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.

See next page

Hale School
2010

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.

SAMPLE

Structure of this examination

	Number of questions	Working time (minutes)	Marks available
This Section (Section 1) Calculator Free	**6**	**50**	**40**
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 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) $f(x)=(x-2)^4x^2$ [3]

(iii) $f(x)=\frac{x}{(x+1)}$ [2]

b) Evaluate: $\frac{d}{dx}\left(\frac{tx^2}{x^2+2x-1}\right)$ [3]

SAMPLE

Question 4 **(4 marks)**

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

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

Question 1 **(6 marks)**

a) Solve for x: $\dfrac{2x^2+1}{x-1}+3=0$

[3]

b) Simplify: $\dfrac{x}{x-3}+\dfrac{2x+1}{x+2}$

[3]

Question 2 **(8 marks)**

The following system of equations does not have a unique solution

$x + y + pz = 3 \qquad 3x - y - z = p \qquad x + 5y + 9z = 11$

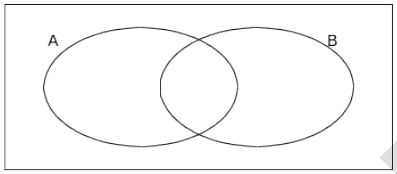
a) Show that there cannot be an infinite number of solutions [5]

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:

$P(A \cap B) = 0.2 \qquad P(A) = 0.6 \qquad P(A \mid B) = 0.75$



a) Find: [4]

(i) P(B)

(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]