

MATH 110-001, QUIZ 2

February 2, 2018

Time: 15 minutes

Show all your work. No calculators, no books/notes are allowed.

Name (please print): _____

Student number: Solution

1. Consider the function $f(x)$ with the following graph.

- (a) Choose the interval(s) in which the Mean Value Theorem applies. (There might be more than one interval.) Give reasons for the interval(s) that you do NOT choose.

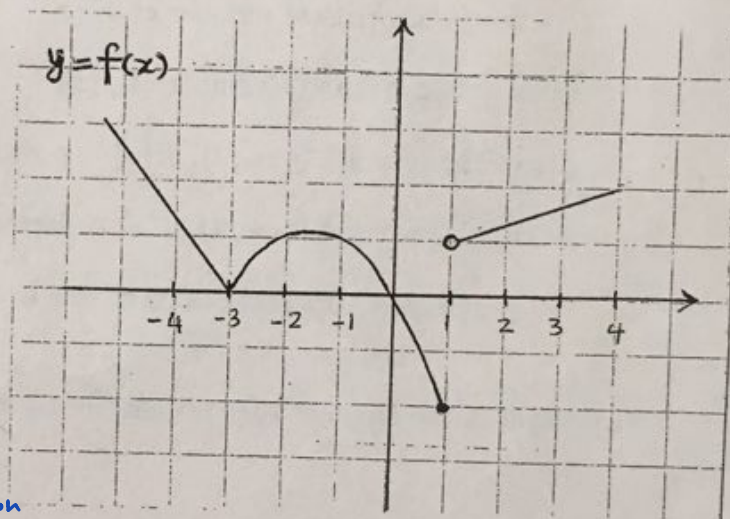
MVT can NOT be applied on $[-4, -1]$ because there is a cusp at $x = -3$ and the function is NOT differentiable in the whole interval.

i. $[-3, -1]$

ii. $[-4, -1]$

iii. $[-1, 2]$

iv. $[2, 3]$



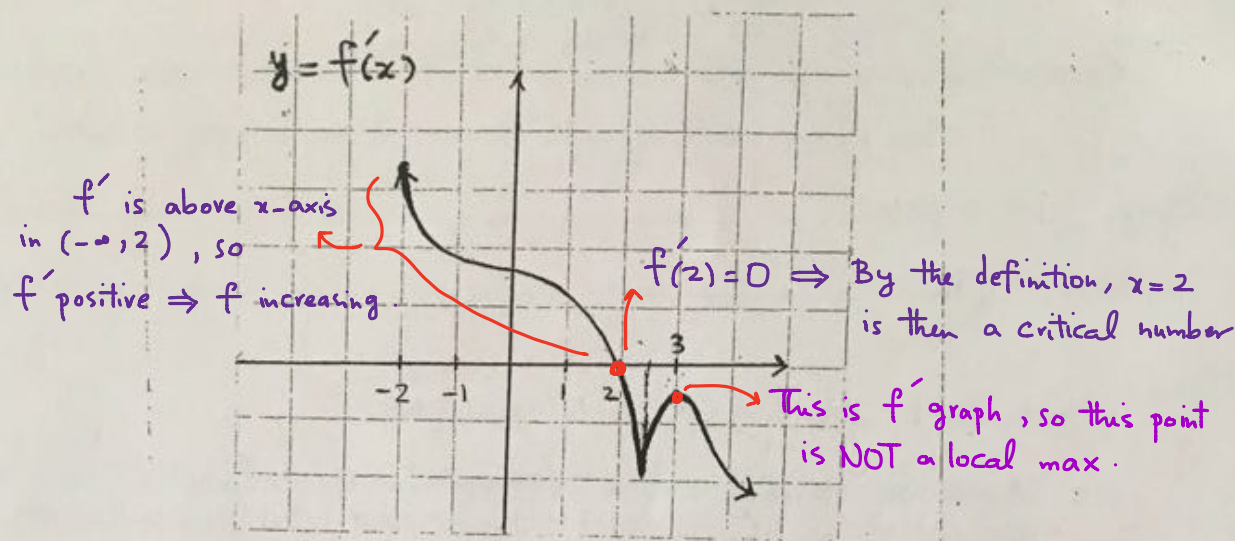
In $[-1, 2]$, there's a point of discontinuity at $x = 1$, so the function is NOT continuous on the whole interval $[-1, 2]$.

- (b) Is there any interval in which you can apply Rolle's Theorem for the function f ? If yes, write the interval, if no state why not.

Yes ; $[-3, 0]$ for example . In this interval , f is cont's and differentiable and also $f(-3) = f(0)$, so all the conditions of Rolle's Theorem are satisfied .

Note : You can choose any other interval as long as all the conditions are satisfied .
for example $[-2, -1]$.

2. Below, the graph of the derivative function, $f'(x)$, is given.



(a) Use the graph and check all the statements that are correct.

i. $x = 3$ is a critical number of $f(x)$.

ii. $x = 2$ is a critical number of $f(x)$.

iii. In the interval $(-\infty, 2)$, $f'(x)$ is positive so $f(x)$ is increasing.

iv. In the interval $(-\infty, 2)$, $f(x)$ is decreasing. NO f' is decreasing NOT f .

v. $f(x)$ has a horizontal tangent line at $x = 2$.

→ We see $f'(2) = 0 \rightarrow$ slope of the tangent line at $x = 2$ is 0

(b) What is the slope of the tangent line at $x = 2.5$? $\Rightarrow$ Horizontal Tangent line at 2.

translate

$$f'(2.5) = ?$$

↓

This is the f' graph, find the y-value for 2.5
will be $f'(2.5)$ which is -2.