3.6 Exercise Set

FOR EXTRA HELP

Concept Reinforcement *Complete each of the following statements.*

1. A(n) matrix is a rectangular array of numbers.
2. The rows of a matrix are horizontal and the columns are vertical.
3. Each number in a matrix is called a(n) entry or element.
4. The plural of the word matrix is matrices.
5. As part of solving a system using matrices, we can interchange any two rows.
6. In the final step of solving a system of equations, the leftmost column has zeros in all rows except the first one.

Solve using matrices.

7. $x + 2y = 11$, $3x - y = 5$ $(3, 4)$
8. $x + 3y = 16$, $6x + y = 11$ $(1, 5)$
9. $x + 4y = 8$, $3x + 5y = 3$ $(-4, 3)$
10. $x + 4y = 5$, $-3x + 2y = 13$ $(-3, 2)$
11. $6x - 2y = 4$, $7x + y = 13$ $\left(\frac{3}{2}, \frac{5}{2}\right)$
12. $3x + 4y = 7$, $-5x + 2y = 10$ $\left(-1, \frac{5}{2}\right)$
13. $3x + 2y + 2z = 3$, $x + 2y - z = 5$, $2x - 4y + z = 0$ $\left(2, \frac{1}{2}, -2\right)$
14. $4x - y - 3z = 19$, $8x + y - z = 11$, $2x + y + 2z = -7$ $\left(\frac{3}{2}, -4, -3\right)$
15. $a - 2b - 3c = 3$, $2a - b - 2c = 4$, $4a + 5b + 6c = 4$ $(2, -2, 1)$
16. $x + 2y - 3z = 9$, $2x - y + 2z = -8$, $3x - y - 4z = 3$ $(-1, 2, -2)$
17. $3u + 2w = 11$, $v - 7w = 4$, $u - 6v = 1$ $\left(4, \frac{1}{2}, -\frac{1}{2}\right)$
18. $4a + 9b = 8$, $8a + 6c = -1$, $6b + 6c = -1$ $\left(\frac{1}{2}, \frac{2}{3}, -\frac{5}{6}\right)$
19. $2x + 2y - 2z - 2w = -10$, $w + y + z + x = -5$, $x - y + 4z + 3w = -2$, $w - 2y + 2z + 3x = -6$ $(1, -3, -2, -1)$
20. $-w - 3y + z + 2x = -8$, $x + y - z - w = -4$, $w + y + z + x = 22$, $x - y - z - w = -14$ $(7, 4, 5, 6)$

Solve using matrices.

21. *Coin Value.* A collection of 42 coins consists of dimes and nickels. The total value is \$3.00. How many dimes and how many nickels are there?
Dimes: 18; nickels: 24
22. *Coin Value.* A collection of 43 coins consists of dimes and quarters. The total value is \$7.60. How many dimes and how many quarters are there?
Dimes: 21; quarters: 22
23. *Snack Mix.* Bree sells a dried-fruit mixture for \$5.80 per pound and Hawaiian macadamia nuts for \$14.75 per pound. She wants to blend the two to get a 15-lb mixture that she will sell for \$9.38 per pound. How much of each should she use?
Dried fruit: 9 lb; macadamia nuts: 6 lb
24. *Mixing Paint.* Higher quality paint typically contains more solids. Grant has available paint that contains 45% solids and paint that contains 25% solids. How much of each should he use to create 20 gal of paint that contains 39% solids?
45% paint: 14 gal; 25% paint: 6 gal
25. *Investments.* Elena receives \$212 per year in simple interest from three investments totaling \$2500. Part is invested at 7%, part at 8%, and part at 9%. There is \$1100 more invested at 9% than at 8%. Find the amount invested at each rate.
\$400 at 7%; \$500 at 8%; \$1600 at 9%
26. *Investments.* Alejandro receives \$306 per year in simple interest from three investments totaling \$3200. Part is invested at 8%, part at 9%, and part at 10%. There is \$1900 more invested at 10% than at 9%. Find the amount invested at each rate.
\$500 at 8%; \$400 at 9%; \$2300 at 10%
27. TW Explain how you can recognize dependent equations when solving with matrices.
28. TW Explain how you can recognize an inconsistent system when solving with matrices.

SKILL REVIEW

To prepare for Section 3.7, review order of operations (Section 1.2).

Simplify. [1.2]

29. $5(-3) - (-7)4$ 13
30. $8(-5) - (-2)9$ -22
31. $-2(5 \cdot 3 - 4 \cdot 6) - 3(2 \cdot 7 - 15) + 4(3 \cdot 8 - 5 \cdot 4)$ 37
32. $6(2 \cdot 7 - 3(-4)) - 4(3(-8) - 10) + 5(4 \cdot 3 - (-2)7)$ 422