King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 280 (161) Sec 01 - Quiz 2

Name: ID: Serial No.:

1. Let S be a subset of $\mathbb{R}^3$ such that

$$S = \{(a, b, c)^T \in \mathbb{R}^3 |\ c = 2a + b\}$$

Show that S is a subspace of $\mathbb{R}^3$.

2. Let $u_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$, $u_2 = \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix}$, and $u_3 = \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$

(a) Show that the set $B_1 = \{u_1, u_2, u_3\}$ forms a basis for $\mathbb{R}^3$.

(b) Find the transition matrix from the $B_2 = \{e_1, e_2, e_3\}$ to B_1.

(c) Using part (b) find $[v]_{B_1}$ where $v = (3, 2, -5)^T$.