Quiz 1 Linear Aglebra I

Name: ____________________ NetID: | | | | | | | | | | | |

Do not begin until instructed. Clearly justify each step.

Problem 1. Recall that we defined the complex numbers as the set

$$\mathbb{C} = \{a + bi : a, b \in \mathbb{R}\}.$$

along with the operations of addition and multiplication defined by

$$(a + bi) + (c + di) = (a + c) + (b + d)i, \quad (a + bi) \cdot (c + di) = (ac - bd) + (ad + bc)i.$$

Show that $\alpha \cdot \beta = \beta \cdot \alpha$ for any $\alpha, \beta \in \mathbb{C}$.

Problem 2. Recall that a non-empty subset X of a vector space V is a *subspace* if it is closed under addition and scalar multiplication.

Show that the set of all continuous real-valued functions f on the interval $[0, 1]$ such that $f'(0) = b$ is a subspace of the vector space of all continuous real-valued functions on $[0, 1]$ if and only if $b = 0$.