MA3.101: Linear Algebra (Spring 2019)
Quiz 3

February 25, 2019

Time: Strictly 20 mins. Max. Marks: 10

Please Sit Apart. Do NOT copy, DO NOT refer to notes. If found doing so, you will get a zero.

1 Questions

1. (3+2+2.5+2.5) Let $V = \mathbb{R}^2$ and $W = \mathbb{R}^3$. Define $L : V \to W$ by $L(x_1, x_2) = (x_1 - x_2, x_1, x_2)$. Let $F = \{(1, 1), (-1, 1)\}$, $E = \{(1, 0), (1, 1)\}$ and let $G = \{(1, 0, 1), (0, 1, 1), (1, 1, 0)\}$.

   (a) Let $\mathbf{x} = (3, 1)$. Find $[\mathbf{x}]_E$ (coordinates of $\mathbf{x}$ with respect to basis E) and $[\mathbf{x}]_F$ (coordinates of $\mathbf{x}$ with respect to basis F).

   (b) Find the matrix P relating $[\mathbf{x}]_E$ and $[\mathbf{x}]_F$ (basis transformation matrix $[P]_E^F$ or its inverse).

   (c) Find the matrix representation of L using the bases E and G.

   (d) Find the matrix representation of L using the bases F and G.