Name_____ Date _____

9.6 Solving Nonlinear Systems of Equations

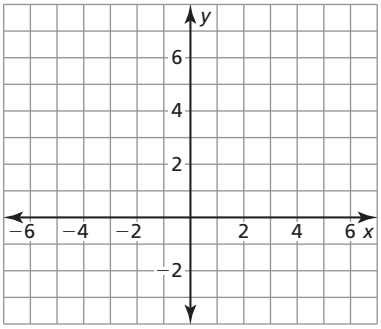
For use with Exploration 9.6

Essential Question How can you solve a system of two equations when one is linear and the other is quadratic?

1 EXPLORATION: Solving a System of Equations

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Solve the system of equations by graphing each equation and finding the points of intersection.



System of Equations

$y = x + 2$ Linear

$y = x^2 + 2x$ Quadratic

2 EXPLORATION: Analyzing Systems of Equations

Work with a partner. Match each system of equations with its graph (shown on the next page). Then solve the system of equations.

a. $y = x^2 - 4$
$y = -x - 2$

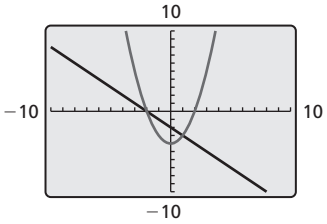
b. $y = x^2 - 2x + 2$
$y = 2x - 2$

c. $y = x^2 + 1$
$y = x - 1$

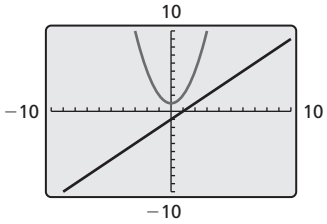
d. $y = x^2 - x - 6$
$y = 2x - 2$

2 EXPLORATION: Analyzing Systems of Equations (continued)

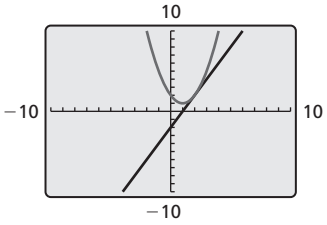
A.



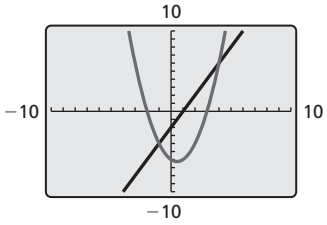
B.



C.



D.



Communicate Your Answer

3. How can you solve a system of two equations when one is linear and the other is quadratic?

4. Write a system of equations (one linear and one quadratic) that has (a) no solutions, (b) one solution, and (c) two solutions. Your systems should be different from those in Explorations 1 and 2.

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9.6 Notetaking with Vocabulary

For use after Lesson 9.6

In your own words, write the meaning of each vocabulary term.

system of nonlinear equations

Notes:

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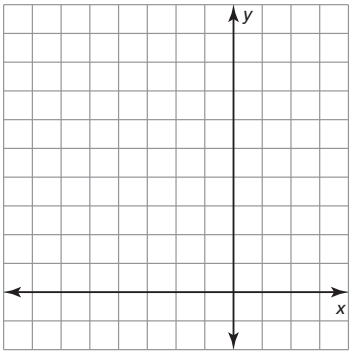
9.6 Notetaking with Vocabulary (continued)

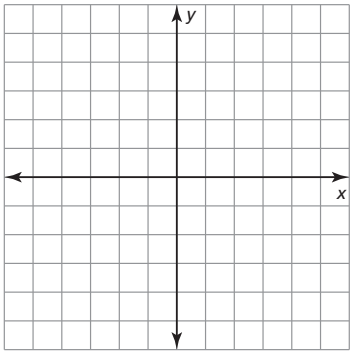
Extra Practice

In Exercises 1–6, solve the system by graphing.

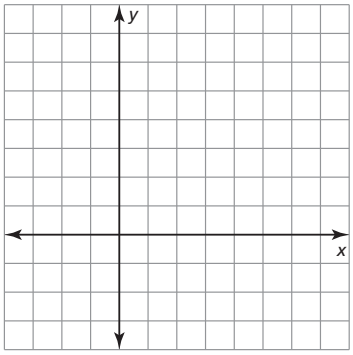
1. $y = x^2 + 5x + 6$
$y = -x + 1$



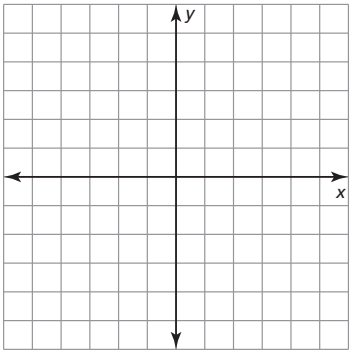
2. $y = x^2 + x - 3$
$y = x + 1$



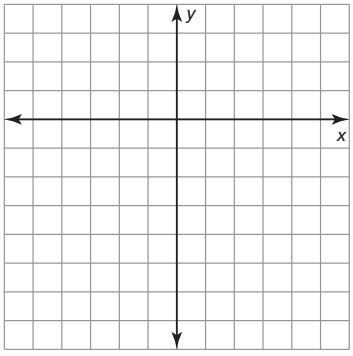
3. $y = \frac{1}{2}x^2 - 2x + 1$
$y = -x + 1$



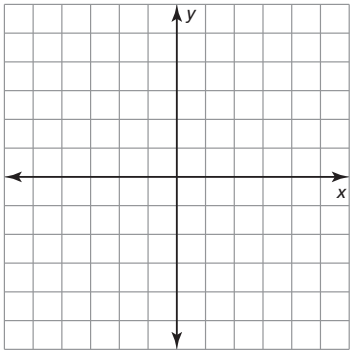
4. $y = -3x^2 - 3x + 2$
$y = 2x$



5. $y = -\frac{1}{3}x^2 + x - 2$
$y = -2$



6. $y = 6x^2 + 3x - 5$
$y = -3x - 5$



In Exercises 7–9, solve the equation by substitution.

7. $y - 2 = x^2$
$y = 6$

8. $y = -2x^2$
$y = 3x + 2$

9. $y = x - 4$
$y = x^2 + 3x - 4$

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9.6 Notetaking with Vocabulary (continued)

In Exercises 10–12, solve the equation by elimination.

10. $y = x^2$
$y = x - 3$

11. $y = x^2 + 3x - 5$
$y = 3x - 1$

12. $y = x^2 + x - 2$
$y = x + 14$

In Exercises 13–18, solve the equation. Round your solution(s) to the nearest hundredth, if necessary.

13. $-6x + 14 = x^2 - 9x + 16$

14. $-x^2 + 4x = -2x + 8$

15. $4x^2 - 9 = 4x - 1$

16. $-\frac{1}{2}x + 1 = -x^2 + 4x$

17. $2x^2 - 4 = -x^2 + 6$

18. $-3\left(\frac{2}{3}\right)^x + 2 = x^2 - 2$