Recall that a linear functional $L\colon V \to F$ is called bounded if there exisits constant $c > 0$ such that $|L(v)| \leq c \cdot \|v\|$ for any $v \in V$.

Let $V = C[0,1]$ be the vector space of real valued continuous functions on $[0,1]$.

a) construct an unbounded linear functional $L\colon V \to \mathbb{R}$;

b) construct a bounded linear functional $L\colon V \to \mathbb{R}$ which can not be represented as $L(v) = \langle v, y\rangle$ for some $y \in V$.