

Step-1

Given that $\det(A - \lambda I) = (\lambda_1 - \lambda)(\lambda_2 - \lambda) \dots (\lambda_n - \lambda)$ where $\lambda_1, \lambda_2, \dots, \lambda_n$ are the eigen values of A .

Substituting $\lambda = 0$ on either sides, we get

$$\det(A - 0I) = (\lambda_1 - 0)(\lambda_2 - 0) \dots (\lambda_n - 0)$$

Or, $\det A = \lambda_1 \lambda_2 \dots \lambda_n$

Therefore the determinant of the matrix is equal to the product of the eigen values.