Q7 316

Work Problem 1 or 2, clearly indicating which problem is to be graded. *No notes, books, or calculators.*

(1) State/Define the following:

(a) State 5 of the 10 *axioms* for a collection of objects V to be vector space.

(b) Define what it means for H to be a *subspace* of a vector space V.

(c) Define what it means for a set $\{v_1, \ldots, v_p\}$ of vectors in a vector space V to be *linearly independent.*

(d) Define what it means to be a *basis* for a subspace H of a vector space V.

(2) Let the columns of $B = \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$ be a basis for $\mathbb{R}^2$.

(a) If $x = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$, find the coordinates $[x]_B$.

(b) If the coordinates of the vector y are $[y]_B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$, find the vector y.