Inverse Of a Matrix

Saturday, 26 July 2025 3:09 PM

$$A^{-1} = \frac{1}{|A|} \, adj(A)$$

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

$$|A| = 1(3+0) - 2(-1) + (-2)(2-0)$$

$$|A| = 3 + 2 - 4$$

$$|A| = 1$$

$$Adj(A) = (Cofector)^T$$

$$Cofector = \begin{bmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{bmatrix}$$

$a_1 = (3-0) = 3$ $\quad b_1 = (2-4) = -2$ $\quad c_1 = (+6) = 6$

$a_2 = (-1) = 1$ $\quad b_2 = (1-0) = 1$ $\quad c_2 = (-2) = -2$

$a_3 = (+2) = 2$ $\quad b_3 = (-2) = -2$ $\quad c_3 = (3+2) = 5$

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

$$Adj(A) = \begin{bmatrix} 3 & -2 & 6 \\ 1 & 1 & -2 \\ 2 & -2 & 5 \end{bmatrix}$$

$$A^{-1} = \frac{1}{|A|} \operatorname{adj}(A)$$

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

$$A^{-1} = \begin{bmatrix} 3 & -2 & 6 \\ 1 & 1 & -2 \\ 2 & -2 & 5 \end{bmatrix}$$