King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

Semester (111) September 26, 2011

Math 302-03
Quiz 1

Name: .....

ID: .....

Exercise 1. Let $E = \mathbb{R}^3$ be equipped with the standard scalar multiplication, but with the addition defined by

$$(x, y, z) + (u, v, w) = (z + w, y + v, x + u), \text{ for all } (x, y, z) \text{ and } (u, v, w) \in \mathbb{R}^3.$$

Give an axiom of vector spaces that fails to hold for E.

Exercise 2. Let $S = \{(a, b, c) \in \mathbb{R}^3 \mid b = a + c + 1\}$. Is S a subspace of $\mathbb{R}^3$?

Exercise 3. Let $S = \{(a, b, c, d) \in \mathbb{R}^4 \mid a = b = c = d\}$. Show that S is a subspace of $\mathbb{R}^4$ and evaluate $\dim(S)$.