This is an “un-quiz” to help you check if you’re understanding the material. You should give yourself 10 minutes to try this problem, and you should not use any notes, texts, or other aids. If you would like to turn this in, I will grade it as if it were an exam problem.

Let \( v \in \mathbb{R}^n \), and define
\[
S = \{ x \in \mathbb{R}^n \mid v \cdot x = 0 \}.
\]

1. Show that \( S \) is a subspace of \( \mathbb{R}^n \).

2. What is the dimension of \( S \)? Explain your answer.