# Assignment #6

(*All Problems Due* **Friday 10/26/01**.)

**Section 3.5, # 23a.**

**Section 3.5, # 23b.**

**Section 3.5, # 23c.**

**Section 3.5, # 23d.**

**Section 3.5, # 24.**

**Section 3.5, # 25.**

**Section 3.6, # 30.**

**Additional IX.** Suppose that $f : D \to \mathbf{R}^*$ is measurable. Suppose that $g : D \to \mathbf{R}^*$ has the property that for all $\epsilon > 0$, $m\{x \in D : |f(x) - g(x)| > \epsilon\} = 0$. Then $g = f$ a.e. and $g$ is measurable.

**Additional X.** (a) Show that if $f : D \to \mathbf{R}$ is measurable and $\{x \in D : f(x) = 0\} = \emptyset$ then $\frac{1}{f}$ is measurable.

(b) Extend (a): If $f^{-1}(\{0\})$ is a set of measure zero, then $\frac{1}{f}$ is measurable. That is, show that any function $h : D \to \mathbf{R}^*$ such that $h(x) = \frac{1}{f(x)}$ for all $x$ such that $f(x) \neq 0$ is measurable.

(c) Show that if $f, g : D \to \mathbf{R}^*$ are measurable and $m(g^{-1}(\{0\})) = 0$ then $\frac{f}{g}$ is measurable.