Tutorial Quiz 2018

MATH1013 - Mathematics and Applications 1

Tutorial Quiz 3
Calculus and Linear Algebra

Reading time: 1 minute
Writing time: 10 minutes

Student Name: _____
University ID: _____

Question and Answer Book

Structure of Book

Number of questions	*Number of questions to be answered*	*Number of marks*
2	2	10

- Students are NOT permitted any calculators or notes during the quiz.
- Students are NOT permitted to colaborate 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 5 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.

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Intructions

Answer **all** questions in the space provided.
In all questions where a numerical answer is required, an exact value must be given unless otherwise specified.
In questions where more than one mark is available, appropriate working **must** be shown.
Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Linear Algebra

Question 1

a. Give the reduced row echelon form of the augmented matrix for a linear system with two equations in three unknowns that has infinitely many solutions. [1 mark].

b. Let T be a linear transformation defined by matrix multiplication $\mathbf{v} \mapsto A\mathbf{v}$, where

$$A = \begin{bmatrix} 1 & 0 & 3 \\ -2 & 1 & -3 \end{bmatrix}.$$

(i) Determine the domain of A. [1 mark].

(ii) Determine the codomain of A. [1 mark].

Turn Over.

(iii) Determine all vectors $\mathbf{v}$ such that $T(\mathbf{v}) = \mathbf{0}$. [2 marks].

(iv) (Bonus). Determine the associated geometric picture for the solution set of $T(\mathbf{v}) = \mathbf{0}$. That is, determine whether the solution set is a point, line, plane or hyperplane.

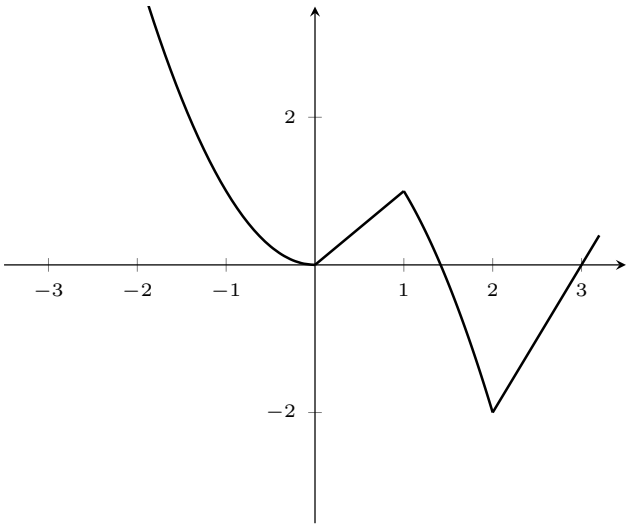
[+1 mark]

Turn Over.

Calculus

Question 1

The diagram shows the graph of a function with domain $\mathbb{R}$.



a. For the graph shown above, sketch on the same set of axes the graph of the derivative function.

[3 marks].

b. Write down the domain of the derivative function. [1 mark].

c. Provide an example of a function which is continuous for all $x \in \mathbb{R}$ but not differentiable for all $x \in \mathbb{R}$. [1 mark].

END OF TUTORIAL QUIZ