

Math 128A: Worksheet #1

Name: _____ Date: September 14, 2020

Fall 2020

Problem 1: Consider the following two functions:

$$g_1(x) = -\frac{1}{12}x^3 + x + \frac{5}{12}$$

$$g_2(x) = \frac{2}{3}x + \frac{5}{3} \frac{1}{x^2}$$

Both have $x^* = \sqrt[3]{5}$ as a fixed point. For which of these functions does fixed point iteration converge to x^* ? If both of them converge, which one is faster?

Problem 2 (2.3 #1): Let $f(x) = x^2 - 6$ and $p_0 = 1$. Use Newton's method to find p_2 .

Problem 3 (2.3 #5a): Use Newton's method to find a solution accurate to within 10^{-4} for:

$$x^3 - 2x^2 - 5 = 0, \quad [1, 4]$$

Problem 4: Show that the sequence

$$p_n = \frac{1}{n^3}, \quad n \geq 1$$

converges linearly to $p = 0$. How large must n be before $|p_n - p| \leq 5 \times 10^{-2}$?