1 | **Axler6.45 orthogonal complement, $U^\perp$**

if U is a subset of V, then the orthogonal complement of U, denoted $U^\perp$, is the set of all vectors in V that are orthogonal to every vector in U:

$$U^\perp = \{v \in V : \langle v, u \rangle = 0 \forall u \in U\}$$

1.1 | **results**

1.1.1 | **Axler6.46 basic properties**

1. complement is a subspace: if U is a subset of V, then $U^\perp$ is a subspace of V

2. $\{0\}^\perp = V$

3. $V^\perp = \{0\}$

4. If U is a subset of V, then $U \cap U^\perp \subseteq \{0\}$

5. If U and W are subsets of V and $U \subseteq W$