

Write your name below:

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**Hale School**

**Year 11 Semester 2 Examination, 2015**

**Mathematics   
Methods**

**Teacher:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Section One:  
Calculator-free**

**Booklet 1 of 3**

TIME ALLOWED FOR THIS SECTION

Reading time before commencing: Five minutes  
Working time for paper: Fifty minutes

**MATERIAL REQUIRED/RECOMMENDED FOR THIS PAPER**

|  |  |
| --- | --- |
| **For Examiners only** | |
| Section 1 |  |
| Section 2 |  |
| Total |  |

*TO BE PROVIDED BY THE SUPERVISOR*

This Question/Answer booklet.

Formula Sheet.

*TO BE PROVIDED BY THE CANDIDATE*

*Standard Items*: pens (blue/black preferred), pencils (including coloured), sharpener,   
 correction fluid/tape, eraser, ruler, highlighters

*Special Items*: nil

**IMPORTANT NOTE TO CANDIDATES**

No other items may be taken into the examination room. 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. Please check carefully, and if you have any unauthorised material with you, hand it to the supervisor **BEFORE** reading any further.

**STRUCTURE OF THIS PAPER**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section | Number of questions available | Number of questions to be answered | Working time (minutes) | Marks available | Percentage of exam |
| Section One:  Calculator-free | 7 | 7 | 50 | 50 | 33 1/3 |
| Section Two:  Calculator-assumed | 12 | 12 | 100 | 85 | 66 2/3 |
|  | | |  | **Total** | 100 |

**INSTRUCTIONS TO CANDIDATES**

1. Write your answers in this Question/Answer Booklet.
2. You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.
3. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

* Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
* Continuing an answer: If you need to use the space to continue an answer, indicate   
   in the original answer space where the answer is continued, i.e. give the page number.

1. Fill in the number of the question that you are continuing to answer at the top of the page.
2. Show all your working clearly. Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks. If you repeat any question, ensure that you cancel the answer you do not wish to have marked.
3. It is recommended that you do not use pencil, except in diagrams.

**Section One: Calculator Free 50 marks (33 1/3%)**  
This section has 8 questions. Answer all questions. Write your answers in the spaces provided.  
Working time: 50 minutes  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question 1 6 marks**

Differentiate each of the following expressions:

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

**Question 2 6 marks**

1. Write down, in order, the transformations that need to be applied to  to draw the graph of . (3 marks)
2. On the axes provided, sketch the graphs of  marking any asymptotes and the x and y intercepts. (3 marks)



**Question 3 6 marks**

****The graph of  is shown in the graph below.

a

****a. On the sets of axes draw the graph of . (3 marks)

b. Describe with reasons the feature that occurs at x = a on the graph of .

(3 marks)

**Question 4 10 marks**

1. Given the equation below, determine the values of m and n (3 marks)



1. Solve the equation  (3 marks)
2. Solve the equation  (4 marks)

**Question 5 6 marks**

A particle starts at a point O and moves in a straight line so that at time t, its velocity is given by  ms-1.

1. When is the particle stationary? (2 marks)

1. Find a formula for the displacement at time *t*. (2 marks)
2. When does the particle return to its starting position? (2 marks)

**Question 6 8 marks**

Find the x coordinates of the stationary points on thecurve  and determine the nature of these points. Hence draw a sketch of the graph, labelling the key features.

(You do not need to find the location of the x – intercepts).

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**Question 7 8 marks**

1. Find the following integrals (antiderivatives):

i.  (2 marks)

ii.  (2 marks)

1. The gradient function for the curve  is given by  and the equation of the tangent to the curve at x = 2 is y = x +7.

Find the formula for the function . (4 marks)

**END OF SECTION ONE**

This page may be used for extra working space:

Question: \_\_\_\_\_\_

This page may be used for extra working space:

Question: \_\_\_\_\_\_