Question 1 *True/False: A matrix A is symmetric if $A = A^T$.*

Multiple Choice:

(a) *True* ✓

(b) *False*

Question 2 *True/False: A matrix is orthogonal if it has orthogonal columns.*

Multiple Choice:

(a) *True*

(b) *False* ✓

Hint: *Consider* $A = \begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}$.

Question 3 *Suppose A is orthogonally diagonalizable with $A = PDP^{-1}$. Which of the following statements must be true?*

Select All Correct Answers:

(a) *A is symmetric.* ✓

(b) *The columns of P are unit vectors.* ✓

(c) *The columns of D are unit vectors.*

(d) $P^T = P^{-1}$ ✓

Question 4 *Suppose A is a symmetric 5×5 matrix. Which of the following statements could be true?*

Select All Correct Answers:

(a) *A has less than 5 eigenvalues counting multiplicity.*

(b) *A has more than 5 eigenvalues counting multiplicity.*

(c) *A has 5 distinct eigenvalues.* ✓

(d) *A has 5 eigenvalues counting multiplicity.* ✓

Question 5 *True/False: The dimension of an eigenspace of a symmetric matrix equals the multiplicity of the corresponding eigenvalue*

Multiple Choice:

(a) *True* ✓

(b) *False*
