MA3.101: Linear Algebra (Spring 2019)
Quiz 2

January 30, 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. (2.5+2.5 marks) Show that the following vectors are linearly independent or dependent.
   (a) Let V be the set of all continuous functions from $\mathbb{R}$ to $\mathbb{R}$. Show that V is a vector space over $\mathbb{R}$.
   (b) Consider the set $\{sin^n\theta\} \cup \{cos(k\theta), sin(k\theta) : k = 0, ..., n\}$, for some positive even integer n. Is this a set of linearly independent vectors in V?
2. (5 marks) Let U be the subspace of $\mathbb{R}^5$ defined by $U = \{(x_1, x_2, x_3, x_4, x_5) \in \mathbb{R}^5 : x_1 = 3x_2 \; and \; x_3 = 7x_4\}$. Find a basis of U.