TMATH 126: Quiz 1

You may use:

- any kind of calculator that cannot access the internet and
- a one-sided 3×5" card for this quiz.

Show *all* your supporting work (numerically, algebraically, or geometrically) for each and simplify. *No credit* is given without supporting work.

1. [6] TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true and provide a brief justification. Otherwise, circle F and provide a counterexample or brief justification.

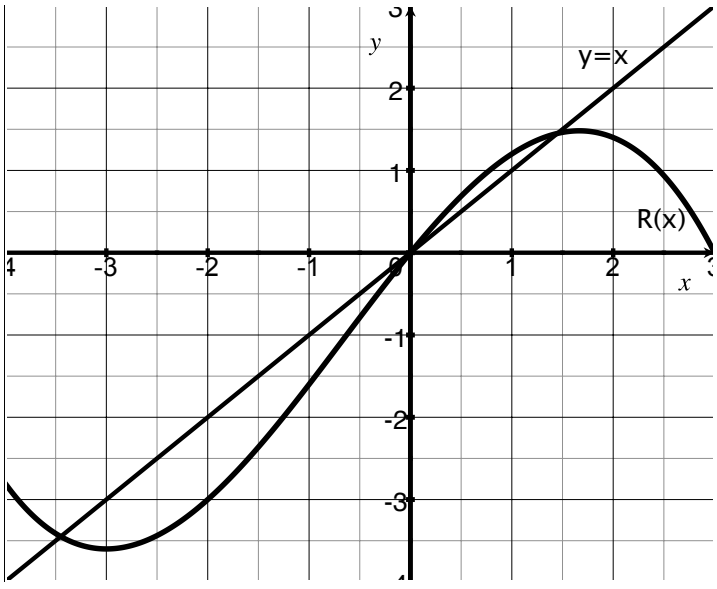
   T F The series $\sum_{n=1}^{\infty} \frac{n}{\ln(n)}$ converges.

   T F If $\sum_{n=1}^{\infty} a_n$ converges, then $\lim_{n\to\infty} a_n$ converges.

2. The graph of $R(x)$ and $y = x$ are both graphed to the right. Consider the recursively defined sequence where $a_n = R(a_{n-1})$ and $a_1 = 2.5$.

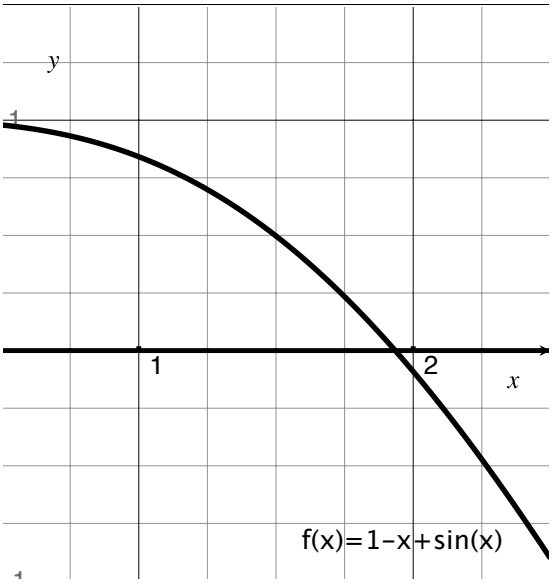
   (a) [1] (SequenceWks #1) Use the graph to estimate a_2.

   (b) [2] (WrittenHW1§9.1 #3) Use the graph to estimate $\lim_{n\to\infty} a_n$.



3. (Suggested Problem §3.8 #15)
Consider $f(x) = 1 - x + \sin(x)$.

   (a) [3] Find an equation of the line tangent to the graph of f at $x = 2$.



   (b) [2] Use part (a) to find the next approximation of the root shown in the graph when the initial guess is 2.

4. [2] (WebHW3 #4) Consider the series $9 - 3 + 1 - \frac{1}{3} + ...$
Determine if the series converges or diverges. If the series converges, find its limit.

5. (WebHW3 #9) A company buys a machine for \$575,000 that depreciates at a rate of 10% per year.

   (a) [2] Find a formula for the value, V, of the machine after n years.

   (b) [2] Find and interpret $\lim_{n\to\infty} V(n)$.