



**Answer Key: page 3**

Matrices And Determinants Extra Practice

Perform the matrix operations.

$$1. \begin{bmatrix} 0 & 1 & -5 \\ 4 & 1 & 6 \end{bmatrix} + \begin{bmatrix} 10 & 3 & 11 \\ -2 & 8 & 3 \end{bmatrix}$$

$$2. \begin{bmatrix} 5 & 1 & 10 \\ -1 & 0 & 0 \\ 2 & 3 & 4 \end{bmatrix} - \begin{bmatrix} 6 & 7 & 3 \\ 0 & 14 & 6 \\ 1 & -1 & 2 \end{bmatrix}$$

$$3. 3 \begin{bmatrix} 4 & 6 & -1 \\ 10 & -5 & 2 \\ 2 & 11 & 1 \end{bmatrix}$$

$$4. -2 \left( \begin{bmatrix} 6 & 4 \\ 0 & 3 \end{bmatrix} - \begin{bmatrix} 5 & 10 \\ 1 & 3 \end{bmatrix} \right)$$

Write the product as a single matrix.

$$5. \begin{bmatrix} 1 & 0 \\ 4 & 9 \end{bmatrix} \begin{bmatrix} -1 & 1 \\ 3 & 2 \end{bmatrix}$$

$$6. \begin{bmatrix} 6 & 6 & 0 \\ 1 & -1 & 5 \end{bmatrix} \begin{bmatrix} -6 & 1 & 4 \\ 5 & -2 & 1 \\ 3 & -8 & 0 \end{bmatrix}$$

$$7. [10 \ 2 \ 1 \ 5] \begin{bmatrix} 1 \\ 0 \\ -2 \\ 3 \end{bmatrix}$$

Evaluate the determinant of the matrix.

$$8. \begin{vmatrix} 6 & -3 \\ 2 & 1 \end{vmatrix}$$

$$9. \begin{vmatrix} 9 & 1 \\ -3 & 2 \end{vmatrix}$$

10.  $\begin{vmatrix} 2 & 1 & 5 \\ -1 & 6 & 3 \\ 2 & -4 & 2 \end{vmatrix}$

11.  $\begin{vmatrix} 2 & -3 & 4 \\ 0 & 1 & -2 \\ 1 & 2 & -3 \end{vmatrix}$

12. Use a determinant to find the area of a triangle with coordinates (-3,4) (6,3) and (2,-1)

Find the inverse of the matrix.

13.  $\begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix}$

14.  $\begin{bmatrix} 2 & 2 \\ 1 & 3 \end{bmatrix}$

15.  $\begin{bmatrix} 8 & -3 \\ 4 & -2 \end{bmatrix}$

Solve the matrix equation.

16.  $\begin{bmatrix} 3 & -1 \\ 5 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -3 \\ 2 \end{bmatrix}$

17.  $\begin{bmatrix} -1 & -1 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} -1 \\ 2 \end{bmatrix} = \begin{bmatrix} -5 \\ 0 \end{bmatrix}$

Use an inverse matrix to solve the linear system.

18.  $\begin{cases} x - 3y = 10 \\ 2x + 5y = -2 \end{cases}$

Use Cramer's rule to solve the linear system.

19.  $\begin{cases} 2x - 3y = -17 \\ 3x + 4y = 0 \end{cases}$

$$20. \begin{cases} x + 2y + z = -2 \\ 2x - y - 3z = 1 \\ -3x + y - 2z = -7 \end{cases}$$

**ANSWER KEY**

Matrices And Determinants Extra Practice

Perform the matrix operations.

$$1. \begin{bmatrix} 0 & 1 & -5 \\ 4 & 1 & 6 \end{bmatrix} + \begin{bmatrix} 10 & 3 & 11 \\ -2 & 8 & 3 \end{bmatrix} \quad \begin{bmatrix} 10 & 4 & 6 \\ 2 & 9 & 9 \end{bmatrix}$$

$$2. \begin{bmatrix} 5 & 1 & 10 \\ -1 & 0 & 0 \\ 2 & 3 & 4 \end{bmatrix} - \begin{bmatrix} 6 & 7 & 3 \\ 0 & 14 & 6 \\ 1 & -1 & 2 \end{bmatrix} \quad \begin{bmatrix} -1 & -6 & 7 \\ -1 & -14 & -6 \\ 1 & 4 & 2 \end{bmatrix}$$

$$3. 3 \begin{bmatrix} 4 & 6 & -1 \\ 10 & -5 & 2 \\ 2 & 11 & 1 \end{bmatrix} \quad \begin{bmatrix} 12 & 18 & -3 \\ 30 & -15 & 6 \\ 6 & 33 & 3 \end{bmatrix}$$

$$4. -2 \left( \begin{bmatrix} 6 & 4 \\ 0 & 3 \end{bmatrix} - \begin{bmatrix} 5 & 10 \\ 1 & 3 \end{bmatrix} \right) \quad \begin{bmatrix} -2 & 12 \\ 2 & 0 \end{bmatrix}$$

Write the product as a single matrix.

$$5. \begin{bmatrix} 1 & 0 \\ 4 & 9 \end{bmatrix} \begin{bmatrix} -1 & 1 \\ 3 & 2 \end{bmatrix} \quad \begin{bmatrix} -1 & 1 \\ 23 & 22 \end{bmatrix}$$

$$6. \begin{bmatrix} 6 & 6 & 0 \\ 1 & -1 & 5 \end{bmatrix} \begin{bmatrix} -6 & 1 & 4 \\ 5 & -2 & 1 \\ 3 & -8 & 0 \end{bmatrix} \quad \begin{bmatrix} -6 & -6 & 30 \\ 4 & -37 & 3 \end{bmatrix}$$

$$7. [10 \ 2 \ 1 \ 5] \begin{bmatrix} 1 \\ 0 \\ -2 \\ 3 \end{bmatrix} \quad [23]$$

Evaluate the determinant of the matrix.

$$8. \begin{vmatrix} 6 & -3 \\ 2 & 1 \end{vmatrix} \quad 12$$

$$9. \begin{vmatrix} 9 & 1 \\ -3 & 2 \end{vmatrix} \quad 21$$

$$10. \begin{vmatrix} 2 & 1 & 5 \\ -1 & 6 & 3 \\ 2 & -4 & 2 \end{vmatrix} \quad 16$$

$$11. \begin{vmatrix} 2 & -3 & 4 \\ 0 & 1 & -2 \\ 1 & 2 & -3 \end{vmatrix} \quad 4$$

12. Use a determinant to find the area of a triangle with coordinates (-3,4) (6,3) and (2,-1)  
**20**

Find the inverse of the matrix.

$$13. \begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix} \quad \begin{bmatrix} -2 & 3 \\ 5 & -7 \end{bmatrix}$$

$$14. \begin{bmatrix} 2 & 2 \\ 1 & 3 \end{bmatrix} \quad \begin{bmatrix} 3/4 & -1/2 \\ -1/4 & 1/2 \end{bmatrix}$$

$$15. \begin{bmatrix} 8 & -3 \\ 4 & -2 \end{bmatrix} \quad \begin{bmatrix} 1/2 & -3/4 \\ 1 & -2 \end{bmatrix}$$

Solve the matrix equation.

$$16. \begin{bmatrix} 3 & -1 \\ 5 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -3 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} -\frac{4}{11} \\ \frac{21}{11} \end{bmatrix}$$

$$17. \begin{bmatrix} -1 & -1 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} -1 \\ 2 \end{bmatrix} = \begin{bmatrix} -5 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} -5 \\ 9 \end{bmatrix}$$

Use an inverse matrix to solve the linear system.

$$18. \begin{cases} x - 3y = 10 \\ 2x + 5y = -2 \end{cases}$$

$$(4, -2)$$

Use Cramer's rule to solve the linear system.

$$19. \begin{cases} 2x - 3y = -17 \\ 3x + 4y = 0 \end{cases}$$

$$(-4, 3)$$

$$20. \begin{cases} x + 2y + z = -2 \\ 2x - y - 3z = 1 \\ -3x + y - 2z = -7 \end{cases}$$

$$(1, -2, 1)$$