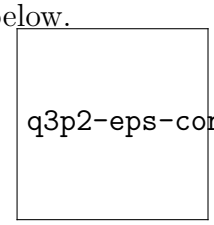
Name:_____

MATH 320: QUIZ 2

(1) (3 points) Let $f(x) = x^3 - 7$. Suppose we would like to find a root of $f(x)$ in the interval $(0, 2)$ using the two endpoints as our "bracket."
   (a) What are the first two points selected inside the interval using the bisection method? Justify your response.
   (b) How many iterations of the bisection method must be performed to guarantee error less than 2^{-16}?
   (c) What is the first point in the interval selected by the false position (regula falsi) method?

(2) (3 points) Let $f(x) = (x^2 - 1)e^{-x^2}$ be our function of interest, with graph shown below.



Suppose we try to find a root using Newton's method.

(a)

(b) Evaluate the n-th order approximation to 10.1^{10} for $n = 0, 1$, and 2.

(c) Compute the approximate relative error in the first-order approximation.

(d) To one significant digit, what is the approximate relative error in the second-order approximation?