

MA552. Homework 6

Homework due October 17, 2006

Let A, B be finite-dimensional vector subspaces of a vector space E over the field K .

1. Show that the set (denoted by $A + B$) consisting of all the sums of an element in A and an element in B is a vector subspace of E .
2. Show that $A + B$ is finite-dimensional and that

$$\dim(A + B) + \dim A \cap B = \dim A + \dim B$$

(Hint: consider first the simple case in which $A \cap B$ consists only of the zero element.)