Math 128A: Worksheet #4

Name: _____   Date: <u>February 17, 2021</u>

<u>Spring 2021</u>

Problem 1 (2.5 #5)**:** Steffensen's method is applied to a function $g(x)$ using $p_0^{(0)} = 1$ and $p_2^{(0)} = 3$ to obtain $p_0^{(1)} = 0.75$. What is $p_1^{(0)}$?

Problem 2 (2.5 #9)**:** Use Steffensen's method with $p_0 = 2$ to compute an approximation to $\sqrt{3}$ accurate to within 10^{-4}.

Problem 3 (2.6 #1b): Find the approximations to within 10^{-4} to all the real zeros of the following polynomial using Newton's method:

$$f(x) = x^3 + 3x^2 - 1.$$

Problem 4 (2.6 #3b): Repeat the previous exercise with Muller's method.

Problem 5 (3.1 #1c): For the function $f(x) = \sqrt{1 + x}$, let $x_0 = 0$, $x_1 = 0.6$, and $x_2 = 0.9$. Construct interpolation polynomials of degree at most one and at most two to approximate $f(0.45)$ and find the absolute error.

Problem 6 (3.1 #3): Use Theorem 3.3 to find an error bound for the approximations in the previous exercise.