Homework 5

1. **a.** If $\int f < \infty$, it need not be the case that $f \to 0$ as $x \to \pm\infty$. Give an example of a continuous, nonnegative, unbounded function which is integrable.

    b. On the other hand, when f is uniformly continuous on $\mathbb{R}$ prove that if f is integrable then $\lim_{x \to \pm\infty} f = 0$. Is this if and only if?

2. If f is a nonnegative measurable function, prove that $\int f = 0$ if and only if $f = 0$ a.e.

3. Royden, Section 4.3, Exercise 26.

4. Royden, Section 4.3, Exercise 27.

5. Royden, Section 4.4, Exercise 33.