

Mar. 22, 2017  
Sect. 6-5a  
Determinant of  
a Matrix (Square)

Notation

$2 \times 2$

$3 \times 3$

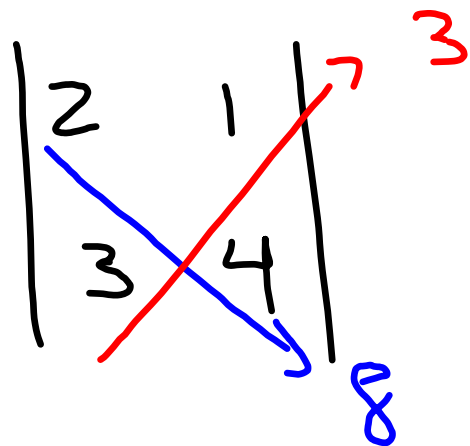
Notation

Given  $A$ , find  $\det(A)$

find  $|A|$

find  $\begin{vmatrix} \# & \# \\ \# & \# \end{vmatrix}$

Topless



$$= 8 - 3 = 5$$

$$\left| \begin{array}{cc|c} 6 & -3 & \\ \hline 1 & 2 & 12 \end{array} \right|$$

A red arrow points from the top-right element (-3) to the top-right element of the augmented matrix (-3). A blue arrow points from the top-left element (6) to the bottom-right element (12).

$$12 - (-3) = 15$$

$$\left| \begin{array}{cc|c} 2 & 6 & 6 \\ \hline 1 & 3 & 6 \end{array} \right|$$

$$= 6 - 6 = 0$$

$$\begin{array}{c}
 \begin{array}{ccc|ccc}
 3 & 1 & 2 & 3 & 1 & \\
 -1 & 0 & 1 & -1 & 0 & \\
 2 & -2 & 3 & 2 & -2 & 
 \end{array} \\
 \begin{array}{l}
 \text{Red arrows: } 0 - 6 - 3 = -9 \\
 \text{Blue arrows: } 0 + 2 + 4 = 6
 \end{array}
 \end{array}
 \quad
 \begin{array}{l}
 6 - (-9) = 15
 \end{array}$$

$$\begin{array}{ccc|ccc}
 2 & 1 & -1 & 2 & 1 & \\
 3 & 1 & -2 & 3 & 1 & \\
 0 & 1 & 1 & 0 & 1 & 
 \end{array}$$

$0 - 4 + 3 = -1$

$2 + 0 - 3 = -1$

$-1 - (-1) = 0$