Answers for 3.6

For use with pages 199–202

3.6 Skill Practice

1. columns; rows

2. Multiply the first element in the first row of A by the first element in the first column of B. Add this value to the product of the second element in the first row of A and the second element in the first column of B. Continue for the rest of the elements in the first row of A and the first column of B.

3. defined; 2×2

4. defined; 3×2

5. not defined

6. defined; 1×3

7. not defined

8. defined; 2×5

9. A **10.** $\begin{bmatrix} 8 \end{bmatrix}$

11. $\begin{bmatrix} -2 & 1 \\ -8 & 4 \end{bmatrix}$

12. Not possible; the number of columns in the first matrix does not equal the number of rows in the second matrix.

13. $\begin{bmatrix} -12 & 15 \\ 8 & -4 \end{bmatrix}$ **14.** $\begin{bmatrix} -15 & 10 \\ 18 & -6 \end{bmatrix}$

15. $\begin{bmatrix} 11 & 35 \\ 8 & 0 \\ -9 & 7 \end{bmatrix}$

16. Not possible; the number of columns in the first matrix does not equal the number of rows in the second matrix.

17. $\begin{bmatrix} 21 & -8 \\ 74 & -50 \end{bmatrix}$ **18.** $\begin{bmatrix} -15 & 52 & -10 \\ -12 & 39 & -21 \\ 21 & -67 & 43 \end{bmatrix}$

19. The multiplication should be row 1 of the left matrix by column 1 of the right matrix; $3(7) + (-1)(1) = 20$.

20. The multiplication should be row 1 of the left matrix by column 1 of the right matrix; $2(4) + 5(3) = 23$.

21. B

22. $\begin{bmatrix} -36 & 33 \\ 48 & -30 \end{bmatrix}$ **23.** $\begin{bmatrix} 21 & -6 \\ -14 & 1 \end{bmatrix}$

24. $\begin{bmatrix} -54 & 23 \\ 44 & -12 \end{bmatrix}$ **25.** $\begin{bmatrix} -10 & 7 \\ -8 & 10 \end{bmatrix}$

26. $\begin{bmatrix} 30 & 9 & -28 \\ -24 & 18 & 48 \\ 5 & 11 & 29 \end{bmatrix}$

27. $\begin{bmatrix} -2 & 4 & 0 \\ 5 & 15 & 8 \\ -16 & 17 & 36 \end{bmatrix}$

28. $\begin{bmatrix} -8 & -2 \\ 64 & -20 \end{bmatrix}$

29. $\begin{bmatrix} -204 & 81 \\ 160 & -38 \end{bmatrix}$

30. $x = 2, y = 8$

31. $x = 3, y = 35$

32. $\begin{bmatrix} 1 & -3 \\ 0 & 4 \end{bmatrix}, \begin{bmatrix} 1 & -7 \\ 0 & 8 \end{bmatrix}$

33. $\begin{bmatrix} 18 & -5 \\ -10 & 3 \end{bmatrix}, \begin{bmatrix} -82 & 23 \\ 46 & -13 \end{bmatrix}$

34. $\begin{bmatrix} 6 & 1 & -2 \\ 1 & 7 & 5 \\ -5 & -3 & 0 \end{bmatrix}, \begin{bmatrix} 17 & 5 & -4 \\ -1 & 16 & 13 \\ -13 & -9 & -1 \end{bmatrix}$

35. *Sample answer:*

$$\begin{bmatrix} 3 & 7 \\ -2 & 5 \end{bmatrix}\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

36. $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, B = \begin{bmatrix} e & f \\ g & h \end{bmatrix}$

$$k(AB) = \begin{bmatrix} aek + bgk & afk + bhk \\ cek + dgk & cfk + dhk \end{bmatrix}$$

$$(kA)B = \begin{bmatrix} aek + bgk & afk + bhk \\ cek + dgk & cfk + dhk \end{bmatrix}$$

$$A(kB) = \begin{bmatrix} aek + bgk & afk + bhk \\ cek + dgk & cfk + dhk \end{bmatrix}$$

Therefore
$k(AB) = (kA)B = A(kB)$.

3.6 Problem Solving

37. $\begin{matrix} \text{Bats} \\ \text{Balls} \\ \text{Uniforms} \end{matrix}\begin{bmatrix} 12 \\ 45 \\ 15 \end{bmatrix}$,

$\begin{matrix} \text{Cost} \end{matrix}\begin{matrix} \text{Bat} & \text{Ball} & \text{Uniform} \\ \begin{bmatrix} 22 & 4 & 30 \end{bmatrix} \end{matrix}$;

$\begin{matrix} \text{Item} \end{matrix}\begin{matrix} \text{Cost} \\ \begin{bmatrix} 882 \end{bmatrix} \end{matrix}$

38. $\begin{matrix} \text{Class 1} \\ \text{Class 2} \end{matrix}\begin{matrix} \text{P} & \text{B} & \text{C} \\ \begin{bmatrix} 24 & 12 & 17 \\ 20 & 14 & 15 \end{bmatrix} \end{matrix}$,

$\begin{matrix} \text{Paint} \\ \text{Brushes} \\ \text{Canvases} \end{matrix}\begin{matrix} \text{Cost} \\ \begin{bmatrix} 3.35 \\ 1.75 \\ 4.50 \end{bmatrix} \end{matrix}$; $\begin{matrix} \text{Class 1} \\ \text{Class 2} \end{matrix}\begin{matrix} \text{Cost} \\ \begin{bmatrix} 177.9 \\ 159 \end{bmatrix} \end{matrix}$

39. Friday: \$1150, Saturday: \$1675

40. U.S: 212 points, China: 144 points, Russia: 173 points

41. *PS*; $\begin{bmatrix} 62{,}400 & 57{,}575 \end{bmatrix}$, it shows the profit for all of the cars sold by each dealer.

42. Jean: 85.8, Ted: 89.8, Pat: 78.8, Al: 76.3, Matt: 90.2

43. a. $\begin{bmatrix} 0.8 & 0.05 \\ 0.2 & 0.95 \end{bmatrix}$

b. $\begin{bmatrix} 4400 \\ 8600 \end{bmatrix}$;

the numbers of commuters after one year.

c. $M_2 = \begin{bmatrix} 3950 \\ 9050 \end{bmatrix}$;

$M_3 = \begin{bmatrix} 3612.5 \\ 9387.5 \end{bmatrix}$;

$M_4 = \begin{bmatrix} 3359.375 \\ 9640.625 \end{bmatrix}$;

the number of commuters after 2, 3, and 4 years, respectively.

44. a. $C = \begin{bmatrix} 10 \\ 15 \\ 20 \\ 20 \end{bmatrix}, P = \begin{bmatrix} 15 \\ 20 \\ 25 \\ 30 \end{bmatrix}$

b. $\begin{bmatrix} 0 & 20 & 100 & 0 \\ 10 & 100 & 50 & 30 \\ 20 & 300 & 100 & 50 \end{bmatrix}$

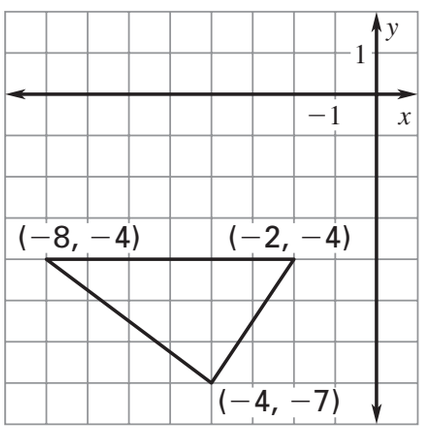
c. $\begin{bmatrix} 2300 \\ 3200 \\ 7700 \end{bmatrix}, \begin{bmatrix} 2900 \\ 4300 \\ 10{,}300 \end{bmatrix}$;

SC represents the total cost for making the scarves after each year, *SP* represents the total prices for each year.

d. $\begin{bmatrix} 600 \\ 1100 \\ 2600 \end{bmatrix}$;

this represents the profit made each year.

45. a. $\begin{bmatrix} -4 & -8 & -2 \\ -7 & -4 & -4 \end{bmatrix}$;



b. $\begin{bmatrix} 7 & 4 & 4 \\ -4 & -8 & -2 \end{bmatrix}$,

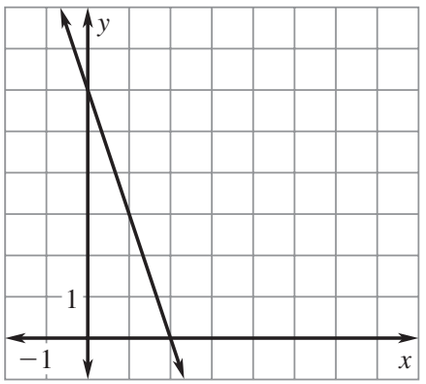
$\begin{bmatrix} 4 & 8 & 2 \\ 7 & 4 & 4 \end{bmatrix}$;

(7, −4), (4, −8), (4, −2);

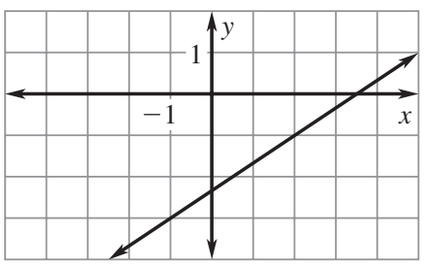
(4, 7), (8, 4), (2, 4)

3.6 Mixed Review

46.



47.



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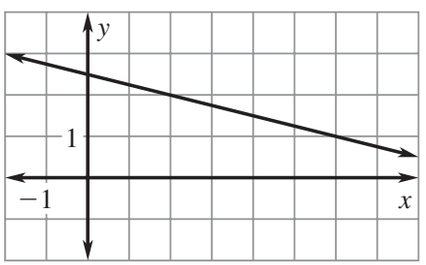
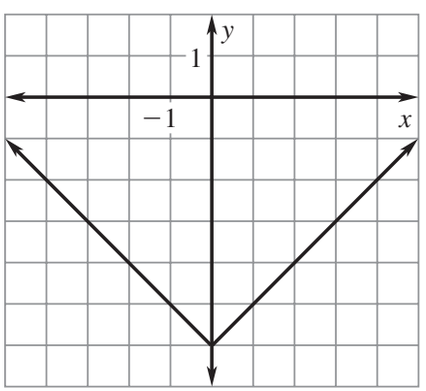
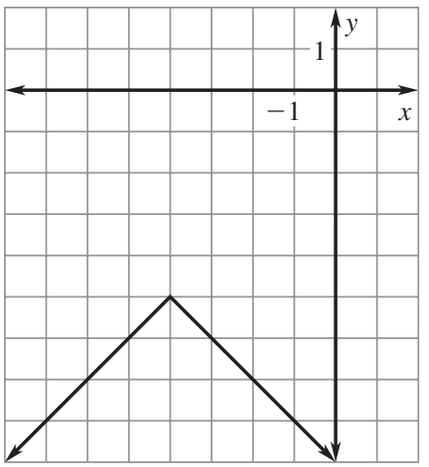


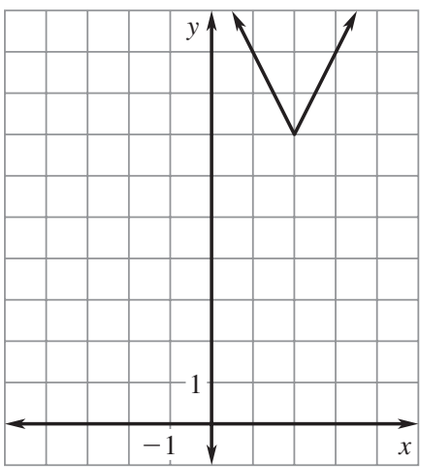
49.



50.



51.



52. $y = 2x - 4$

53. $y = -3x + 17$

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

55. $y = \frac{3}{4}x + 3$

56. $y = 2x$

57. $y = -\frac{7}{8}x + 1$

58. $(-1, 4)$

59. $(7, 2)$

60. $(-2, -10)$

61. $(5, 1)$

62. infinitely many solutions

63. $\left(6, -\frac{1}{2}\right)$