Homework assignment, Nov. 30, 2007.

1. Show that the if $f : \mathbb{R} \to \mathbb{R}$ is monotone, then f is measurable.

2. #1, p. 247

3. Prove that if $\{f_n\}$ is a sequence of real-valued measurable functions on X, then the set of x such that $\lim_{n \to \infty} f_n(x)$ exists is measurable (belongs to the σ-algebra $\mathfrak{A}$).

You can use the fact that $\sup_n f_n$ and $\inf_n f_n$ is measurable for a sequence of measurable functions.