Chapter Practice

Chapter 4

For Exercises 1–7, choose the correct answer.

1. What is the solution of $\begin{bmatrix} 2x & 3 & y^2 \\ -1 & -9 & -1 \end{bmatrix} = \begin{bmatrix} 8 & 3 & 25 \\ x + y & y - x & -1 \end{bmatrix}$?

A $x = 4, y = 5$

B $x = 1, y = 5$

C $x = 4, y = -5$

D $x = -1, y = 5$

E none of the above

2. What is the solution of $X + \begin{bmatrix} 2 & 3 \\ 1 & -2 \end{bmatrix} = \begin{bmatrix} 0 & 5 \\ 6 & -1 \end{bmatrix}$?

A $\begin{bmatrix} 2 & -2 \\ -5 & -3 \end{bmatrix}$

B $\begin{bmatrix} -2 & 2 \\ 5 & -2 \end{bmatrix}$

C $\begin{bmatrix} -2 & 2 \\ -5 & -3 \end{bmatrix}$

D $\begin{bmatrix} -2 & 2 \\ 5 & 1 \end{bmatrix}$

E $\begin{bmatrix} -2 & 2 \\ 5 & -3 \end{bmatrix}$

3. Which product does *not* exist?

A $0\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

B $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

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

D $\begin{bmatrix} 1 & 6 & 3 \\ 4 & 2 & 1 \end{bmatrix}\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

E $-2\begin{bmatrix} 0.5 & 0.5 \\ 0.5 & 0.5 \end{bmatrix}$

4. Which sentence describes this transformation?

$$\frac{1}{2}\begin{bmatrix} 1 & 6 & 6 & 1 \\ 6 & 6 & 1 & 1 \end{bmatrix} = \begin{bmatrix} \frac{1}{2} & 3 & 3 & \frac{1}{2} \\ 3 & 3 & \frac{1}{2} & \frac{1}{2} \end{bmatrix}$$

A A square moves 1 unit to the right and 6 units down.

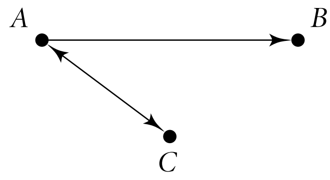
B A square is dilated by a factor of 2.

C A square is dilated by a factor of 6.

D A square is translated $\frac{1}{2}$ units.

E A square is dilated by a factor of $\frac{1}{2}$.

5. Which matrix matches this graph?



A $\begin{bmatrix} 0 & 1 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

B $\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$

C $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

D $\begin{bmatrix} 0 & 1 & 2 \\ 0 & 0 & 0 \\ 2 & 0 & 0 \end{bmatrix}$

E none of the above

6. Which of the following is *false*?

A $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ is the 2×2 identity matrix for multiplication.

B $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

C $\begin{bmatrix} 4 & 3 \\ 8 & 6 \end{bmatrix}$ has no inverse.

D A 3×4 matrix can be multiplied by a 4×6 matrix.

E $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ is the 2×2 identity matrix for addition.

7. What are the dimensions of this matrix?

$$\begin{bmatrix} 4 & 2 & 7 & 6 \\ 9 & -7 & 4 & 8 \\ -3 & 6 & -5 & 2 \end{bmatrix}$$

A 4×3

B 12×1

C 3×4

D $3 \times 3 + 1 \times 3$

E 1×12

For Exercises 8–11, compare the values in Column A and Column B. Choose the best answer.

A The value in Column A is greater.

B The value in Column B is greater.

C The two values are equal.

D The relationship cannot be determined on the basis of the information supplied.

	Column A	Column B
	$B = \begin{bmatrix} 1 & -4 & 6 \\ 2 & 3 & -1 \\ 0 & 2 & -1 \end{bmatrix}$	
8.	b_{32}	b_{23}
	the product of a 4 × 5 matrix and a 5 × 3 matrix	
9.	number of rows in the product matrix	number of columns in the product matrix
	matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$	
10.	$a \cdot b$	$b \cdot c$
11.	number of elements in a 5 × 6 matrix	number of elements in a 7 × 4 matrix

For Exercises 12–20, write your answer.

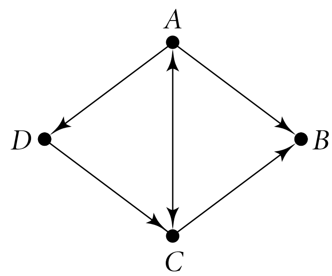
12. Write the 2 × 3 matrix A given that $a_{12} = 1$, $a_{23} = 8$, $a_{21} = -2$, $a_{11} = -4$, $a_{13} = 5$, and $a_{22} = 0$.

13. Find $A + B$ if $A = \begin{bmatrix} 2 & 3 & -1 \\ 0 & 4 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 1 & -1 \\ -2 & 0 & 3 \end{bmatrix}$.

14. Find AB if $A = \begin{bmatrix} 3 & 1 & 0 \\ 4 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 4 & 2 \\ 7 & 0 \end{bmatrix}$.

15. Write the translation matrix that shifts a hexagon 3 units to the left and 5 units up.

16. Write the communications matrix for this graph.



17. **Open-ended** Write a 2 × 2 matrix that has an inverse. Find the inverse.

18. Write the system as a matrix equation.

$$\begin{cases} 3a + b + 2c = -4 \\ 2a - b - 3c = 8 \\ 6a + b + 2c = -8 \end{cases}$$

19. How many columns does a 5 × 6 matrix have?

20. $A = \begin{bmatrix} 3 & 1 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ -1 & 4 \end{bmatrix}$.

If $C = AB$, what is the value of c_{22}?