Determinants: a real # we can find from any SQUARE Matrix

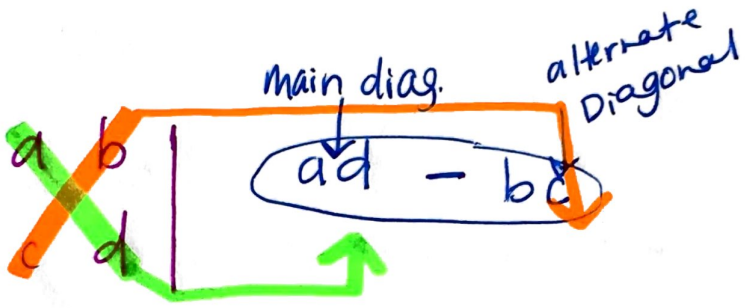
$\det(A)$ $|A|$

The Determinant of a Matrix

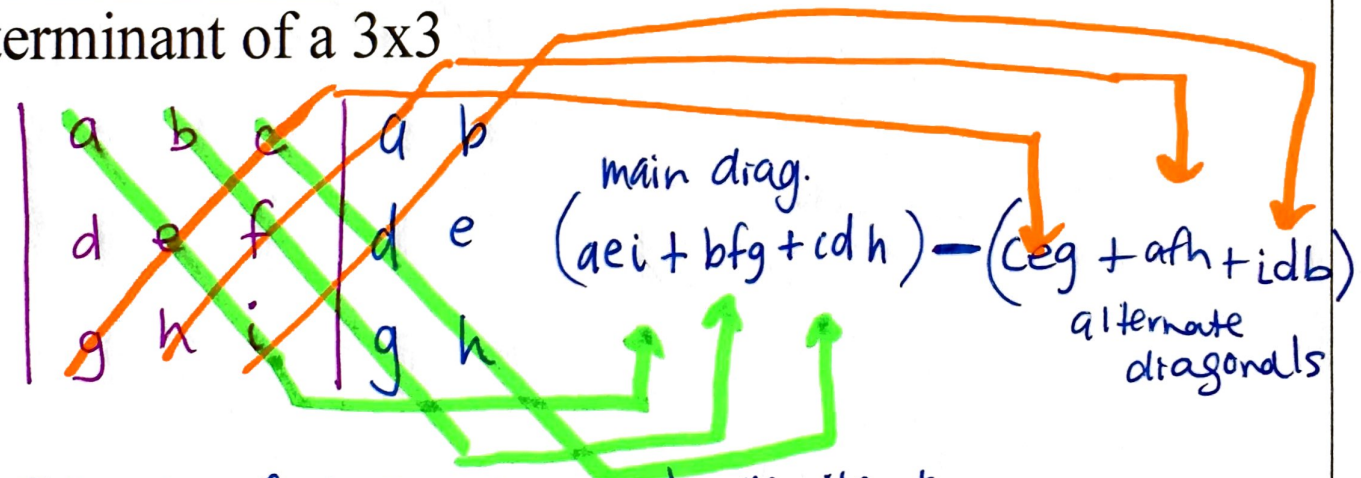
Determinant of a 2x2

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

$$\det(A) = \begin{vmatrix} a & b \\ c & d \end{vmatrix}$$



Determinant of a 3x3



*Take the first 2 columns & rewrite them on the right side of the matrix.

Ex. 1: Evaluate the determinant of the matrix.

a. $\begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix}$ $5 - 6 = -1$

b. $\begin{bmatrix} 2 & -1 & 3 \\ -2 & 0 & 1 \\ 1 & 2 & 4 \end{bmatrix}$

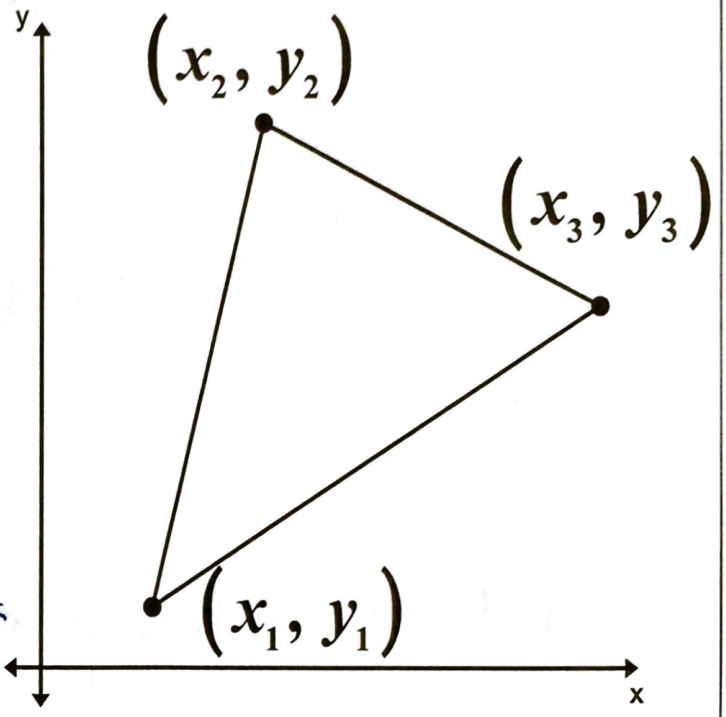
$(0 + -1 + -12) - (0 + 4 + 8)$

$(-13) - (12)$

$-13 - 12 = \boxed{-25}$

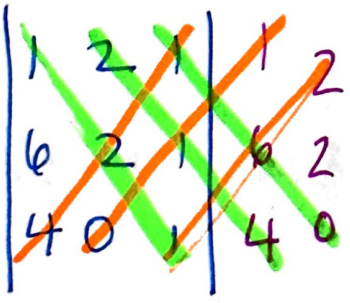
Area of a Triangle

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



* Ignore a negative answer Because Area can't be negative!*

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

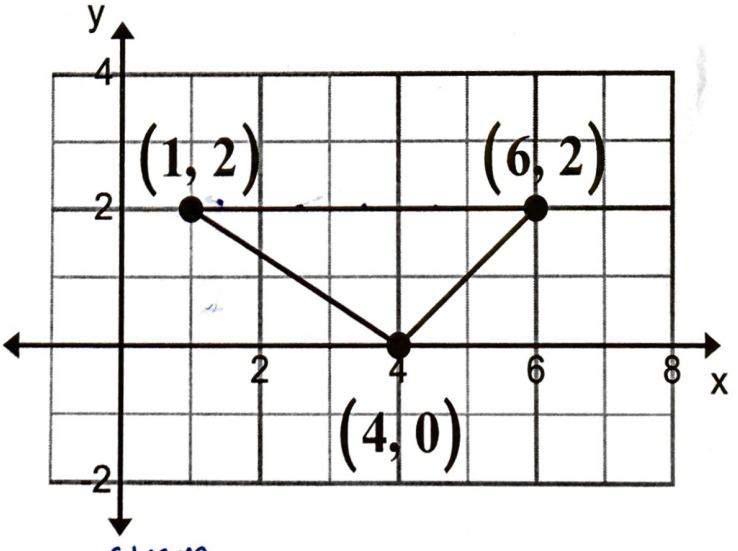


$(2 + 8 + 0) - (8 + 0 + 12)$

$10 - 20$

(-10)

$10 \cdot \frac{1}{2} =$ 5 units²



5 square units

$A = \frac{1}{2} \cdot 5 \cdot 2 = 5$

Height = 2

Base = 5