

1. Let $A = \begin{bmatrix} -2 & 0 & 0 \\ 0 & 1 & -4 \\ 0 & -4 & 1 \end{bmatrix}$. Is A diagonalizable? If so, find a diagonalization.

2. Construct a matrix A with eigenvalues $0, 2, 3$ and eigenvectors $(1, 3, -2)$, $(3, 2, 0)$, and $(-2, 1, 4)$, respectively.

3. Let $B = \begin{bmatrix} 3 & -1 \\ 1 & 1 \end{bmatrix}$. Is B diagonalizable? If so, find a diagonalization.

4. True or False

(a) If A is diagonalizable, then A invertible.

(b) If A is invertible, then A is diagonalizable.