1. Let $A = (1, 2, 3)$, $B = (2, 3, 4)$, $C = (5, 7, 9)$. Find $x, y \in \mathbb{R}$ so that $C = xA + yB$.

2. Find all real $t$ so that $(1 + t, 1 - t)$ and $(1 - t, 1 + t)$ are linearly independent.

3. Let $i, j, k$ and $i + j + k$ be four vectors in $\mathbb{R}^3$. Show that any three are linearly independent, but all 4 are linearly dependent.

4. Find two bases for $\mathbb{R}^3$ containing the vectors $(1, 1, 2)$ and $(1, 0, 1)$.

5. Let $L$ be the line in $\mathbb{R}^3$ through the points $(-3, 1, 1)$ and $(1, 2, 7)$. Determine which of the following points are on the line:
   a) $(-7, 0, 5)$
   b) $(-7, 0, -5)$
   c) $(-11, 1, 11)$

6. Let $L$ be the line in $\mathbb{R}^2$ given by
   $$\{X \in \mathbb{R}^2 : X \cdot N = P \cdot N\},$$
   where $P$ is on the line and $N$ is a non-zero vector normal to the line. Let $Q$ be a point in $\mathbb{R}^2$. Prove that the distance of $Q$ to $L$ is
   $$\frac{|(P - Q) \cdot N|}{\|N\|}.$$