MATH221

quiz #4, 12/2/14

Total 100

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

1. (20) Let $A = \begin{bmatrix} 2 & 0 & -4 \\ 0 & 1 & 3 \\ 1 & 5 & 8 \end{bmatrix}$. Compute $|A|$ the determinant of A.

$|A| =$

2. (80) Let $A = \begin{bmatrix} 4 & 2 \\ 2 & 1 \end{bmatrix}$.

(a) **(20)** Find the eigenvalues λ_1 and λ_2 of A.

The eigenvalues of A are: $\lambda_1 =$ $\lambda_2 =$

(b) **(20)** Find unit norm eigenvectors $\mathbf{v}_1$ and $\mathbf{v}_2$ of A.

The eigenvectors of A are: $\mathbf{v}_1 =$ $\mathbf{v}_2 =$

(c) **(20)** Find a matrix V such that $V^T A V = \Lambda$, where Λ is a diagonal matrix.

$V =$

(d) **(20)** Compute A^6.

$A^6 =$

3. (20) Let $\mathbf{y} = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$, and $\mathbf{u} = \begin{bmatrix} 7 \\ 1 \end{bmatrix}$. Compute the distance d from $\mathbf{u}$ to the line through $\mathbf{y}$ and the origin.

$d =$