quiz 18
math1117.02
u new haven
f15nov

name: _____

1. *(4 points each)* For the following functions, determine the location and value of the absolute extreme values on the given interval, if they exist.

(a) $f(x) = \dfrac{x}{(x^2+3)^2}$ on $[-2, 2]$

(b) $f(x) = x^4 - 4x^3 + 4x^2$ on $[-1, 3]$

$$f'(x) = \frac{(x^2+3)^2 - x\left(2(x^2+3)\cdot 2x\right)}{(x^2+3)^4}$$

$$= \frac{(x^2+3) - 4x^2}{(x^2+3)^3}$$

$$= \frac{-3(x^2-1)}{(x^2+3)^3}$$

Setting $f'(x)=0$:

$$0 = \frac{-3(x^2-1)}{(x^2+3)^3} \Rightarrow x = \pm 1$$

Also $f'(x)$ is not undefined anywhere, so critical points are $-1, 1$.

$f(-2) = -2/49$, $f(1) = 1/16$
$f(-1) = -1/16$, $f(2) = 2/49$

- Absolute max @ $(1, 1/16)$
- Absolute min @ $(-1, -1/16)$