Name: _____

Quiz 13

This quiz is graded out of 12 marks. No books, watches, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

defintion:[1] The *union* of two sets A and B, denoted $A \cup B$, is the set of elements which are in A, in B, or in both A and B. In symbols, $A \cup B = \{x \mid x \in A \text{ or } x \in B\}$

The *intersection* of two sets A and B, denoted by $A \cap B$, is the set of all objects that are members of both the sets A and B. In symbols, $A \cap B = \{x \mid x \in A \text{ and } x \in B\}$.

Question 1. Prove or disprove.

a. *(3 marks)* The intersection of any two subspaces of a vector space V is a subspace of V.

b. *(3 marks)* The union of any two subspaces of a vector space V is a subspace of V

Question 2. *(4 marks)* Determine whether the following polynomials span P_2: $p_1 = 1 - x + 2x^2, p_2 = 3 + x, p_3 = 5 - x + 4x^2, p_4 = -2 - 2x + 2x^2$.

Question 3. *(3 marks)* Determine whether $\mathbb{R} \subseteq \text{span}(\{\sin^2 x, \cos^2 x\})$.

[1] from Wikipedia