Key

Elements of Calculus I, MATH 180 Quiz 9

Janet Vassilev

(1) Find the points where $f(x) = x^3 - 2x^2 + x - 1$ has an absolute maximum or absolute minimum on the interval $[0, 2]$.

(3pts) $f'(x) = 3x^2 - 4x + 1 = (3x-1)(x-1) = 0$

the critical points are

$x = \frac{1}{3}$ & $x = 1$

compare (4pts)

$f(0) = -1$

$f(1/3) = \frac{1}{27} - \frac{2}{9} + 1/3 - 1$

$= \frac{1 - 6 + 9 - 27}{27} = \frac{-23}{27}$

$f(1) = 1 - 2 + 1 - 1 = -1$

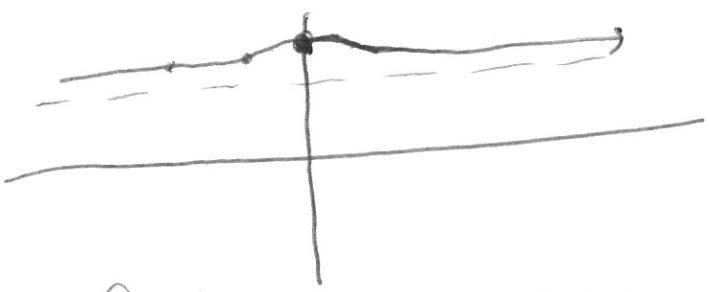
$f(2) = 8 - 8 + 2 - 1 = 1$

1pts

min: $(0, -1)$ & $(1, -1)$ max $(2, 1)$

(2) Determine if the function $f(x) = \frac{x^2 + 6}{x^2 + 4}$ has an absolute maximum or an absolute minimum on the real line. Identify any points where an absolute extremum occurs.

Given



3pts We see f has an asymptote $y = 1$ & all values are greater than 1. The max is at $(0, 3/2)$ } +2

There is no min. (1 pt for mentioning this or not mentioning min)