

NAME: _____

Eigenvalues, Eigenvectors, and Critical Points Worksheet

- 1) Find eigenvalues and corresponding unit eigenvectors of the following 2×2 matrices:

a) $A = \begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix}.$

b) $B = \begin{bmatrix} -2 & 1 \\ -1 & 2 \end{bmatrix}.$

- 2) Find eigenvalues of the following 3×3 matrix: $C = \begin{bmatrix} 1 & -3 & 3 \\ 3 & -5 & 4 \\ 6 & -6 & 4 \end{bmatrix}$

- 3) Consider the function $w = (x - 1)(y - 2) + z^2$.
- a) Find the critical point of w .
 - b) Calculate the Hessian matrix evaluated at the critical point.
 - c) Find the eigenvalues of the Hessian matrix and use them to classify the critical point.