MATH 131–HOMEWORK 3

Due on Monday, Jan 28, before class.

Please read section §2.A.

Question 1 (10 points) Find the plane equation of the subspace

$$\texttt{Span}((1,1,0),(0,0,1))$$

in $\mathbb{R}^3$.

Question 2 (10 points) Show that if $v_1, \ldots, v_m$ and $w_1, \ldots, w_n$ are vectors in V, then

$$\texttt{Span}(v_1, \ldots, v_m) + \texttt{Span}(w_1, \ldots, w_n) = \texttt{Span}(v_1, \ldots, v_m, w_1, \ldots, w_n).$$

Question 3 (10 points) Explain why no set of four polynomials spans $P_4(\mathbb{F})$.

Question 4 (10 points) Prove or give a counterexample: Let W and U are two subspaces of V and $x \in V$. If $x \notin W$ and $x \notin U$, then $x \notin W + U$.

Question 5 (10 points) Suppose $\{v_1, v_2, v_3, v_4\}$ is linearly independent in V. Prove or give a counterexample: the subset

$$\{v_1 - v_2, v_2 - v_3, v_3 - v_4, v_4\}$$

is also linearly independent.

Question 6 (10 points) Prove or give a counterexample:
If $\{v_1, \ldots, v_m\}$ and $\{w_1, \ldots, w_m\}$ are linearly independent subsets of vectors in V, then $\{v_1 + w_1, \ldots, v_m + w_m\}$ is linearly independent.