Assignment 1
Due date: 11 March 2021
TA: 劉孟鑫 E814 (15:10~16:00)

1. If $b \in \mathbf{F}$, then show that $\{(x_1, x_2, x_3, x_4) \in \mathbf{F}^4 \mid x_3 = 5x_4 + b\}$ is a subspace of $\mathbf{F}^4$ if and only if $b = 0$.
2. Prove that $\{0\}$ is a subspace of a vector space *V*.
3. Show that $(1, 2), (3, 5)$ is a basis of $\mathbf{F}^2$.
4. Show that
   a. $V = \{(x, y, z) \in \mathbf{R}^3 \mid x + y + z = 0\}$ is a subspace of $\mathbf{F}^3$.
   b. Following a., show that $(1, -1, 0), (1, 0, -1)$ is a basis of *V*.