Part I (due at the beginning of class Monday, November 3)

Read the following. No reading questions this time.

We now want to explore how the derivative of a function can help us understand what the original function looks like.

Definition 1. *A function $f(x)$ is called*

- increasing *on (a, b) if $f(x_1) \leq f(x_2)$ for all $x_1, x_2 \in (a, b)$ such that $x_1 < x_2$*
- decreasing *on (a, b) if $f(x_1) \geq f(x_2)$ for all $x_1, x_2 \in (a, b)$ such that $x_1 < x_2$.*

We say that $f(x)$ is monotone *on (a, b) if it is either decreasing or increasing on (a, b).*

Theorem 1. *Let $f(x)$ be differentiable on (a, b).*

- *If $f'(x) > 0$ for $x \in (a, b)$, then f is increasing on (a, b).*
- *If $f'(x) < 0$ for $x \in (a, b)$, then f is decreasing on (a, b).*

Part II: WeBWorK (due Saturday, November 8, by 11 PM)

Click here for your WeBWorK assignment. Complete the DW 24 WeBWorK assignment.

Part III: Homework Problems (due Wednesday, November 5 at the beginning of class)

1. Suppose that $f(0) = 1$ and $f'(x) \leq 2$ for every value of x. Use the Mean Value Theorem to determine the largest possible value for $f(4)$. Make sure to explain *why* the Mean Value Theorem applies (why $f(x)$ satisfies the hypotheses of the MVT).
2. Show that the function $f(x) = x^5 + 6x + c$ has at most one real root in the interval $[-1, 1]$.

Integration Assignment Reminder

The due date for Integration Assignment 4 is now Monday, November 3.