Math 423 Homework 2 due in class, Monday, 6/26/06

Curtis, p33, #7: Is the intersection of two subspaces always a subspace? Prove your answer.

Curtis, p33, #8: Is the union of two subspaces always a subspace? Explain.

Curtis, p33, #10: Show that any set of vectors which contains a set of linearly dependent vectors is linearly dependent. What is the analogous statemnent about linearly independent vectors? (Prove your answer.)

Curtis, p37, #4: Show that the set of all functions $f \in C(\mathbf{R})$ such that $\frac{df}{dt}$ exists and $\frac{df}{dt} = 0$ is a one-dimensional subspace of $C(\mathbf{R})$. Generalize this result. For example, what is the dimension of the subspace consisting of all $f \in C(\mathbf{R})$ such that $\frac{d^2f}{dt^2}$ exists and $\frac{d^2f}{dt^2} = 0$?