Name: Key ID #:

As always you need to show your work. Fill in the appropriate blanks

1. The characteristic equation of a matrix A is $\det(A - \lambda I) = 0$.

2. Eigenvalues are roots of $\det(A - \lambda I) = 0 = 0$.

3. The char eqn of $A = \begin{pmatrix} 3 & 2 \\ 2 & 0 \end{pmatrix}$ is $(3-\lambda)(-\lambda) - 4 = 0$ with evals $\frac{3 \pm \sqrt{25}}{2}$

$\lambda^2 - 3\lambda - 4 = 0$

$\lambda = \frac{3 \pm \sqrt{9+16}}{2}$

or $\frac{3 \pm 5}{2} = 4$ or -1

4. The char eqn of $A = \begin{pmatrix} 3 & 2 \\ 2 & 3 \end{pmatrix}$ is $(3-\lambda)^2 - 4 = 0 = 0$ with evals $5, 1$

$(3-\lambda)^2 = 4$

$3 - \lambda = \pm 2$

$\lambda = 3 \pm 2 = 5, 1$

5. The char eqn of $A = \begin{pmatrix} 6 & 0 & 0 \\ 0 & 3 & 2 \\ 0 & -2 & 3 \end{pmatrix}$ is $(6-\lambda)\left[(3-\lambda)^2 + 4\right] = 0$ with evals $6, 3 \pm 2i$

$(3-\lambda)^2 = -4$

$\lambda - 3 = \pm 2i$

6. The char eqn of $A = \begin{pmatrix} 6 & 0 & 0 \\ 0 & 3 & 2 \\ 1 & 1 & 0 \end{pmatrix}$ is $(6-\lambda)\left[(3-\lambda)(-\lambda) - 2\right] = 0$ with evals $6, \frac{3 \pm \sqrt{17}}{2}$

$(3-\lambda)(-\lambda) - 2 = 0$

$\lambda^2 - 3\lambda - 2 = 0$

$\lambda = \frac{3 \pm \sqrt{9+8}}{2}$