Show all work legibly.   **Name:**_____

$$A = \begin{bmatrix} 2 & -1 \\ 0 & 1 \end{bmatrix}$$

1. (20) Find eigenvalues λ_1 and λ_2 of the matrix A.

$\lambda_1 =$ $\lambda_2 =$

2. (20) Find eigenvectors $\mathbf{v}_1$ and $\mathbf{v}_2$ so that $A\mathbf{v}_1 = \lambda_1 \mathbf{v}_1$, and $A\mathbf{v}_2 = \lambda_2 \mathbf{v}_2$.

$$\mathbf{v}_1 = \begin{bmatrix} \end{bmatrix} \text{ and } \mathbf{v}_2 = \begin{bmatrix} \end{bmatrix}$$

3. (20) Find the inverse V^{-1} of the matrix $V = [\mathbf{v}_1, \mathbf{v}_2]$ where $\mathbf{v}_1$ and $\mathbf{v}_2$ are eigenvectors of the matrix A.

$V^{-1} =$

4. (20) Use V and V^{-1} to compute A^{10}.

$A^{10} =$

5. (20) Use the eigenvectors $\mathbf{v}_1$ and $\mathbf{v}_2$ to build an orthonormal basis $\{\mathbf{w}_1, \mathbf{w}_2\}$ for $\mathbf{R}^2$.

$$\mathbf{w}_1 = \begin{bmatrix} \\ \end{bmatrix} \text{ and } \mathbf{w}_2 = \begin{bmatrix} \\ \end{bmatrix}$$