



# 10-4 Additional Practice

## Inverses and Determinants

Find the inverse of each matrix.

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

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

3.  $\begin{bmatrix} 30 & -4 \\ -25 & 3 \end{bmatrix}$

Does each given matrix have an inverse? If so, find it.

4.  $A = \begin{bmatrix} 3 & 4 \\ 3 & 4 \end{bmatrix}$

5.  $B = \begin{bmatrix} 5 & 0 \\ -5 & 1 \end{bmatrix}$

6.  $C = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$

7. Assign every letter in the alphabet a number, from  $A = 1$  to  $Z = 26$ . Let 27

represent a space between words. The matrix  $\begin{bmatrix} 162 & 133 & 109 & 139 & 83 \\ 141 & 113 & 81 & 110 & 61 \\ 129 & 108 & 80 & 101 & 42 \end{bmatrix}$

was encoded using the matrix  $P = \begin{bmatrix} 2 & 4 & 3 \\ 1 & 4 & 2 \\ 1 & 4 & 1 \end{bmatrix}$ . What is the message?

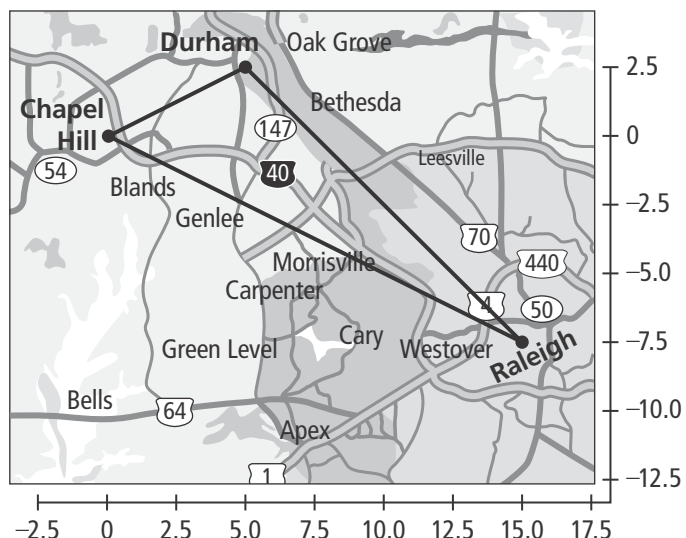
Find the area of the triangle or parallelogram defined by the given vectors.

8. triangle;  
vectors  $\langle 5, 3 \rangle$  and  $\langle -3, 7 \rangle$

9. parallelogram;  
vectors  $\langle 4, -8 \rangle$  and  $\langle 5, -1 \rangle$

10. triangle;  
vectors  $\langle -3, -4 \rangle$  and  $\langle -8, 6 \rangle$

11. The area between the North Carolina cities of Raleigh, Durham, and Chapel Hill is called the Research Triangle. Use the map to determine the approximate area of the triangle. The coordinates are given in miles.





# 10-4 Additional Practice

## Inverses and Determinants

Find the inverse of each matrix.

1.  $\begin{bmatrix} 3 & 4 \\ -3 & 4 \end{bmatrix} \begin{bmatrix} \frac{1}{6} & -\frac{1}{6} \\ \frac{1}{8} & \frac{1}{8} \end{bmatrix}$

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

3.  $\begin{bmatrix} 30 & -4 \\ -25 & 3 \end{bmatrix} \begin{bmatrix} -\frac{3}{10} & -\frac{2}{5} \\ -\frac{5}{2} & -3 \end{bmatrix}$

Does each given matrix have an inverse? If so, find it.

4.  $A = \begin{bmatrix} 3 & 4 \\ 3 & 4 \end{bmatrix}$

**no inverse**

5.  $B = \begin{bmatrix} 5 & 0 \\ -5 & 1 \end{bmatrix} \begin{bmatrix} \frac{1}{5} & 0 \\ 1 & 1 \end{bmatrix}$

6.  $C = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$

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

7. Assign every letter in the alphabet a number, from A = 1 to Z = 26. Let 27

represent a space between words. The matrix  $\begin{bmatrix} 162 & 133 & 109 & 139 & 83 \\ 141 & 113 & 81 & 110 & 61 \\ 129 & 108 & 80 & 101 & 42 \end{bmatrix}$

was encoded using the matrix  $P = \begin{bmatrix} 2 & 4 & 3 \\ 1 & 4 & 2 \\ 1 & 4 & 1 \end{bmatrix}$ . What is the message?

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Find the area of the triangle or parallelogram defined by the given vectors.

8. triangle;  
vectors  $\langle 5, 3 \rangle$  and  $\langle -3, 7 \rangle$

**22**

9. parallelogram;  
vectors  $\langle 4, -8 \rangle$  and  $\langle 5, -1 \rangle$

**36**

10. triangle;  
vectors  $\langle -3, -4 \rangle$  and  $\langle -8, 6 \rangle$

**25**

11. The area between the North Carolina cities of Raleigh, Durham, and Chapel Hill is called the Research Triangle. Use the map to determine the approximate area of the triangle. The coordinates are given in miles.

**Answers may vary.**

**Sample:  $\approx 32 \text{ mi}^2$**

