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MATH 3450 Intro to Numerical Methods

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HW2

2. (a) Knowing the real root of f(x) is a number slightly bigger than 1, my first range (a,b) was 0 to 5, but I wanted to try the code as if I didn’t know where the root would be, so next I tried -5 to 5 (and -10 to 10? A common range chosen). Both resulted in the same number (1.1486983549970349) N=100. With N=10, the values are much less accurate

(a,b) N=10

(0,2) 1.15234375

(0,5) 1.142578125

(-5,5) 1.15234375

(-10,10) 1.1328125

With g(x)

(b) For f(x), x0=2.0 & N=100, the result was 1.357364938202444. At x0=1.0, the guess was 1.1529012345679013. For N=1000, x0=2.0, the root was. 1.357364938202444. For g(x), there are three roots. I ran the program with three different guesses. For x0=1.0 N=100, the root was 0.9100176657834059. For x0=-1.0, the root was -0.4698019077245228. x0=4.0, result was 3.735379375079544.

(c)

Diagram

Description automatically generated how

Gets the real root, but none of the imaginary roots

(d)

Chart

Description automatically generated zeros -> 0 just keep getting smaller bc it converges to 0??, no zero at 100 right

Closest zero to 100 has to be around 30 or its past 100