309 Worksheet 3.1

(1) Let V be a vector space, S a subspace of V, and $\mathbf{u}, \mathbf{v} \in V$ vectors with $\mathbf{u}, \mathbf{v} \in S$. Show that
(a) $\operatorname{span}(\mathbf{u}, \mathbf{v}) \subseteq S$
(b) $\operatorname{span}(\mathbf{u}, \mathbf{v})$ is the smallest subspace of V that contains $\mathbf{u}$ and $\mathbf{v}$.
Proof:

(2) Given subspaces S and T of a vector space V. The *sum* of S and T is defined to be the set

$$S + T = \{\, \mathbf{u} + \mathbf{v} \,|\, \mathbf{u} \in S \text{ and } \mathbf{v} \in T \,\}.$$

Show that $S + T$ is a subspace of V.
Proof: