Hale School
2011

Question/Answer Booklet

MATHEMATICS 3CD
SEMESTER 2
Section One
(Calculator Free)

Booklet 1 of 3

Circle your teacher's initials

GJ JIB BAH VMU

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.

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Spare page

Structure of this examination

		Number of questions	Working time (minutes)	Marks available
Booklet 1 This Booklet (Section 1)	**Calculator Free**	**8**	**50**	**40**
Booklet 2 (Section 2)	Calculator Assumed	7	100	40
Booklet 3 (Section 2)		5		40
			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.

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Question 8 (3 marks)

A spherical cloud is expanding at a constant rate of 5000π m^3 per second.

Find the radius of the cloud at the instant when the radius of the cloud is expanding at the rate of 2 m per second.

End of paper

Question 7 **(4 marks)**

Solve the inequality $\frac{2x+1}{x-3} \leq \frac{x+2}{x-1}$ showing your working.

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Question 1 **(5 marks)**

Consider the system of equations below;

$$\begin{aligned} x + 3y + 2z &= 7a - 2 \\ 2x + 4y + z &= 6a - 3 \\ 2x + 5y + 3z &= 11a - 2 \end{aligned}$$

Find algebraically, showing full working, the solution to the equations above, giving your answers in terms of a where necessary. [5]

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Question 2 (7 marks)

a) Find the exact value of the definite integral $\int_5^{13} (2x - 1)^{-3/2} dx$;

[3]

b) Differentiate $x^2 e^{2x}$ and hence find $\int_0^1 x(1+x)e^{2x} dx$

[4]

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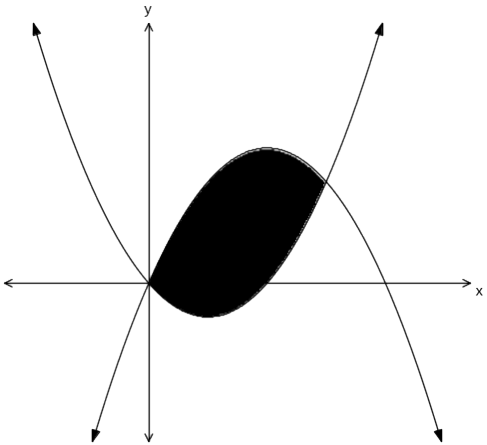
Question 6 (5 marks)

The diagram below shows graphs of $y = 4x - x^2$ and $y = x^2 - 2x$. Find the shaded area.



Question 3 (5 marks)

The table below shows the **cumulative probability distribution** for a random variable, X.

x	1	2	3	4	5
$P(X \leq x)$	0.1	0.2	0.4	p	1

Given that the expected value for the probability distribution is 3.5,

a) Find the value of p. [3]

b) Find $P(X < 4 \mid X < 5)$ [2]

Question 4 (6 marks)

Two positive numbers x and y add up to 10. Use calculus to find the values of x and y so that the product x^3y^2 is maximised.

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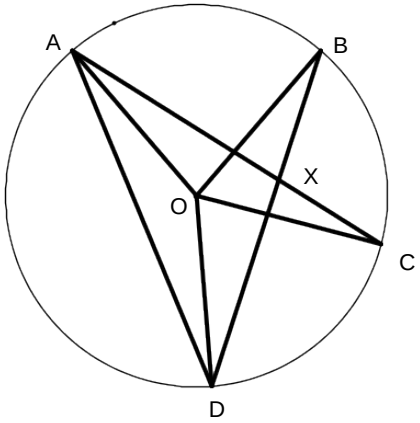
Question 5 (5 marks)



The diagram shows four points A, B, C and D on the circumference of a circle, centre O. X is the point of intersection of the chords AC and BD.

It is known that $\angle DOC = 64^\circ$ and $\angle AOB = 72^\circ$.

Find, with full reasoning,

i) the size of angle DAC.

ii) the size of angle AXB.

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