

Mathematics Department
Math 1411- Worksheet #4

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Name: ---

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

- ① $x=0$ is a critical value but not an extreme value
② $x=0$ is a critical value and extreme value
③ None of the above

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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

Q1 f has abs Max and local Max 2 at $x=1$
 f has abs Min and local Min 0 at $x=-1$ and $x=3$

Q2 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

Q3 (a)

Q4 $f'(c) = 0 \rightarrow c = 0$

Interval = $[-4, 2]$
 $\hat{1} \hat{1} \hat{0}$

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Q5 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 $f'(c) = 4$

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

Q6 By using the M.V.T