

Mathematics Department

Math 1411 - Worksheet #4

Name: _____

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Q1 Find the extreme value (Abs and local) of the following functions

① $f(x) = \sqrt{3 + 2x - x^2}$

Q2 Why $f(x) = \tan x$ does not have a local extreme value at $x=0$?? Explain your answer

Q3

$f(x) = x^{1/3}$

- a) $x=0$ is a critical value but not an extreme value
b) $x=0$ is a critical value and extreme value
c) None of the above

Q4

Let $f(x) = \frac{1}{x^2 + 1}$

Use the M.V.T to

find an interval that contains a number c s.t. $f'(c) = 0$

Q5

Show that the function $f(x) = \frac{1}{25} x^3$ satisfy the

hypotheses of the M.V.T on the interval $[0, 10]$ and ~~find~~ find c ??

Q6. Assume that f is cont on $[a, b]$ and diff on (a, b) . Show that if $f(a) < f(b)$, then f' is positive at some point between a and b

Short answer - Worksheet #4

$\boxed{Q_1}$ f has abs Max and local Max 2 at $x=1$
 f has abs Min and local Min 0 at $x=-1$ and $x=3$

$\boxed{Q_2}$ f does not have extreme value at $x=0$
 \rightarrow Since $f'(0) \neq 0$

Note: Theorem

IF $f'(c) \neq 0 \rightarrow f$ has no extreme value at $x=c$

IF $f'(c) = 0 \rightarrow$ Can not tell

$\boxed{Q_3}$ (a)

$\boxed{Q_4}$ $f'(c) = 0 \rightarrow c = 0$

Interval = $[-4, 2]$
 $\underline{1 \text{ to } 2}$

$\boxed{Q_5}$ f is cont on $[0, 10]$ and diff. on $(0, 10)$
 since it is polynomial

By M.V.T, \exists at least $c \in (0, 10)$ such that $\boxed{f'(c) = 4}$

$\boxed{c = \frac{10}{\sqrt{3}}}$ only

$\boxed{Q_6}$ By using the M.V.T