

Problems - HW 6

Tuesday, September 22

- Suppose that V is a vector space of dimension 7, that W is a vector space of dimension 4, and that $T : V \rightarrow W$ is a linear transformation. Which of the following is *not* necessarily true?
 - If $T(v) = 3w$, then $T(2v) = 6w$.
 - There are independent vectors $v_1, v_2 \in V$ such that $T(v_1) = T(v_2) = 0$.
 - $T(v_1 - v_2) = T(v_1) - T(v_2)$.
 - For every $w \in W$, there is a $v \in V$ such that $T(v) = w$.
 - There are independent vectors $v_1, v_2 \in V$ such that $T(v_1) = T(v_2)$.
- If V and W are subspaces of \mathbb{R}^8 with $\dim(V) = 5$ and $\dim(W) = 6$, then which of the following must be true.
 - $\dim(V \cap W) = 1$
 - $\dim(V \cap W) = 5$
 - $3 \leq \dim(V \cap W) \leq 5$
 - $7 \leq \dim(V + W) \leq 10$
 - $\dim(V + W) = 11$
- Which of the following is *not* a subspace of \mathbb{R}^3 ?
 - $\{(x, y, z) \in \mathbb{R}^3 : x - 3y + 2z = 0\}$
 - $\{(x, y, z) \in \mathbb{R}^3 : x^2 - y^2 + z^2 = 0\}$
 - $\{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 = 0\}$
 - The y -axis
 - The xz -plane