

MAT 136 (Calculus I), Quiz 7, Prof. Jim Swift

Name: key

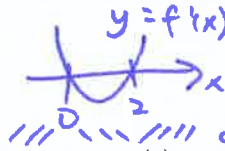
You may work on this in groups, but turn in your own quiz.

Let the function f be defined by $f(x) = x^3 - 3x^2 + 1$ for this entire worksheet.

1. Compute $f'(x)$ and find the largest interval(s) on which f is increasing, and on which f is decreasing.

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

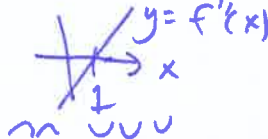
$$f'(0) = 0 \text{ and } f'(2) = 0$$



f is increasing on $(-\infty, 0]$, and $[2, \infty)$
 f is decreasing on $[0, 2]$

2. Compute $f''(x)$ and find the largest interval(s) on which f is concave up, and on which f is concave down.

$$f''(x) = 6x - 6 = 6(x-1)$$



f is concave down on $(-\infty, 1]$
 f is concave up on $[1, \infty)$

3. Fill in the blanks in these four sentences. Fill in the first blank with “increasing” or “decreasing”, and fill in the second blank with “concave up” or “concave down”.

On the interval $(-\infty, 0]$, the function f is increasing and concave down

On the interval $[0, 1]$, the function f is decreasing and concave down

On the interval $[1, 2]$, the function f is decreasing and concave up

On the interval $[2, \infty)$, the function f is increasing and concave up