1. The sets $A$ and $B$ are subsets of the vector space $\mathbb{R}^3$. For each set, either show that it is affine by showing the affine combination $s\vec{w} + (1 - s)\vec{v}$ does belong to the set whenever $\vec{w}$ and $\vec{v}$ belong to the set and $s$ is a real scalar; or show that it is not affine by producing elements $\vec{w}$ and $\vec{v}$ of the set and a real scalar $s$, so that the affine combination $s\vec{w} + (1 - s)\vec{v}$ does not belong to given set.

(a) $A = \{(x, y, z) : x > 0\}$

(b) $B = \{(x, y, z) : x - z = 5\}$

2. The sets $F$ and $S$ are subsets of the vector space $C([0, 1])$, the collection of continuous functions $f : [0, 1] \rightarrow \mathbb{R}$. Let $F = \{f : \int_0^1 f(t) \, dt = 1\}$ and let $S = \{f : \int_0^1 f(t) \, dt = 0\}$. (You may remember from the first quiz that $S$ is a subspace of $C([0, 1])$.) Show If $g \in F$, then $S = F - g = \{f - g : f \in F\}$. [Hint you need to show $F - g \subset S$ and $S \subset F - g$.]