Math 110

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September 5, 2002

Let V and W be vector spaces over a field F. Suppose that $f: V \to W$ satisfies f(v+w) = f(v) + f(w) for $v, w \in V$. Assume that f(v) = 0 if and only if v = 0.

Show that f is injective (i.e., f is 1-1).