4.1 Exercises

Problem 1 Determine whether $\vec{u} = (1,4,5)$, $\vec{v} = (4,2,5)$, $\vec{w} = (-3,3,-1)$ are linearly independent or dependent. If they're linearly dependent, find scalars $a, b,$ and c not all zero such that $a\vec{u} + b\vec{v} + c\vec{w} = \vec{0}$.

Problem 2 Show that V, defined as the set of all (x,y,z) such that $z = 2x + 3y,$ is closed under addition and under multiplication by scalars, and is therefore a subspace of $\mathbb{R}^3$.

Problem 3 Show that V, the set of all (x,y,z) such that $y = 1$, is not a subspace of $\mathbb{R}^3$.