Chapter 3 Notes

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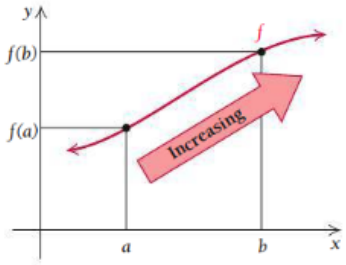
3.1 - Using First Derivaties to Classify Maximum and Minimum Values

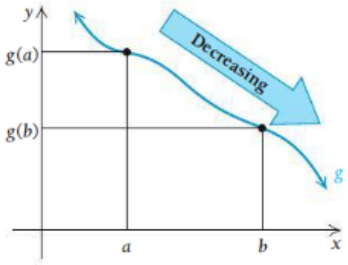
Increasing and Decreasing Functions

If the graph of a function rises from left to right over an interval I, the function is said to be increasing on, or over, I.

If the graph drops from left to right, the function is said to be decreasing on, or over, I.



If the input a is less than the input b, then the output for a is less than the output for b.



If the input a is less than the input b, then the output for a is greater than the output for b.

We can define these concepts as follows.

A function f is **increasing** over I if, for every a and b in I,

$$\text{if } a < b, \quad \text{then } f(a) < f(b)$$

A function f is **decreasing** over I if, for every a and b in I,

$$\text{if } a < b, \quad \text{then } f(a) > f(b)$$

The above definitions can be restated in terms of slopes of secant lines