Homework

due on Friday, April 29

Read carefully sections 10.1-10.4 in the book. Solve the following problems.

Problem 1. a) Let $x \leq z \leq y$. Prove that $|z| \leq \max(|x|, |y|)$.

b) Suppose that $a_n \leq b_n \leq c_n$ for every n and $\lim_{n\to\infty} a_n = \lim_{n\to\infty} c_n = L$. Prove that $\lim_{n\to\infty} b_n = L$. This result is often called **Pinching Theorem**, or **Sandwich Theorem** , or **Squeeze Theorem**.

Problem 2. Prove that every decreasing and bounded below sequence of real numbers has a limit. (You can either mimic the proof from class for increasing and bounded above sequences or derive the claim of the problem from this result from class).

Problem 3. Use the algebra of limits to compute the following limits (explain your solution in details):

a) $\lim\limits_{n\to\infty} \dfrac{2n^3 - n + 3}{n^3 - 3n^2 + 7}$.

b) $\lim\limits_{n\to\infty} \dfrac{\sqrt[n]{3} \cdot 3^n - 1}{3^n + 2^n}$.