There are two parts to this assignment. The first part is on WebWorK (accessible through Canvas). The second part consists of the questions on this page. You are expected to provide full solutions with complete justifications. You will be graded on the mathematical, logical and grammatical coherence of your solutions.

This Homework is shorter than usual due to the Quiz exam on Friday, November 15. The unique problem is worth 6 points.

Your solutions must be typed or handwritten clearly, with your name, student number and recitation number at the top of the first page. If your solutions are on multiple pages, the pages must be stapled together. Your written assignment must be handed in at the end of your recitation on Friday, November 15. The online assignment will close at 9:00am on Friday, November 15.

**Problem 1.** A function $f$ is called *injective* or *one-to-one* if $x_1 \neq x_2$ implies that $f(x_1) \neq f(x_2)$. Equivalently, $f$ is injective if $f(x_1) = f(x_2)$ implies that $x_1 = x_2$.

(i) Let $f$ be a differentiable function on $\mathbb{R}$ such that $f'(x) > 0$ for all $x \in [l, r]$. Use the mean value theorem to prove that $f$ is injective on $[l, r]$.

(ii) Conclude that $f$ has at most one root in $[l, r]$. 