Exercise 9 on page 14

Your Name

Math 220 assignment due January 24

Here is an annotated statement of the exercise.

A real-valued function $f(x)$ is said to be *increasing* on the closed interval $[a, b]$ if for all $x_1, x_2 \in [a, b]$, if $x_1 < x_2$, then $f(x_1) < f(x_2)$.

[Notice that the word "all" corresponds to a universal quantifier. The set-membership symbol $\in$ should not be confused with the quantifier symbol $\exists$. The symbolic expression "for all $x_1, x_2 \in [a, b]$" could be verbalized as "for all x_1 and x_2 in the interval $[a, b]$" or "for all x_1 and x_2 belonging to the interval $[a, b]$."]

(a) Write the negation of this definition. [What the author really means is, "Write the definition of the negation." In other words, write a statement starting, "A real-valued function $f(x)$ is said to be not increasing on the closed interval $[a, b]$ if ...."]

(b) Give an example of an increasing function on $[0, 1]$. [Here you are supposed to exhibit an example of a function that fits the original definition: namely, write "An example of a function that is increasing on the interval $[0, 1]$ is $f(x) = \ldots$."]

(c) Give an example of a function that is not increasing on $[0, 1]$. [Here you are supposed to exhibit a function that fits your answer to part (a): namely, write "An example of a function that is not increasing on $[0, 1]$ is $f(x) = \ldots$." Notice that the words "not increasing" have a different meaning from "decreasing": a decreasing function is not increasing, but some functions are neither increasing nor decreasing.]