Section 3.3 Maximum and Minimum Values

Definition For a function f defined on a set S of real numbers and a number c in S.

A) $f(c)$ is called the <u>absolute maximum</u> of f on S if $f(c) \geq f(x)$ for all x in S.

B) $f(c)$ is called the <u>absolute minimum</u> of f on S if $f(c) \leq f(x)$ for all x in S.

Absolute maximum and minimum are also called *absolute extrema*. Similarly we may also define the *local extrema* as follows.

Definition Let I be an open interval containing the point c

a) $f(c)$ is called a <u>local maximum</u> of f, if $f(c) \geq f(x)$ for all x in I

b) $f(c)$ is called a <u>local minimum</u> of f, if $f(c) \leq f(x)$ for all x in I.

How are the definitions of absolute and relative extrema different? In the relative case, we only require that our point f(c) beat values f(x) where x is close to c, though in the absolute case we insist that f(c) beat all values f(x) for x in the domain of f. Lets see the difference in action in the example below: