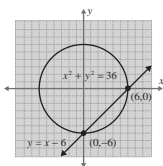


Attention!

In the examples and the exercises, the curves intersect. However, there are many situations where the curves do **not** intersect. This can be confirmed both algebraically and graphically.

Margin Exercise Answers

1. $(0, -6)$ and $(6, 0)$ 2. $(-3, 0)$ and $(2, 5)$ 3. $(0, -5)$, $(-3, 4)$, and $(3, 4)$



12.5 Exercises

Concept Check

Fill-in-the-Blank. Complete each sentence using information found in this section.

- The equations for the conic sections presented in this lesson all have at least one term that is _____-degree.
- If a system of two equations has one nonlinear equation and one linear equation, then the method of _____ should be used to solve the system.
- If a system of two equations has two nonlinear equations, then either the _____ method or the _____ method will work.
- When solving a nonlinear system of equations, the final step is to _____ the curves on the same set of axes.
- Solutions to a system of two equations must satisfy _____ equations.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

- Equations that have at least one second-degree term are called linear equations.
- Graphing a system of equations is useful for approximating solutions.
- Graphing a system of equations will determine the exact number of solutions.
- If a system of equations has two nonlinear equations, the curves must intersect.

Practice

Solve each system of equations. Sketch the graphs.

$$1. \begin{cases} y = x^2 + 1 \\ 2x + y = 4 \end{cases}$$

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

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

$$4. \begin{cases} x^2 + y^2 = 25 \\ y + x + 5 = 0 \end{cases}$$

$$5. \begin{cases} x^2 + y^2 = 20 \\ x - y = 2 \end{cases}$$

$$6. \begin{cases} x^2 - y^2 = 16 \\ 3x + 5y = 0 \end{cases}$$

$$7. \begin{cases} y = x - 2 \\ x^2 = y^2 + 16 \end{cases}$$

$$8. \begin{cases} x^2 + 3y^2 = 12 \\ x = 3y \end{cases}$$

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

$$10. \begin{cases} x^2 + y^2 = 9 \\ x^2 - y + 3 = 0 \end{cases}$$

$$11. \begin{cases} 4x^2 + y^2 = 25 \\ 3x - y^2 + 3 = 0 \end{cases}$$

$$12. \begin{cases} x^2 - 4y^2 = 9 \\ x + 2y^2 = 3 \end{cases}$$

$$13. \begin{cases} x^2 + y^2 + 4x - 2y = 4 \\ x + y = 2 \end{cases}$$

$$14. \begin{cases} x^2 - y^2 = 9 \\ x^2 + y^2 - 2x - 3 = 0 \end{cases}$$

$$15. \begin{cases} x^2 - y^2 = 5 \\ x^2 + 4y^2 = 25 \end{cases}$$

$$16. \begin{cases} 2x^2 - 3y^2 = 6 \\ 2x^2 + y^2 = 22 \end{cases}$$

Solve each system of equations.

$$17. \begin{cases} x^2 - y^2 = 20 \\ x^2 - 9y = 0 \end{cases}$$

$$18. \begin{cases} x^2 + 5y^2 = 16 \\ x^2 + y^2 = 4x \end{cases}$$

$$19. \begin{cases} x^2 + y^2 = 10 \\ x^2 + y^2 - 4y + 2 = 0 \end{cases}$$

$$20. \begin{cases} x^2 + y^2 = 20 \\ 4x + 8 = y^2 \end{cases}$$

$$21. \begin{cases} x^2 + y^2 - 4y = 16 \\ x - y = 0 \end{cases}$$

$$22. \begin{cases} y = x^2 + 2x + 2 \\ 2x + y = 2 \end{cases}$$

$$23. \begin{cases} 4y + 10x^2 + 7x - 8 = 0 \\ 6x - 8y + 1 = 0 \end{cases}$$

$$24. \begin{cases} x^2 + y^2 - 4x + 6y = -3 \\ 2x - y - 2 = 0 \end{cases}$$

$$25. \begin{cases} 2x^2 - y^2 = 7 \\ 2x^2 + y^2 = 29 \end{cases}$$


$$26. \begin{cases} 4x^2 + y^2 = 11 \\ y = 4x^2 - 9 \end{cases}$$

$$27. \begin{cases} x^2 - y^2 - 2y = 22 \\ 2x + 5y + 5 = 0 \end{cases}$$

$$28. \begin{cases} x^2 + y^2 - 6y = 0 \\ 2x^2 - y^2 + 15 = 0 \end{cases}$$

$$29. \begin{cases} y = x^2 - 2x + 3 \\ y = -x^2 + 2x + 3 \end{cases}$$

$$30. \begin{cases} y^2 = x^2 - 5 \\ 4x^2 - y^2 = 32 \end{cases}$$

 Use a graphing calculator to graph and estimate the solution(s) to each system of equations. If necessary, round values to two decimal places.

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

$$32. \begin{cases} y = 1 - x^2 \\ x + y = -4 \end{cases}$$

$$33. \begin{cases} y = 3 - 2x \\ y = (x - 1)^2 \end{cases}$$

$$34. \begin{cases} x^2 + y^2 = 36 \\ y = x + 5 \end{cases}$$

$$35. \begin{cases} x^2 + y^2 = 10 \\ x - y = 1 \end{cases}$$

$$36. \begin{cases} x^2 + y^2 = 4 \\ x^2 - y^2 = 3 \end{cases}$$