**Test 4**

## *Logarithmic Functions*

## 

## Semester One 2018 Year 12 Mathematics Methods

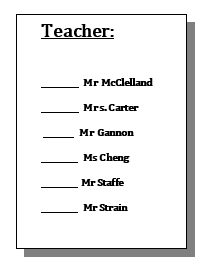
**Calculator Assumed**

**Name:**

Date: 29/06/2018 7.45am

You may have a calculator, a single-sided page of notes and a formula sheet for the test.

**40 Minutes Total\_\_\_\_\_\_\_\_\_\_\_/35 marks**



**Questions 1**  **(7 marks)**

Find the derivatives of the following. Do not simplify your answer.

1. (2 marks)
2. (2 marks)
3. (3 marks)

**Question 2 (5 marks)**

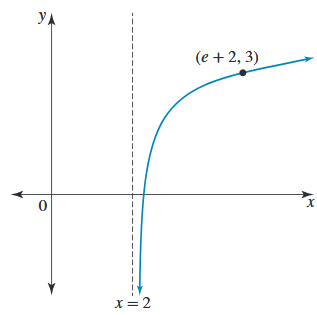
1. Use Polynomial Long division to simplify . (3 marks)
2. Hence find (2 marks)

**Question 3 (5 marks)**

1. Find the constants and given that for {. (3 marks)
2. Hence find (2 marks)

**Question 4 (2 marks)**

The rule for the function shown is . Find the values of and



**Question 5 (3 marks)**

Solve the following equations for . Show full algebraic reasoning.

**Question 6 (5 marks)**

The graph of the function with the rule intersects the axes at the point and ). Find the exact values of and Show full algebraic reasoning.

**Question 7 (8 marks)**

There are two species of insects living in a suburb: the *Asla bibla* and the *Cutus pius*. The number of *Ala bibla* alive at time days after 1 January 2000 is given by

The number of *Cutus pius* alive at time days after 1 January 2000 is given by

1. (i) Show full reasoning that if and only if (4 marks)
2. Solve the value for if (2 marks)
3. It is found by observation that the model for *Cutus pius* does not quite work. It is known that the model for the population of *Asla bible* is satisfactory. The form of the model for *Cutus pius* is . Find the value of , correct to two decimal places, if it is known that (2 marks)

**End of Test**