

1. For what values of λ are the vectors $(\lambda, 1, 0)$, $(1, \lambda, 1)$ and $(0, 1, \lambda)$ in \mathbf{R}^3 linearly dependent?
2. Let L , M , N be subspaces of the vectorspace V . Show that

$$L \cap (M + (L \cap N)) = (L \cap M) + (L \cap N).$$

3. Show that B is a basis for the vector space U if and only if B is a minimal spanning set.
4. (For extra credit) Let V and W be two proper subspaces of the vector space U . Show that $U \neq V \cup W$.