QUIZ 10 FOR MATH 304-06, 11/20 YOUR NAME _____

(1) (5 points) Complete the sentence: An orthogonal matrix is defined as a square matrix $B$ such that

(2) (5 points) Complete the sentence: A matrix $A$ is called orthogonally diagonalizable if

(3) (5 points) Complete the sentence: If $A$ is symmetric, if $\lambda_1$ and $\lambda_2$ are two different eigenvalues, and if $\lambda_1$ has an eigenvector $\mathbf{u}_1$ and $\lambda_2$ has an eigenvector $\mathbf{u}_2$, then $\mathbf{u}_1$ and $\mathbf{u}_2$ are _____.

(4) (5 points) Complete the sentence: Suppose $A$ is an $n \times n$ matrix. Then $\mathbb{R}^n$ has a basis that consists of _____ eigenvectors of $A$, if and only if $A$ is symmetric.

(5) (10 points) Let $A = \begin{bmatrix} 9 & 12 \\ 12 & 16 \end{bmatrix}$. Find an ortbogonal matrix $P$ such that $A = PDP^{-1}$, where $D$ is a diagonal matrix. Also find $D$.