Q2

$$\begin{aligned} f((0,1,0),(0,1,0)) &= 0 \cdot 0 + 0 \cdot 0 \\ &= 0 \end{aligned}$$

However, $(0,1,0) \neq 0$, so f does not satisfy the property of definiteness.

Q3

Let S be the set of inner products with the positivity condition. Let S' be the set of inner products with the new condition. To start, let $f \in S$. Then, $f(v,v) > 0 \; \forall v \in V$ with $v \neq 0$, so the new condition is satisfied since $\exists v \in V$ with $f(v,v) > 0$. So, $f \in S'$, so $S \subseteq S'$. INCMPLETE

Q8