8.4 The determinant of a square matrix

In this section you will learn to
Find the determinants of square matrices.

A determinant is a unique scalar number associated with a square matrix.

For a 2 x 2 matrix:

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$\det(A) = |A| =$

For a 3x3 matrix

$$B = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$$

$\det(B) = |B| =$

Example 1: Find the determinant of each matrix.

a) $\begin{bmatrix} 3 & -2 \\ 4 & 6 \end{bmatrix}$

b) $\begin{bmatrix} 0 & -1 & 2 \\ 4 & 1 & 0 \\ 1 & 0 & -2 \end{bmatrix}$

c) What if we have a 4 x 4 matrix?

$$\begin{vmatrix} -1 & 3 & 0 & 1 \\ 2 & 0 & 4 & -3 \\ -2 & 1 & 7 & 0 \\ 3 & 2 & 0 & 5 \end{vmatrix} =$$

Example 3:

Solve for x.

$$\begin{vmatrix} x + 4 & -2 \\ 7 & x - 5 \end{vmatrix} = 0$$