



10-2 Additional Practice

Matrix Multiplication

1. A carpenter builds three boxes. One box uses 12 nails. The second box uses 6 nails and 6 screws. The third box uses 8 screws and 2 hinges. Nails cost \$0.04 each, screws cost \$0.06 each, and hinges cost \$0.12 each.

- a. Write a 3×3 matrix that represents the number of each type of hardware in each box.

Sample: $\begin{bmatrix} 12 & 0 & 0 \\ 6 & 6 & 0 \\ 0 & 8 & 2 \end{bmatrix}$

- b. Write a 3×1 matrix that represents the cost of each type of hardware.

Sample: $\begin{bmatrix} 0.04 \\ 0.06 \\ 0.12 \end{bmatrix}$

- c. Find the 3×1 matrix that represents the cost of hardware for each box.

Sample: $\begin{bmatrix} 0.48 \\ 0.60 \\ 0.72 \end{bmatrix}$

For Items 2 and 3, determine whether each equation is true for the square matrices A, B, and C. Show your work.

$$A = \begin{bmatrix} 3 & 3 \\ 2 & 0 \end{bmatrix}$$

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

$$C = \begin{bmatrix} 8 & -4 \\ 5 & 2 \end{bmatrix}$$

2. $(A + B)C = AC + BC$ **yes**

$$\begin{bmatrix} 43 & 10 \\ -3 & 6 \end{bmatrix} = \begin{bmatrix} 43 & 10 \\ -3 & 6 \end{bmatrix}$$

3. $A(BC) = (AB)C$ **yes**

$$\begin{bmatrix} -45 & 90 \\ 8 & 32 \end{bmatrix} = \begin{bmatrix} -45 & 90 \\ 8 & 32 \end{bmatrix}$$

4. Find IQ .

$$\text{Let } I = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \text{ and } Q = \begin{bmatrix} 4 & -4 & 3 \\ 3 & 4 & -2 \\ -2 & 8 & 2 \end{bmatrix}.$$

$$IQ = \begin{bmatrix} 4 & -4 & 3 \\ 3 & 4 & -2 \\ -2 & 8 & 2 \end{bmatrix}$$

5. Write a matrix that represents the coordinates of the triangle ABC after a reflection across the y -axis. Then show $A'B'C'$ on the graph.

$$A'B'C' = \begin{bmatrix} 2 & 3 & 1 \\ 3 & -3 & -2 \end{bmatrix}$$

