

Tutorial Quiz 2018

# MATH1013 - Mathematics and Applications 1

## Tutorial Quiz 4 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>
2	2	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 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.**



- c. Suppose we now extend  $T$  to be a function defined on  $\mathbb{R}^5$ . That is, we have a new function  $\tilde{T} : \mathbb{R}^5 \rightarrow \mathbb{R}^3$  which agrees with  $T$  when restricted to  $\mathbb{R}^3$ . Determine, with justification, the dimension of the matrix  $A$ , where  $\tilde{T}(\mathbf{v}) = A\mathbf{v}$ . [1 mark].

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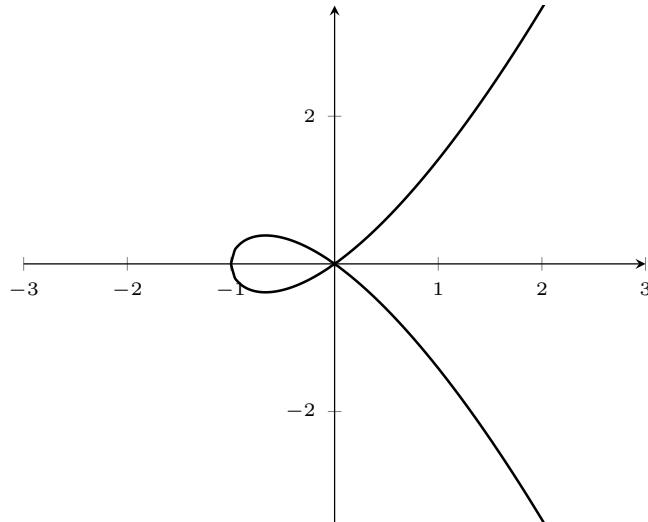
**Turn Over.**

# Calculus

## Question 1

The diagram below shows the graph of the elliptic curve

$$y^2 = x^3 + x^2, \quad x, y \in \mathbb{R}.$$



- a. Evaluate  $\frac{dy}{dx}$ . [2 marks].

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- b. Determine the domain on which the elliptic curve is differentiable. [2 marks]

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- c. Determine the stationary point(s) of the elliptic curve. [1 mark].

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**END OF TUTORIAL QUIZ**