



**Question/Answer Booklet**

**MATHEMATICS 3CD**  
**Section One**  
**(Calculator Free)**

Circle your teacher's initials

GJ

JIB

BAH

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**

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
<b>This Section (Section 1) Calculator Free</b>	<b>6</b>	<b>50</b>	<b>40</b>
Section Two Calculator Assumed	10	90	70
Total marks			110

## 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****(6 marks)**

$$\frac{2x^2+1}{x-1} + 3 = 0$$

a) Solve for  $x$ :

[3]

$$\frac{x}{x-3} + \frac{2x+1}{x+2}$$

b) Simplify:

[3]

**Question 2****(8 marks)**

The following system of equations does not have a unique solution

$$x + y + pz = 3$$

$$3x - y - z = p$$

$$x + 5y + 9z = 11$$

- a) Show that there cannot be an infinite number of solutions

[5]

- b) Hence, determine the value of  $p$  so that the system has no solutions.

[3]

**Question 3**

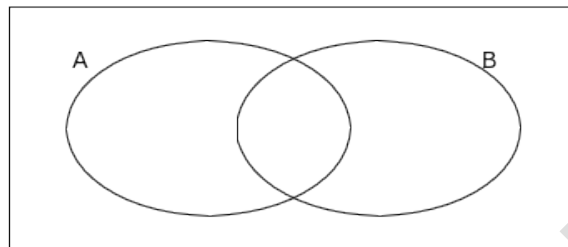
**(8 marks)**

For events A and B represented in the Venn Diagram below:

$$P(A \cap B) = 0.2$$

$$P(A) = 0.6$$

$$P(A|B) = 0.75$$



a) Find:

(i)  $P(B)$

[4]

(ii)  $P(\bar{A} \cap \bar{B})$

b) Are the events A and B independent? Justify your answer.

[2]

c) Are the events A and  $\bar{B}$  independent? Justify the answer.

[2]

**Question 4****(4 marks)**

Explain clearly why the following set of equations has infinite solutions:

$$\begin{aligned} -x - 3y - 3z &= -7 \\ 3x + 9y + 9z &= 21 \\ -4x - 2y + 2z &= 24 \end{aligned}$$

SAMPLE

**Question 5**

**(10 marks)**

a) Find  $f'(x)$  giving each answer in simplest form using positive indices.

(i)  $f(x) = \sqrt{5-x^4}$

[2]

(ii)  $f(x) = (x-2)^4 x^2$

[3]

(iii)  $f(x) = \frac{x}{(x+1)}$

[2]

b) Evaluate:  $\frac{d}{dx} \left( \frac{tx^2}{x^2 + 2x - 1} \right)$

[3]

**Question 6**  
**(4 marks)**

For a particular function  $y=f(x)$

- $\frac{dy}{dx}=0$  at  $x=-3$  , 1 and 5
- $\frac{dy}{dx}>0$  when  $x<-3$  and  $1<x<5$
- $\frac{dy}{dx}<0$  when  $-3<x<1$  and  $x>5$

Sketch a possible graph to incorporate all of these features.