

12-3

Practice

Form G

Determinants and Inverses

Determine whether the matrices are multiplicative inverses.

1. $\begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}, \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$

2. $\begin{bmatrix} 4 & 9 \\ 2 & 6 \end{bmatrix}, \begin{bmatrix} 1 & -\frac{3}{2} \\ -\frac{1}{3} & \frac{2}{3} \end{bmatrix}$

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

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

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

Evaluate the determinant of each matrix.

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

7. $\begin{bmatrix} 3 & 9 \\ 3 & 2 \end{bmatrix}$

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

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

10. $\begin{bmatrix} 5 & 4 \\ 4 & 5 \end{bmatrix}$

11. $\begin{bmatrix} 1 & -12 \\ 3 & 0 \end{bmatrix}$

12. $\begin{bmatrix} 1 & 2 & -2 \\ 0 & 3 & 2 \\ 1 & -1 & 3 \end{bmatrix}$

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

14. $\begin{bmatrix} 8 & -1 & 0 \\ 0 & 0 & 2 \\ 9 & 12 & -4 \end{bmatrix}$

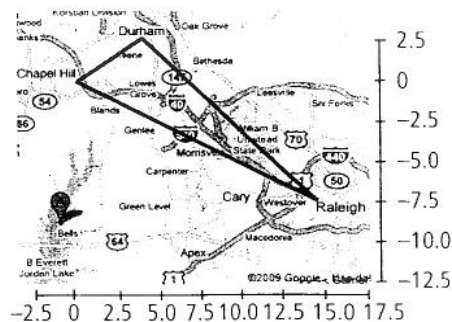
Graphing Calculator Evaluate the determinant of each 3×3 matrix.

15. $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

16. $\begin{bmatrix} 5 & 6 & 7 \\ -2 & 9 & 10 \\ 8 & -1 & 4 \end{bmatrix}$

17. $\begin{bmatrix} 5.4 & 2.6 & 1.9 \\ -5.5 & 5.1 & 8.2 \\ 4.8 & -8.2 & 2.7 \end{bmatrix}$

18. 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 Research Triangle. The coordinates are given in miles.



12-3 Practice (continued)

Determinants and Inverses

Form G

Determine whether each matrix has an inverse. If an inverse matrix exists, find it.

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

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

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

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

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

24. $\begin{bmatrix} -12 & 4 \\ -9 & 3 \end{bmatrix}$

25. Use the coding matrix $\begin{bmatrix} 3 & 6 \\ 9 & 12 \end{bmatrix}$ to encode the serial number 45-8-62-4-31-10.

Evaluate the determinant of each matrix.

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

27. $\begin{bmatrix} -5 & 3 \\ 3 & 8 \end{bmatrix}$

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

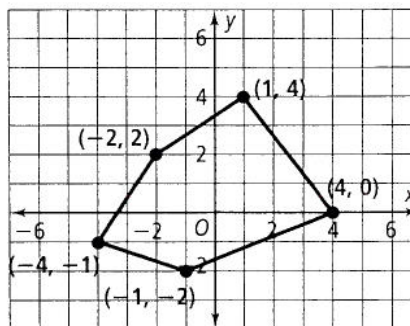
29. $\begin{bmatrix} 3 & -2 & 5 \\ 1 & 0 & -4 \\ -4 & 3 & 9 \end{bmatrix}$

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

31. $\begin{bmatrix} 7 & 4 & -3 \\ 6 & 10 & -1 \\ 8 & 0 & 8 \end{bmatrix}$

32. **Writing** Describe how to use matrices to find the area of a polygon.

33. Find the area of the figure at the right.



Determine whether each matrix has an inverse. If an inverse matrix exists, find it. If it does not exist, explain why not.

34. $\begin{bmatrix} 1 & 3 \\ 0 & 4 \end{bmatrix}$

35. $\begin{bmatrix} 0 & 2 \\ -1 & -1 \end{bmatrix}$

36. $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$