Problem Set 8 **Real Analysis 1** **Due 11/28/18**

Four of these problems will be graded, with each problem worth 5 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor.

1. [6.1.3] Prove that a constant function $f(x) = c, c \in \mathbb{R}$, is Riemann integrable on any interval $[a, b]$ and $\int_a^b f(x)\,dx = c(b-a)$.
2. [6.1.4] If $f(x) \leq g(x) \leq h(x)$ for all $x \in [a, b]$, and f and h are Riemann integrable on $[a, b]$, then so is g.
3. [6.1.6] If a function $f : [a, b] \to \mathbb{R}$ is bounded and nonnegative, then $\underline{\int_a^b} f \geq 0$.
4. If f and g are Riemann integrable on $[a, b]$ then so is $f - g$, and $\int_a^b (f-g) = \int_a^b f - \int_a^b g$.
5. If f and g are Riemann integrable on $[a, b]$ and $f(x) \leq g(x)$ for all $x \in [a, b]$, then $\int_a^b f \leq \int_a^b g$.
6. Is the converse of #5 true?