Homework Assignment for Week 03

Assigned Mar 09, 2011.

1. Section 2.5: problems 30, 32, 35, 38, 41.

2. Chap 2: problems 74, 75.

3. How would you define the following limits formally using ϵ and δ? (Need not prove anything, just define them)

   a.
   $$\lim_{x \to c^+} f(x) = L$$

   b.
   $$\lim_{x \to c} f(x) = \infty$$

   c.
   $$\lim_{x \to -\infty} f(x) = L$$

   Hint: The formal definition of $\lim_{x \to c} f(x) = L$ is a translation of

   $f(x)$ can be arbitrarily close to L as long as $x \neq c$ is close enough to c

   The '$f(x) \to \infty$' part, in plain words can be like '$f(x)$ be arbitrarily large' while the 'as $x \to \infty$' part can be 'whenever x is large enough'. The latter, in mathematical language, would be 'there is an M such that for all $x > M, \cdots$'

4. Use the $\epsilon - \delta$ argument to show that, if $f(x)$ and $g(x)$ are both continuous at $x = c$, then so is $f(x) + g(x)$ and $f(x) - g(x)$.

5. Use the $\epsilon - \delta$ argument to show that if $f(x)$ is continuous at $x = c$, then so is $3f(x)$.

6. Section 3.1: problems 35, 40, 49.