

5.2 # 3

3. $A = \begin{bmatrix} 3 & -2 \\ 1 & -1 \end{bmatrix}$, $A - \lambda I = \begin{bmatrix} 3 - \lambda & -2 \\ 1 & -1 - \lambda \end{bmatrix}$. The characteristic polynomial is

$$\det(A - \lambda I) = (3 - \lambda)(-1 - \lambda) - (-2)(1) = \lambda^2 - 2\lambda - 1$$

Use the quadratic formula to solve the characteristic equation and find the eigenvalues:

$$\lambda = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{4 + 4}}{2} = 1 \pm \sqrt{2}$$