Name: _____

Teacher: _____

Class: _____

FORT STREET HIGH SCHOOL

2010

PRELIMINARY SCHOOL CERTIFICATE COURSE

ASSESSMENT TASK 2 – PART A

Mathematics Extension I

TIME ALLOWED: 45 MINUTES

Outcomes Assessed	Questions	Marks
Applies appropriate techniques to solve problems in co-ordinate geometry.	1	
Understands the concept of a function and its relationship with its graph, domain and range	2	

Question	1	2	Total	%
Marks	/18	/18	/36	

Directions to candidates:

- Attempt all questions
- The marks allocated for each question are indicated
- All necessary working should be shown in every question. Marks may be deducted for careless or badly arranged work.
- Board – approved calculators may be used
- Each new question is to be started in a new booklet
- Write in blue or black pen only

Question 1: Linear Functions (18 marks)

a) The line $x-4y-8=0$ cuts the x and y axes at P and Q respectively.

i. Find the midpoint M of PQ. [2]

ii. Find the distance from M to the line parallel to $x-4y-8=0$ that passes through the origin. [3]

b) Given the points $A(3,7)$ and $B(-1,-5)$ find the coordinates of the endpoint $Q(x,y)$ where B divides AQ into the ratio 3:5 externally [2]

c) Shade the region on the number plane given simultaneously by $y<3x+2$ and $y-x^2-4x-1>0$. [4]

d) Using the 'k' Method, find the equation that passes through the intersection of the lines $y=2-x$ and $2x-y=4$ and the point $P(1,-3)$. [4]

e) Find the acute angle between the two lines $4x-y+5=0$ and $2x+3y-1=0$. Give your answer in degrees to one decimal place. [3]

Question 2: Real Functions (18 marks)

a) Show algebraically that $f(x) = x^3 + 2x - \frac{3}{x}$ is an odd function. [2]

b) Sketch $y = \sqrt{x+3}$. State the domain and range of this function. [3]

c) For the function $f(x) = x^2 - 4x + 1$:

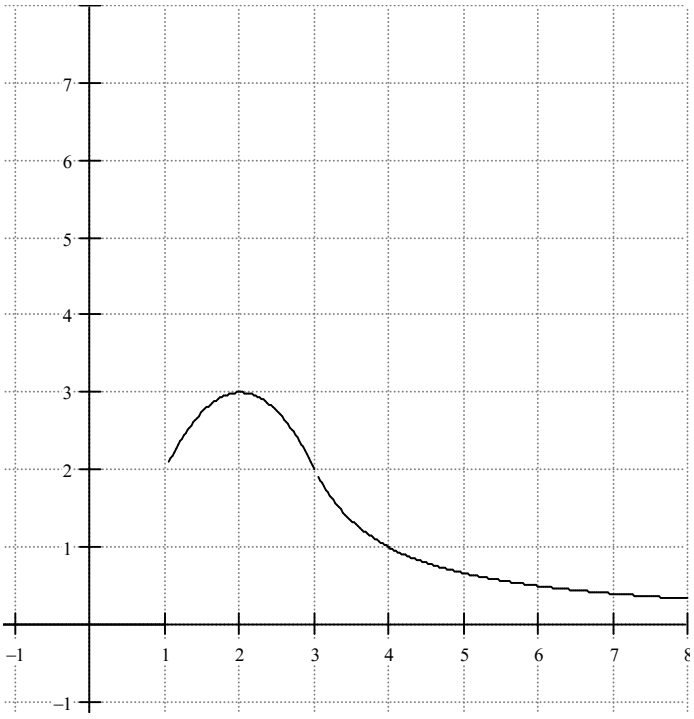
i. Express this function in the form $f(x) = (x-m)^2 + n$ and thus find the values of m and n. [2]

ii. Hence sketch the curve given by $g(x) = \frac{x^2 - 4x + 1}{(x-m)}$ (using the m value you found in (i.) above), showing all intercepts and asymptotes. [3]

d) Complete the following sketch to produce the graph of a function that is both continuous and (Answer on the graph sheet provided)

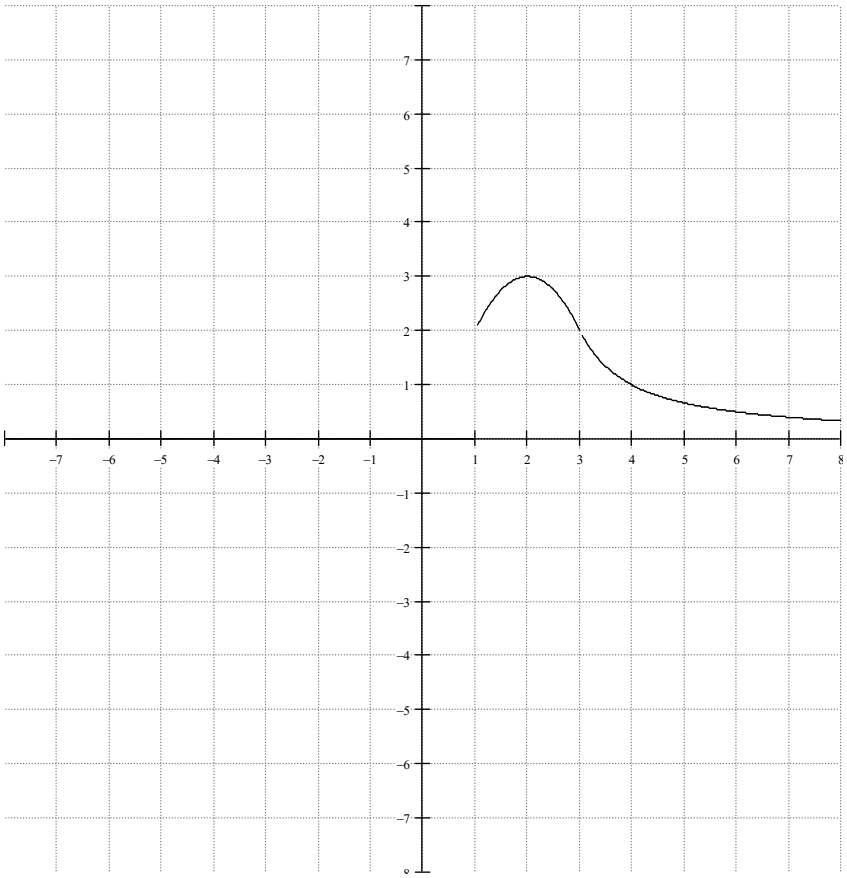
i. Odd. [2]

ii. Even [2]



e) Sketch the curve $y = |x-1| - |2x-6| + 2$ and state the domain and range for this function. [4]

Real Functions: Question 4(a) Name:_____



Real Functions: Question 4(b)