MATH 306 Workshop

Important Theorems: (you should also review all the definitions)
Subspace:1.34
Direct sum: 1.44, 1.45
Span: 2.21

1. What is the definition of a **subspace**?

2. How do we prove a subset of a vector space is a subspace?

3. Prove or disprove: if A and B are two subspaces of **V**, then the union of A and B is also a subspace of **V**.

4. $Suppose\ U = \{(x, x, y, y) \in \mathbb{F}^4 : x, y \in \mathbb{F}\}$

   $Find\ a\ subspace\ W\ of\ \mathbb{F}^4\ such\ that\ \mathbb{F}^4 = U \oplus W$

5. Review the definitions from 2A
   a. Linear combination
   b. Span
   c. Finite-dimensional vector space

d. Polynomial, $\mathcal{P}(\mathbb{F})$

e. $\mathcal{P}_m(\mathbb{F})$

f. Linearly independent

6. *Suppose* v_1, v_2, v_3, v_4 *spans* V. *Prove that the list*

$$v_1 - v_2\,, v_2 - v_3\,, v_3 - v_4\,, v_4$$

also spans V.

7. *Explain why no list of* 4 *polynomials spans* $\mathcal{P}_4(\mathbb{F})$