

Evaluate the determinant of the matrix.

1. $\begin{vmatrix} -4 & 2 \\ 8 & 0 \end{vmatrix}$ -16
 $0 - 16$

2. $\begin{vmatrix} 1 & 4 \\ 5 & 1 \end{vmatrix}$ -19
 $1 - 20$

3. $\begin{vmatrix} -6 & 5 \\ 8 & 10 \end{vmatrix}$ -100
 $-60 - 40$

4. $\begin{vmatrix} 5 & 9 \\ 8 & 1 \end{vmatrix}$ -67
 $5 - 72$

5. $\begin{vmatrix} 7 & -7 \\ 11 & 4 \end{vmatrix}$ 105
 $28 - 77$

6. $\begin{vmatrix} 1 & 3 \\ -2 & -6 \end{vmatrix}$ 0
 $-6 + 6$

Evaluate the determinant of each matrix by hand and using calculator.

7. $\begin{vmatrix} 3 & 2 & -5 \\ 6 & 0 & -1 \\ 0 & -1 & 3 \end{vmatrix}$ -9

8. $\begin{vmatrix} -1 & 2 & 7 \\ 2 & -1 & -1 \\ 3 & 5 & 2 \end{vmatrix}$ 74

9. $\begin{vmatrix} 1 & 2 & 1 \\ 6 & 5 & 0 \\ 1 & 4 & -2 \end{vmatrix}$ 33

10. $\begin{vmatrix} 3 & 12 & 1 \\ -10 & 9 & 8 \\ -5 & 4 & -1 \end{vmatrix}$ -718

Solve for x.

11. $\begin{vmatrix} 2 & 6 \\ 1 & x \end{vmatrix} = 2$
 $2x - 6 = 2$
 $2x = 8$
 $x = 4$

12. $\begin{vmatrix} x & 3 \\ -4 & x \end{vmatrix} = 7x$
 $x^2 + 12 = 7x$
 $x^2 - 7x + 12 = 0$
 $(x + 4)(x - 3) = 0$
 $x = -4, 3$

13. $\begin{vmatrix} x & 3 & -1 \\ 2 & 1 & -2 \\ 4 & 1 & x \end{vmatrix} = 10$
 $x^2 - 4x - 22 = 10$
 $x^2 - 4x - 32 = 0$
 $(x - 8)(x + 4) = 0$
 $x = 8, -4$

For each matrix state if an inverse exists.

1) $\begin{bmatrix} -9 & -9 \\ -2 & -2 \end{bmatrix}$ $18 - 18 = 0$
 No inverse

2) $\begin{bmatrix} -2 & 1 \\ -6 & 1 \end{bmatrix}$ $-2 + 6 = 4$ $\frac{1}{4} \begin{bmatrix} 1 & -1 \\ 6 & -2 \end{bmatrix}$ $\begin{bmatrix} 1/4 & -1/4 \\ 3/2 & -1/2 \end{bmatrix}$

3) $\begin{bmatrix} 4 & -5 \\ -9 & 6 \end{bmatrix}$ $24 - 45 = -21$
 $-\frac{1}{21} \begin{bmatrix} 6 & 5 \\ 9 & 4 \end{bmatrix}$ $\begin{bmatrix} -2/7 & -5/21 \\ -3/7 & -4/21 \end{bmatrix}$

4) $\begin{bmatrix} 0 & 0 \\ -6 & 4 \end{bmatrix}$ $0 - 0 = 0$ No inverse

Find the inverse of each matrix.

5) $\begin{bmatrix} 11 & -5 \\ 2 & -1 \end{bmatrix}$ $\begin{bmatrix} +1 & -5 \\ +2 & -11 \end{bmatrix}$
 $-11 + 10 = -1$
 $\Rightarrow \frac{1}{-1} \begin{bmatrix} -1 & 5 \\ -2 & 11 \end{bmatrix}$

6) $\begin{bmatrix} 0 & -2 \\ -1 & -9 \end{bmatrix}$ $0 - 2 = -2$ $\begin{bmatrix} -9/2 & -1 \\ -1/2 & 0 \end{bmatrix}$
 $-\frac{1}{2} \begin{bmatrix} -9 & 2 \\ 1 & 0 \end{bmatrix}$

7) $\begin{bmatrix} -1 & 7 \\ -1 & 7 \end{bmatrix}$ $-7 + 7 = 0$
 No inverse

8) $\begin{bmatrix} 1 & -1 \\ -6 & -3 \end{bmatrix}$ $-3 - 6 = -9$ $\begin{bmatrix} 1/3 & -1/9 \\ -2/3 & -1/9 \end{bmatrix}$
 $-\frac{1}{9} \begin{bmatrix} -3 & 1 \\ 6 & 1 \end{bmatrix}$