

Determinants

determinant (of a square matrix) -

a real # associated with every square matrix.

$$\text{Find } |A| = \det A$$

Determinant of a 2 x 2 Matrix:

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$$

Example:

$$1. \begin{vmatrix} 7 & 2 \\ 2 & 3 \end{vmatrix} = 21 - 4 = \boxed{17}$$

$$2. \begin{vmatrix} -3 & 5 \\ -2 & -1 \end{vmatrix} = 3 - (-10) = \boxed{13}$$

Determinant of a 3 x 3 Matrix:

Lattice Method

Method: (using Diagonals)

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

$$(aei + bfg + cdh)$$

downward
diagonals

Subtract

$$- (gef + hfa + idb)$$

upward
diagonals

★ This only works for 3x3.

Ex 3: Find the determinant.

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

$$= (-56 + 0 + -10) - (-7 + 0 + 30)$$

$$= (-66) - (23)$$

$$= -66 - 23$$

$$= \boxed{-89}$$

Determinant Notes

Ex 4: Find the determinant.

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

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

$$= (-13) - (12)$$

$$= \boxed{-25}$$