

Determinants: Associated with each square matrix is a real # called a determinant.

$$\det A \quad |A|$$

### The Determinant of a Matrix

Determinant of a 2x2:

$$\det \begin{bmatrix} a & b \\ c & d \end{bmatrix} = ad - cb$$

Main diagonal needs to be 1st

Determinant of a 3x3

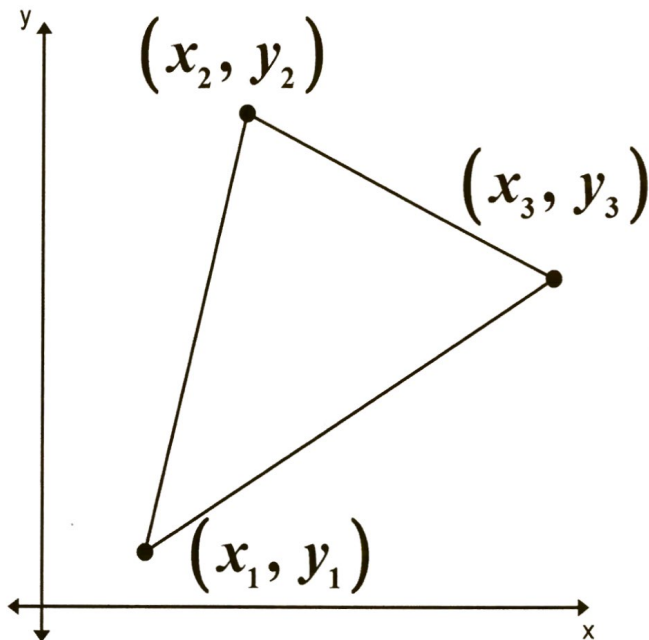
$$\det \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} = (aei + bfg + cdh) - (gec + hfa + idb)$$

Main Diag.

① Copy the 1st 2 columns of the matrix on the right side of the matrix

Area of a Triangle

$$\text{Area} = \pm \frac{1}{2} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$



Ex. 2: Find the area of the triangle shown.

$$\pm \frac{1}{2} \begin{vmatrix} 1 & 2 & 1 & 1 & 2 \\ 6 & 2 & 1 & 6 & 2 \\ 4 & 0 & 1 & 4 & 0 \end{vmatrix}$$

$$\begin{aligned} & (2+8+0) - (8+0+12) \\ & 10 - 20 \\ & -\frac{1}{2}(-10) \end{aligned}$$

5 units<sup>2</sup>

