PRACTICAL 1

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Aim:	Calculate the possible eigen values for the given matrix.				

The Eigen Values are: 3, $\frac{7+\sqrt{41}}{2}$, $\frac{7-\sqrt{41}}{2}$

Q Calculate Possible Eigen Value for matrix A.

Given Matrix :

$$A = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 4 & 5 \\ 0 & 2 & 3 \end{bmatrix}$$

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Identity Matrix (I) = $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

calculating $A - \lambda I = \begin{bmatrix} 3-\lambda & 0 & 0 \\ 0 & 4-\lambda & 5 \\ 0 & 2 & 3-\lambda \end{bmatrix}$

To Calculate eigenvalues $|A - \lambda I| = 0$

$\Rightarrow (3-\lambda)[(4-\lambda)(3-\lambda) - (2)(5)] + 0 + 0 = 0$

$\Rightarrow (3-\lambda)[12 - 7\lambda + \lambda^2 - 10] = 0$

$= (\lambda - 3)(\lambda^2 - 7\lambda + 2) = 0$

$\lambda - 3 = 0$

$\boxed{\lambda = 3}$ - (1)

$\lambda^2 - 7\lambda + 2 = 0$

$\lambda = \frac{7 \pm \sqrt{(-7)^2 - 4(1)(2)}}{2}$

$\lambda = \frac{7 \pm \sqrt{41}}{2}$

Thus Eigen values are : 3, $\frac{7+\sqrt{41}}{2}$, $\frac{7-\sqrt{41}}{2}$