309 Worksheet 4.1

True or False? Justify your answer:

(1) The norm is a function from a vector space into the set of nonnegative real numbers.
True — False?
REASON:

(2) If the distance from $\mathbf{u}$ to $\mathbf{v}$ equals the distance from $\mathbf{u}$ to $-\mathbf{v}$, then $\mathbf{u}$ and $\mathbf{v}$ are orthogonal.
True — False?
REASON:

(3) Not every linearly independent subset of $\mathbb{R}^n$ is an orthogonal set.
True — False?
REASON:

(4) Not every orthogonal set is linearly independent.
True — False?
REASON:

(5) If a set $T = \{\mathbf{u}_1, \ldots, \mathbf{u}_n\}$ has the property that $< \mathbf{u}_i, \mathbf{u}_j >= 0$ whenever $i \neq j$, then T is an orthonormal set.
True — False?
REASON:

(6) The orthogonal projection of $\mathbf{y}$ onto $\mathbf{v}$ is the same as the orthogonal projection of $\mathbf{y}$ onto $c\mathbf{v}$ whenever $c \neq 0$.
True — False?
REASON: