#  Hale School

#  2010

### Question/Answer Booklet

Circle your teacher’s initials

GJ JIB BAH

# MATHEMATICS 3CD

**SEMESTER 2**

## Section One

## (Calculator Free)

 Your name

## Time allowed for this section

Reading time before commencing work: 5 minutes

Working time for paper: 50 minutes

## Material required/recommended for this section

##### To be provided by the supervisor

This Question/answer booklet for Section One.

Formula sheet.

##### To be provided by the candidate

Standard items: pens, pencils, pencil sharpener, highlighter, eraser, ruler.

## 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. If you have any unauthorised material with you, hand it to the supervisor before reading any further.

## Structure of this examination

|  |  |  |  |
| --- | --- | --- | --- |
|  | Number of questions | Working time (minutes) | Marks available |
| **This Section (Section 1)****Calculator Free** | **8** | **50** | **40** |
| Section TwoCalculator Assumed | 11 | 100 | 80 |
| Total marks | 120 |

## Instructions to candidates

1. The rules for the conduct of WACE external examinations are detailed in the booklet *WACE Examinations Handbook*. Sitting this examination implies that you agree to abide by these rules.
2. Answer the questions in the spaces provided.
3. Spare answer pages are provided at the end of this booklet. If you need to use them, indicate in the original answer space where the answer is continued i.e. give the page number.
4. Show all working clearly. Any question, or part question, worth more than 2 marks requires valid working or justification to receive full marks. If you repeat an answer to any question, ensure that you cancel the answer you do not wish to have marked.

Question 1 (5 marks)

Consider the system of equations below;

a) Show algebraically that [3]

b) Find the solution to the system of equations given that p = 7. [2]

Question 2 (5 marks)

Consider the integral 

Determine

 i)  [1]

 ii)  [1]

 iii) the value of b if  [3]

Question 3 (4 marks)

The graph below shows the lines

 y = f(x) = ½ x + 1 and y = g(x) = -½ x + 1

Find

 i)  [1]

 ii)  [1]

 iii)  [2]

Question 4 (4 marks)

A rectangular metal box has sides in the ratio 1 : 2 : 3.

When heated the volume expands at the rate of 20 cm3 per second with the sides of the box remaining in the same ratio.

Find the rate at which the shortest side of the box is expanding when it is 10 cm long.

Question 5 (5 marks)

P

Q

O

B

A

The tangents from points A and B meet at the point P and angle APB is known to be 70°.

Find, with full reasoning, the size of angle AQB. Question 6 (5 marks)

The graph of the polynomial  is shown below.

 a) Find  for the curve. [2]

 b) Given that (1 , -1) is a point of inflection, determine the values of a and b. [3]

**Question 7 (6 marks)**

Find the exact values of

 i)  [4]

 ii)  [2]

Question 8 (6 marks)

 A piece of wire 360 cm long, is used to make the twelve edges of a rectangular box in which the length is twice the breadth. If the breadth of the box is x cm and the height is h cm,

 i) Express h in terms of x and hence show that the volume of the box is given by  [2]

 ii) Find the maximum volume of the box, justifying that it is indeed a maximum. [4]