

# STUDENT NAME:

Calculus 1550, section 6. Tuesday, March 23, 2004. Fifteenth quiz

Find the absolute maximum and absolute minimum values of the function

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

on the interval  $[1, 8]$ . [8 points]

Sketch a graph of  $f(x)$  on this interval, and indicate where the maximum and minimum are on your graph. [2 points]

$$f'(x) = \frac{x \cdot (2x + 0) - 1 \cdot (x^2 + 4)}{x^2}$$
$$= \frac{2x^2 - x^2 - 4}{x^2} = \frac{x^2 - 4}{x^2} = \frac{(x-2)(x+2)}{x^2}$$

so critical values (where  $f'(x) = 0$  or is undefined)

are at  $x = 2, -2, 0$ .

the only critical number in  $[1, 8]$  is 2.

$x$	1	2	8
$f(x)$	5	4	8.5

↑ min    ↑ max

$$f(8) = \frac{8^2 + 4}{8} = \frac{8^2}{8} + \frac{4}{8} = 8 + 1/2 = 8\frac{1}{2}$$

$f(x)$  has a maximum value of  $8.5$  on  $[1, 8]$ , attained when  $x = 8$   
 $f(x)$  " " minimum " "  $4$  on  $[1, 8]$  " "  $x = 2$

sketch:

