

Tutorial Quiz 2018

MATH1014 - Mathematics and Applications 2

Tutorial Quiz 1 Calculus and Linear Algebra

Reading time: 1 minute
Writing time: 10 minutes

Student Name: _____
University ID: _____

Question and Answer Book

Structure of Book

<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
3	3	10

- Students are NOT permitted any calculators or notes during the quiz.
- Students are NOT permitted to collaborate in any form during the quiz. Any signs of collaboration or cheating will result in a nullified score and the course convenor will be informed of any academic misconduct.

Materials supplied

- Question and answer booklet of 4 pages.
- Working space is provided throughout the booklet.

Instructions

- Write your **student number** in the space provided above on this page.
- All written responses must be in English.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

Question 3

Consider the following vector $\mathbf{r}(t) \in \mathbb{R}^3$ which is parameterised by time $t \in \mathbb{R}_{\geq 0}$,

$$\mathbf{r}(t) = \cos t \mathbf{i} + \sin t \mathbf{j}.$$

- (a) Evaluate $\mathbf{r}'(t)$. Here $\mathbf{r}'(t)$ denotes the vector whose components are given by the derivatives of the components of $\mathbf{r}(t)$. [2 marks].

- (b) Show that $\mathbf{r}(t)$ and $\mathbf{r}'(t)$ are orthogonal. [2 marks].

END OF TUTORIAL QUIZ.