Day 2

WinterSunset95

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2 Calculations

$$P = \begin{bmatrix} -3 & 4 \\ 2 & -5 \end{bmatrix}$$

$$\begin{aligned} |P| &= ad - bc \\ &= -3(-5) - 4(2) = 7 \end{aligned}$$

Ex. Area of triange with vertices P(0,1), Q(2,3), R(4,0)
Solution: The matrix A formed by the coordinates is

$$A = \begin{bmatrix} 0 & 1 & 1 \\ 2 & 3 & 1 \\ 4 & 0 & 1 \end{bmatrix}$$

Now,
$|A| = a_{11}c_{11} + a_{12}c_{12} + a_{13}c_{13}$

$$c_{11} = (-1)^{1+1} det \begin{bmatrix} 3 & 1 \\ 0 & 1 \end{bmatrix}$$
$$= 1x(3x1) - 0 = 3$$
$$c_{12} = (-1)^{1+2} det \begin{bmatrix} 2 & 1 \\ 4 & 1 \end{bmatrix}$$
$$= -1(2-4) = 2$$

Therefore,

$$c_{13} = (-1)^{1+3} det \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix}$$
$$= 1(0-12) = -12$$

$So,$

$$|A| = 0x3 + 1x2 + 1(-12)$$
$$= 2 - 12 = -10$$

Area = 1/2—A— = 1/2(-10) = -5

Ex. Find the inverse of A = $\begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$

Solution: Firstly,
$|A| = ad - bc$
$$= (3x2) - (1x4) = 6 - 4 = 2$$

Here, —A— != 0, therefore A' exists.

$$adj(A) = \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

Now,

$$= \begin{bmatrix} 2 & -1 \\ -4 & 3 \end{bmatrix}$$
$$A' = \frac{1}{|A|} adj(A)$$
$$= \frac{1}{2} \begin{bmatrix} 2 & -1 \\ -4 & 3 \end{bmatrix}$$
$$= \begin{bmatrix} 1 & -\frac{1}{2} \\ -2 & \frac{3}{2} \end{bmatrix}$$
$$\begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ 10 \end{bmatrix}$$