

EXTRA PRACTICE 37
Solving Nonlinear Systems of Equations
Use after Section 13.4

Name _____

Example. Solve: $4y^2 = 16 - 3x^2$,

$$2x^2 = y^2 + 7.$$

$$3x^2 + 4y^2 = 16 \rightarrow 3x^2 + 4y^2 = 16$$

$$2x^2 - y^2 = 7 \rightarrow \underline{8x^2 - 4y^2 = 28} \text{ (Multiplying by 4)}$$

$$11x^2 = 44 \text{ (Adding)}$$

$$x^2 = 4$$

$$x = \pm 2$$

If $x = 2$, $x^2 = 4$, and if $x = -2$, $x^2 = 4$, so substituting 2 or -2 in $2x^2 = y^2 + 7$, we have

$$2 \cdot 4 = y^2 + 7$$

$$1 = y^2$$

$$\pm 1 = y$$

The solutions are $(2,1)$, $(-2,1)$, $(2,-1)$, and $(-2,-1)$.

Solve.

1. $x^2 + y^2 = 20$,
 $xy = 8$

2. $x^2 + y^2 = 49$,
 $x^2 - y^2 = 49$

3. $x^2 - 25 = -y^2$,
 $y - x = 1$

4. $x^2 + y^2 = 82$,
 $xy = -9$

5. $x^2 + 4y^2 = 16$,
 $2y = 4 - x$

6. $x^2 + y^2 = 41$,
 $5x - 4y = 0$

7. $25x^2 + y^2 = 100$,
 $10x + 2y = 20$

8. $x^2 = 36 - y^2$,
 $x^2 = 36 + y^2$

9. $y^2 - 3x^2 = 25$,
 $3x^2 + y^2 = 25$

10. $x^2 + y^2 = 34$,
 $y - x = 2$

11. $x^2 - y = 8$,
 $x^2 + y^2 = 20$

12. $x^2 + y^2 = 64$,
 $y^2 = x + 8$

EXTRA PRACTICE 37**Solving Nonlinear Systems of Equations****Use after Section 13.4**

13. A rectangle has perimeter 170 cm, and the length of a diagonal is 65 cm. What are its dimensions? _____
14. The area of a rectangle is $12\sqrt{2}$ m². The length of a diagonal is $\sqrt{34}$ m. Find the dimensions. _____
15. The product of two numbers is -44 . The sum of their squares is 137. Find the numbers.

16. The sum of the squares of two positive numbers is 89. Their difference is 3. What are the numbers? _____
17. The sum of the squares of two positive integers is 58. Their difference is 4. What are the integers? _____
18. The perimeter of a rectangle is 44 m and the area is 105 m². What are the dimensions of the rectangle? _____
19. The product of two numbers is $\frac{1}{6}$. The sum of their squares is $\frac{13}{36}$. Find the numbers.

20. The area of a rectangle is 0.48 cm². The length of a diagonal is 1.0 cm. Find the dimensions of the rectangle. _____