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**MATHEMATICS  
Methods Units 1 & 2**

**Test 2 – Linear and Quadratic Functions, Polynomials**

**Chapters 4, 5, 6 and 7**

**Semester 1 2019**

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**Section Two - Calculator Assumed**

Time allowed for this section

Working time for this section: 30 minutes

Marks available: 32 marks

## Material required/recommended for this section

##### To be provided by the supervisor

This Question/Answer booklet

Formula sheet

##### To be provided by the candidate

Standard items: pens, pencils, pencil sharpener, eraser, correction fluid, ruler, highlighters

Special items: drawing instruments, templates, notes on one unfolded sheet of A4 paper, and up to three calculators satisfying the conditions set by the Curriculum Council for this course.

## Important note to candidates

No other items may be used in this section of the examination. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

1. (10 marks)

Bill, a plumber, charges a call-out fee of $100 plus $80 per half hour or part thereof. Ian, another plumber, does not charge a call-out fee but charges $180 per hour or part thereof.

1. How much will Bill charge for a job that is estimated to take exactly 4 hours? [2]
2. How much will Ian charge for a job that is estimated to take exactly 4 hours? [1]
3. Determine which plumber will be cheaper to employ if a job is estimated to take 3 hours and 20 minutes. Justify your answer. [3]
4. Under what conditions will it be cheaper to employ Bill? Justify your answer. [4]
5. (12 marks)

For the cubic defined by

1. determine any stationary points and their nature [4]
2. state the zeros of the function [3]
3. find where the cubic changes concavity [1]
4. describe the curve over its natural domain [4]
5. (3 marks)

If the function defined passes through the points and , find the possible values of *p* and *q*.

1. (7 marks)  
   Gemma owns a hobby farm and needs to create a fenced-up area for her sheep using the back wall of her shed as one of the sides of the fenced-up area. She has 200 metres of fencing available. From what she could recall from her mathematics class when she was a student, to maximise the fenced-up area, she would need to maximise the function where is the width of the fenced-up area.
2. On the axes provided below sketch . [2]



1. Find the coordinates of the turning point of function . [1]
2. Find the maximum possible area that can be fenced and the dimensions of that fenced-up area. [2]
3. Find the possible dimensions of the fenced-up area if its area is . [2]

**End of Test**