

3

CHAPTER REVIEW

3.7 Evaluate Determinants and Apply Cramer's Rule

pp. 203–209

EXAMPLE

Evaluate the determinant of $\begin{bmatrix} 2 & 1 \\ 5 & 7 \end{bmatrix}$.

$$\begin{vmatrix} 2 & 1 \\ 5 & 7 \end{vmatrix} = 2(7) - 5(1) = 14 - 5 = 9$$

EXERCISES

Evaluate the determinant of the matrix.

29. $\begin{bmatrix} -4 & 2 \\ 5 & 8 \end{bmatrix}$

30. $\begin{bmatrix} 3 & -5 \\ 2 & 6 \end{bmatrix}$

31. $\begin{bmatrix} 3 & 0 \\ 1 & 6 \end{bmatrix}$

32. **SCHOOL SPIRIT** You are making a large triangular pennant for your school football team. The vertices of the triangle are (0, 0), (0, 50), and (70, 20) where the coordinates are measured in inches. How many square feet of material will you need to make the pennant?

EXAMPLES

1 and 2

on pp. 203–204
for Exs. 29–32

3.8 Use Inverse Matrices to Solve Linear Systems

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EXAMPLE

Use an inverse matrix to solve the linear system at the right.

$x - 2y = 14$

$2x + y = 8$

Write the linear system as a matrix equation $AX = B$.

$$\begin{bmatrix} 1 & -2 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 14 \\ 8 \end{bmatrix}$$

Find the inverse of the coefficient matrix A .

$$A^{-1} = \frac{1}{1 - (-4)} \begin{bmatrix} 1 & 2 \\ -2 & 1 \end{bmatrix} = \begin{bmatrix} 0.2 & 0.4 \\ -0.4 & 0.2 \end{bmatrix}$$

Then multiply the matrix of constants by A^{-1} on the left.

$$X = A^{-1}B = \begin{bmatrix} 0.2 & 0.4 \\ -0.4 & 0.2 \end{bmatrix} \begin{bmatrix} 14 \\ 8 \end{bmatrix} = \begin{bmatrix} 6 \\ -4 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$$

► The solution of the system is (6, -4).

EXERCISES

Use an inverse matrix to solve the linear system.

33. $x + 4y = 11$
 $2x - 5y = 9$

34. $3x + y = -1$
 $-x + 2y = 12$

35. $3x + 2y = -11$
 $4x - 3y = 8$

EXAMPLE 4

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for Exs. 33–35