

Solutions

Math 19: Quiz 7

Name: _____

For full credit you must show your work. Partial credit may be given for incorrect solutions if sufficient work is shown.

For the function $f(x) = x^3 - 3x^2 - 24x$, find

1. the interval(s) where f is concave/up down (4 pts)

$$f'(x) = 3x^2 - 6x - 24$$

$$f''(x) = 6x - 6$$

Partition #s:

$$f''(x) = 0 \Rightarrow 6x - 6 = 0 \Rightarrow x = 1$$

$$\begin{array}{c} - \quad + \\ | \\ 1 \end{array} \quad \begin{array}{l} f''(0) = -6 < 0 \\ f''(2) = 6 > 0 \end{array}$$

Concave up $(1, \infty)$
Concave down $(-\infty, 1)$

2. point(s) of inflection (3 pts)

$$\boxed{x=1}$$

Concavity changes from down to up

3. the absolute maximum and minimum on $[0, 6]$ (3 pts)

$$f'(x) = 3x^2 - 6x - 24$$

Partition/critical #s:

$$f'(x) = 0 \Rightarrow 3x^2 - 6x - 24 = 0$$

$$\Rightarrow 3(x^2 - 2x - 8) = 0$$

$$\Rightarrow x^2 - 2x - 8 = 0$$

$$\Rightarrow (x-4)(x+2) = 0$$

$$\Rightarrow x = 4, \quad \cancel{x = -2}$$

this is outside $[0, 6]$

x	$f(x)$
0	0
4	-80
6	-36

$x=0$ is absolute max
 $x=4$ is absolute min

