Math330 HW9 (Fall 2020)

Professor Youngjoon Hong   Due Date: Nov. 18 (11:59 pm)

Problem 1 *Let I be a closed bounded interval and let $f : I \to \mathbb{R}$ be continuous on I. Then, the set $f(I) := \{f(x) : x \in I\}$ is a closed bounded interval.*

Problem 2 *Consider the equation $x^5 + x + 1 = 0$ for $x \in \mathbb{R}$. Show that there is a solution of the polynomial.*
(Hint: use the I.V.T.)

Problem 3 *Let $f(x)$ and $g(x)$ two function differentiable at x. Prove that $(f + g)'(x) = f'(x) + g'(x)$.*

Problem 4 *Let f and g be two differentiable functions at x. Prove that $(fg)'(x) = f'(x)g(x) + f(x)g'(x)$.*