

## Determinants of 3×3 Matrices

**Evaluate the determinant of each matrix.**

1) 
$$\begin{bmatrix} 3 & -2 & 1 \\ 3 & -1 & -2 \\ 3 & -2 & -3 \end{bmatrix}$$

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

**Evaluate each determinant.**

3) 
$$\begin{vmatrix} 5 & 3 & 3 \\ -4 & -5 & 1 \\ 5 & 3 & 0 \end{vmatrix}$$

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

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

6) 
$$\begin{vmatrix} -2 & 5 & -4 \\ 0 & -3 & 5 \\ -5 & 5 & -6 \end{vmatrix}$$

7) 
$$\begin{vmatrix} 3 & 4 & 5 \\ -4 & 6 & 3 \\ 1 & -4 & 3 \end{vmatrix}$$

8) 
$$\begin{vmatrix} 6 & 5 & -3 \\ -5 & 4 & -2 \\ 1 & -4 & 5 \end{vmatrix}$$

9) 
$$\begin{vmatrix} -1 & -8 & 9 \\ 4 & 12 & -7 \\ -10 & 3 & 2 \end{vmatrix}$$

10) 
$$\begin{vmatrix} -5 & 5 & 5 \\ -8 & 9 & -3 \\ 8 & 5 & 9 \end{vmatrix}$$

11) 
$$\begin{vmatrix} 0 & a & b \\ 0 & c & d \\ 0 & x & y \end{vmatrix}$$

12) What value of  $x$  makes the determinant  $-4$ ?  
$$\begin{vmatrix} -2 & 0 & 0 \\ -6 & x & 1 \\ -4 & 0 & -1 \end{vmatrix}$$

## Determinants of 3×3 Matrices

Evaluate the determinant of each matrix.

$$1) \begin{bmatrix} 3 & -2 & 1 \\ 3 & -1 & -2 \\ 3 & -2 & -3 \end{bmatrix}$$

**-12**

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

**-24**

Evaluate each determinant.

$$3) \begin{vmatrix} 5 & 3 & 3 \\ -4 & -5 & 1 \\ 5 & 3 & 0 \end{vmatrix}$$

**39**

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

**-103**

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

**-161**

$$6) \begin{vmatrix} -2 & 5 & -4 \\ 0 & -3 & 5 \\ -5 & 5 & -6 \end{vmatrix}$$

**-51**

$$7) \begin{vmatrix} 3 & 4 & 5 \\ -4 & 6 & 3 \\ 1 & -4 & 3 \end{vmatrix}$$

**200**

$$8) \begin{vmatrix} 6 & 5 & -3 \\ -5 & 4 & -2 \\ 1 & -4 & 5 \end{vmatrix}$$

**139**

$$9) \begin{vmatrix} -1 & -8 & 9 \\ 4 & 12 & -7 \\ -10 & 3 & 2 \end{vmatrix}$$

**647**

$$10) \begin{vmatrix} -5 & 5 & 5 \\ -8 & 9 & -3 \\ 8 & 5 & 9 \end{vmatrix}$$

**-800**

$$11) \begin{vmatrix} 0 & a & b \\ 0 & c & d \\ 0 & x & y \end{vmatrix}$$

**0**12) What value of  $x$  makes the determinant  $-4$ ?

$$\begin{vmatrix} -2 & 0 & 0 \\ -6 & x & 1 \\ -4 & 0 & -1 \end{vmatrix}$$

**-2**