Name _____ Date _____ Class _____

LESSON 10-7

Practice B

Solving Nonlinear Systems

Solve each system of equations by graphing.

1. $\begin{cases} 4x + y = 24 \\ x = \frac{1}{16}y^2 \end{cases}$

2. $\begin{cases} y - 4 = \frac{1}{4}x^2 \\ x + 2y = 12 \end{cases}$

3. $\begin{cases} 9y - 6x = 0 \\ \frac{x^2}{45} + \frac{y^2}{5} = 1 \end{cases}$

Solve each system of equations by using the substitution method.

4. $\begin{cases} x^2 + y^2 = 101 \\ 10x + y = 0 \end{cases}$

5. $\begin{cases} 3y = 4x \\ x^2 - y^2 = -63 \end{cases}$

6. $\begin{cases} 8y = x + 5 \\ x + 5 = \frac{1}{2}y^2 \end{cases}$

7. $\begin{cases} x^2 + y^2 = 34 \\ 3x - 3y = 6 \end{cases}$

8. $\begin{cases} x^2 + y^2 = 5 \\ y + 3 = \frac{1}{2}x^2 \end{cases}$

9. $\begin{cases} x^2 + y^2 = 109 \\ x - 7 = \frac{1}{3}y^2 \end{cases}$

Solve each system of equations by using the elimination method.

10. $\begin{cases} 2x^2 + y^2 = 86 \\ x^2 + 3y^2 = 133 \end{cases}$

11. $\begin{cases} 4x^2 + y^2 = 13 \\ 2x^2 - y^2 = -7 \end{cases}$

12. $\begin{cases} 3x^2 + 2y^2 = 350 \\ 4x^2 - 2y^2 = -98 \end{cases}$

13. $\begin{cases} 8x^2 - 3y^2 = 173 \\ 5x^2 - y^2 = 116 \end{cases}$

14. $\begin{cases} 2x^2 - 3y^2 = 15 \\ 3x^2 - 2y^2 = 341 \end{cases}$

15. $\begin{cases} 5x^2 - 3y^2 = 128 \\ 4x^2 - 2y^2 = 128 \end{cases}$

Solve.

16. The shape of a state park can be modeled by a circle with the equation $x^2 + y^2 = 1600$. A stretch of highway near the park is modeled by the equation $y = \frac{1}{40}(x - 40)^2$. At what points does a car on the highway enter or exit the park?

2. (0, 6), (10, 1)
3. (4, 3), (2, –1)
4. (10, 5), (–10, –5)
5. (8, 2), (–8, –2)
6. (6, 8), (–8, 6)
7. (3, 0), (39, 12)
8. (4, 3), (4, –3), (–4, 3), (–4, –3)
9. (9, 4), (9, –4), (–9, 4), (–9, –4)
10. (1, 10), (1, –10), (–1, 10), (–1, –10)
11. (8, 2), (8, –2), (–8, 2), (–8, –2)

Practice B

1. (9, –12), (4, 8)
2. (2, 5), (–4, 8)
3. (3, 2), (–3, –2)
4. (1, –10), (–1, 10)
5. (9, 12), (–9, –12)
6. (–5, 0), (123, 16)
7. (5, 3), (–3, –5)
8. (2, –1), (–2, –1)
9. (10, 3), (10, –3)
10. (5, 6), (5, –6), (–5, 6), (–5, –6)
11. (1, 3), (1, –3), (–1, 3), (–1, –3)
12. (6, 11), (6, –11), (–6, 11), (–6, –11)
13. (5, 3), (5, –3), (–5, 3), (–5, –3)
14. (9, 7), (9, –7), (–9, 7), (–9, –7)
15. (8, 8), (8, –8), (–8, 8), (–8, –8)
16. (0, 40), (40, 0)

Practice C

1. (–0.5, 2), (1, –4)
2. (4, 5), (–4, –5)
3. (2, 3), (–2, –3)
4. (11, 15), (11, –15)
5. (7, –3), (–7, –3), (11.8, 10), (–11.8, 10)
6. (5, 12), (5, –12)
7. (14, 8)
8. (5, 4), (5, –4), (–5, 4), (–5, –4)
9. $(3 + 2\sqrt{2}, -3)$, $(3 - 2\sqrt{2}, -3)$, (7, 1), (–1, 1)
10. (2, 8), (2, –8), (–2, 8), (–2, –8)
11. (21, 1), (21, –1), (–21, 1), (–21, –1)
12. (15, 7), (15, –7), (–15, 7), (–15, –7)
13. (10, 3), (10, –3), (–10, 3), (–10, –3)
14. (9, 6), (9, –6), (–9, 6), (–9, –6)
15. (7, 2), (7, –2), (–7, 2), (–7, –2)
16. (29.7, 40.2), (29.7, –40.2), (–29.7, 40.2), (–29.7, –40.2)

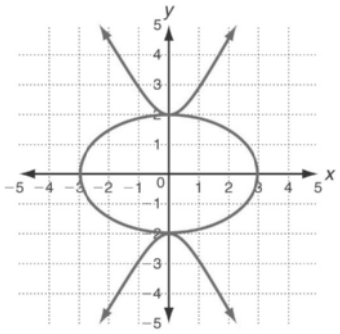
Reteach

1. a. $x^2 = 2y + 12$
   b. $2y + 12 + y^2 = 20$
   c. $y^2 + 2y - 8 = 0$
   d. $y = -4$ or $y = 2$
   e. (–4, 2), (4, 2), (2, –4), (–2, –4)
2. a. $3x^2 = 48$
   b. $x = \pm 4$
   c. $y = \pm 3$
   d. (4, 3), (4, –3), (–4, 3), (–4, –3)

Challenge

1. Up to four points of intersection are possible.
2. Three different satellites will generate three hyperbolas and yield a single point of intersection.
3. (5, 2)
4. (10, –4)
5. (6, 2)

Problem Solving

1. a. Jim's boat: ellipse; the sum of two squared terms; Janice's boat: parabola; only one squared term
   b. 4
   c. $8(x - 2)$
   d. $4x^2 + 72x - 180 = 0$
   e. $x = 2.2$ and -20.2
   f. Yes; points of possible collision are (2.2, 1.3) and (2.2, –1.3)
2. a. 
   b. Yes; point of possible collision is (0, 2)
3. C
4. F