

pg. 213 #4, 6, 14, 30, 33, 35, 42, 49*

$$4. \begin{array}{ccc} \text{coefficient} & & \text{variable} & & \text{constant} \\ \begin{bmatrix} 1 & 3 & -1 \\ 1 & 0 & 2 \\ 0 & 2 & -1 \end{bmatrix} & \begin{bmatrix} x \\ y \\ z \end{bmatrix} & = & \begin{bmatrix} 2 \\ 8 \\ 1 \end{bmatrix} \end{array}$$

$$14. A \begin{bmatrix} 0 & 9 & 2 \\ 3 & 2 & 1 \\ 1 & -1 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = B \begin{bmatrix} 18 \\ 5 \\ -1 \end{bmatrix} \quad \text{use GC. } A^{-1}B$$

(-3, -2, 18)

$$30. \begin{cases} -x + z = -4 \\ 2y - z = -1 \\ x + y + z = 6 \end{cases} \quad \leftarrow \text{rearrange equations so variables on left, constants on right.}$$

$$A \begin{bmatrix} -1 & 0 & 1 \\ 0 & 2 & -1 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = B \begin{bmatrix} -4 \\ -1 \\ 6 \end{bmatrix} \quad \text{Use GC. } A^{-1}B$$

(5, 0, 1)

$$42. \begin{cases} 1.5c + .4r + 6f = 29.5 \\ 100c + 20r + 50f = 850 \\ c + r + f = 18 \end{cases}$$

$$\begin{bmatrix} 1.5 & 0.4 & 6 \\ 100 & 20 & 50 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} c \\ r \\ f \end{bmatrix} = \begin{bmatrix} 29.5 \\ 850 \\ 18 \end{bmatrix} \quad \text{use GC}$$

(5 lb. chicken, 10 lb. rice, 3 lb. shellfish)

17

$$49. \begin{bmatrix} -1 & 3 & 7 \\ 5 & -4 & -2 \\ 0 & 2 & 10 \end{bmatrix} \begin{matrix} -1 \\ 5 \\ 10 \end{matrix} \begin{matrix} 3 \\ -4 \\ 2 \end{matrix}$$

$$(40 + 0 + 70) - (0 + 4 + 150)$$
$$110 - 154 = -44$$

Answers for Lesson 4-7, pp. 213–215 Exercises

1. $\begin{bmatrix} 1 & 1 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ -4 \end{bmatrix}$; coefficient matrix is $\begin{bmatrix} 1 & 1 \\ 1 & -2 \end{bmatrix}$,
variable matrix is $\begin{bmatrix} x \\ y \end{bmatrix}$, constant matrix is $\begin{bmatrix} 5 \\ -4 \end{bmatrix}$.

2. $\begin{bmatrix} -3 & 1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -7 \\ 2 \end{bmatrix}$; coefficient matrix is $\begin{bmatrix} -3 & 1 \\ 1 & 0 \end{bmatrix}$,
variable matrix is $\begin{bmatrix} x \\ y \end{bmatrix}$, constant matrix is $\begin{bmatrix} -7 \\ 2 \end{bmatrix}$.

3. $\begin{bmatrix} 3 & 5 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$; coefficient matrix is $\begin{bmatrix} 3 & 5 \\ 1 & 1 \end{bmatrix}$, variable
matrix is $\begin{bmatrix} a \\ b \end{bmatrix}$, constant matrix is $\begin{bmatrix} 0 \\ 2 \end{bmatrix}$.

4. $\begin{bmatrix} 1 & 3 & -1 \\ 1 & 0 & 2 \\ 0 & 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 8 \\ 1 \end{bmatrix}$; coefficient matrix is $\begin{bmatrix} 1 & 3 & -1 \\ 1 & 0 & 2 \\ 0 & 2 & -1 \end{bmatrix}$,
variable matrix is $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$, constant matrix is $\begin{bmatrix} 2 \\ 8 \\ 1 \end{bmatrix}$.

5. $\begin{bmatrix} 1 & -1 & 1 \\ 2 & 0 & 1 \\ 0 & 1 & 3 \end{bmatrix} \begin{bmatrix} r \\ s \\ t \end{bmatrix} = \begin{bmatrix} 150 \\ 425 \\ 0 \end{bmatrix}$; coefficient matrix is $\begin{bmatrix} 1 & -1 & 1 \\ 2 & 0 & 1 \\ 0 & 1 & 3 \end{bmatrix}$,
variable matrix is $\begin{bmatrix} r \\ s \\ t \end{bmatrix}$, constant matrix is $\begin{bmatrix} 150 \\ 425 \\ 0 \end{bmatrix}$.

Answers for Lesson 4-7, pp. 213–215 Exercises (cont.)

6. $\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 11 \\ 18 \end{bmatrix}$; coefficient matrix is $\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$, variable matrix is $\begin{bmatrix} x \\ y \end{bmatrix}$, constant matrix is $\begin{bmatrix} 11 \\ 18 \end{bmatrix}$.

7. (2, 1)

8. (-1, 0)

9. $(\frac{1}{2}, 20)$

10. (1, -1)

11. (3, 2)

12. (-8, 7)

13. (2, -1, 3)

14. (-3, -2, 18)

15. (1, 2, -2)

16. a. x is the number of pounds of almonds, y is the number of pounds of peanuts, and z is the number of pounds of raisins that must be bought. The first equation states that the total weight will be 9 pounds. The second equation states that the total cost will be \$15. The third equation states that the combined weights of almonds and peanuts should be double the weight of the raisins.

b. (2.5, 3.5, 3)

17. yes

18. yes

19. yes

20. yes

21. no

22. yes

23. (6, 2)

24. no unique solution

25. (16, -22)

26. (-2, -1)

27. (2, 4)

28. (-1, 0)

29. (4, 1, 3)

30. (5, 0, 1)

31. (-19, 22, 13)

32. (1, 0, 3)

33. (2, -1, 3)

34. (1, 1, 1, 1)

35. (2, 0, 2, 0)

36. (2, 3)

37. length = 280 ft, width = 140 ft

38. 14

39. Answers may vary. Sample: 0, 0

Answers for Lesson 4-7, pp. 213–215 Exercises (cont.)

40. Answers may vary. Sample: 0, 1

41. The tea temperature was 126°F and the milk temperature was 36°F.

42. a. Let $c =$ lb of chicken, $r =$ lb of rice, and $s =$ lb of shellfish.

$$\begin{cases} c + r + s = 18 \\ 1.50c + 0.40r + 6.00s = 29.50 \\ 100c + 20r + 50s = 850 \end{cases}$$

b. (5, 10, 3); 5 lb of chicken, 10 lb of rice, 3 lb of shellfish

43. B

44. I

45. C

46. I

47. B

48. [2] First write each equation in standard form. Then place the coefficients in a matrix with the coefficients of x in the first column, the coefficients of y in the second, and the coefficients of z in the third:

$$\begin{bmatrix} 2 & -3 & 1 \\ 1 & 4 & -2 \\ -3 & -2 & 3 \end{bmatrix}$$

Finally, put this in an equation with the variable matrix

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} \text{ and the constant matrix } \begin{bmatrix} -10 \\ 11 \\ -7 \end{bmatrix}, \text{ to get}$$

$$\begin{bmatrix} 2 & -3 & 1 \\ 1 & 4 & -2 \\ -3 & -2 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -10 \\ 11 \\ -7 \end{bmatrix}$$

[1] answer only, without explanation of steps

49. -44

Answers for Lesson 4-7, pp. 213–215 Exercises (cont.)

49. -44

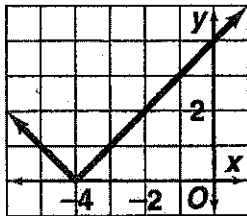
50. 4913

51. -218

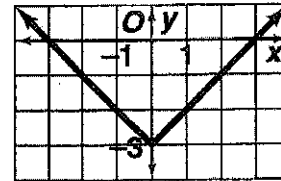
52. $\begin{bmatrix} 9 & -3 \\ -5 & 12 \end{bmatrix}$

53. $\begin{bmatrix} -1 & -4 & 3 \\ 6 & 2 & 4 \\ 26 & -7 & -3 \end{bmatrix}$

54. horizontal



55. vertical



56. diagonal

