Exercise Abbott 4.5.2:

Exercise Abbott 4.5.5 (b): You may assume that you have found a sequence of nested intervals $I_k = [a_k, b_k]$ with $f(a_) < 0$ and $f(b_k) \geq 0$ and $|I_{k+1}| = |I_k|_/2$, where $|\cdot|$ denotes the length of the interval.

For those of you in Numerical Analysis, this proof of the IVT mirrors the bisection method for finding roots!

Exercise Abbott 4.4.3:

Exercise Abbott 4.2.10:

Exercise Supplemental 1: a) Show that a continuous function on all of $\mathbb{R}$ that equals zero on the rational numbers must be the zero function

b) Suppose f and g are two continuous functions on the real numbers. Is it true that if $f(q) = g(q)$ for all $q \in \mathbb{Q}$, then f and g are the same function?

Exercise Supplemental 2: Suppose $K \subseteq \mathbb{R}$ is compact. Show that there exists $x_M \in K$ such that $x_M \geq x$ for all $x \in K$. Then, with very little work, show that there exists $x_m \in K$ such that $x_m \leq x$ for all $x \in K$.

Exercise Abbott 4.3.7(a):

Exercise Abbott 4.4.6:

Exercise Abbott 4.4.9: