MATH 347 HW 7

due October 30, at the beginning of class

Problems

Do the following problems from your book: 13.8, 13.9, 13.20, 13.21, 13.25. Also answer the following:

(1) Let $\{a_n\}$ be a sequence of real numbers. Show that the sequence converges to $a \in \mathbb{R}$ if and only if

$$\lim_{n \to \infty} |a_n - a| = 0.$$

(2) Let $\{a_n\}$ be a sequence of real numbers. Show that if

$$\lim_{n \to \infty} a_n = a,$$

then the set $\{a_n \mid n \in \mathbb{N}\}$ is bounded above and below.

(3) Suppose X_n is a countably infinite set for each $n \in \mathbb{N}$. Show that the union

$$X = \bigcup_{n \in \mathbb{N}} X_n$$

is a countably infinite set.

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