

$f(x) = x + \frac{4}{x}$  Find global max/min in the interval  $[1, 4]$

$$f'(x) = 1 - \frac{4}{x^2} = \frac{x^2 - 4}{x^2} = \frac{(x-2)(x+2)}{x^2}$$

possible critical pts:  $x = -2, 0, 2$

But  $x = -2, 0$  not in  $[1, 4]$

So only critical pts  $x = 2$

$$f(1) = 1 + 4 = 5$$

$$f(2) = 2 + \frac{4}{2} = 4$$

$$f(4) = 4 + \frac{4}{4} = 5$$

Global max happens at  $x = 1$  and  $x = 4$   $f(1) = f(4) = 5$

Global min happens at  $x = 2$ ,  $f(2) = 4$

Math 221 Quiz 8

Name D1 Section \_\_\_\_\_ Score \_\_\_\_/10

Instructions.

Please make sure to SHOW YOUR WORK, and do NOT skip steps.

1. (10 pts) Graphing:  $f(x) = x + \frac{4}{x}$ .

(Make sure to follow the 5 steps as our professor did in class. Your graph should provide the information of increasing/decreasing, concavity, asymptotes, critical points and possible inflection points, if there's any.)

①  $f(x) = 1 - \frac{4}{x^2} = \frac{(x+2)(x-2)}{x^2}$       critical pts:  $x = -2, 0, 2$

$f'(x) = (1 - 4x^{-2})' = 8x^{-3} = \frac{8}{x^3}$       possible inflection pt:  $x = 0$

② Table

	$-\infty$	$-2$	$0$	$2$	$+\infty$
$f'$	+	-	-	+	
$f''$	-	-	+	+	
shape					

③ y-values

$f(-2) = -2 + \frac{4}{-2} = -4$

$f(0)$  not defined

$f(2) = 2 + \frac{4}{2} = 4$

④ Asymptotes:

VA:  $x = 0$

HA: none

SA:  $y = x$

⑤ Graph:

