1. True or False?

There exist vectors v_1, v_2, v_3 in $\mathbf{F}^3$ such that v_3 is a linear combination of v_1 and v_2, but v_1 is *not* a linear combination of v_2 and v_3.

2. True or False?

There exist a linearly dependent list of 3 vectors in $\mathbf{F}^3$ none of which is a scalar multiple of another.

3. True or False?

There exists a number $t \in \mathbf{F}$ such that the list

$$(1, -1, 0), (0, 1, 1), (1, 0, t)$$

is linearly dependent in $\mathbf{F}^3$.

4. True or False?

Let V be the set of sequences $(a_0, a_1, a_2, \dots)$ in $\mathbf{F}^\infty$ for which $a_n \neq 0$ for only finitely many n. Then V is a finite dimensional subspace of $\mathbf{F}^\infty$.