MA552. Quiz 7

Let $A$, $B$ are 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.)