TMATH 126: Quiz 1

You may use:

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

Show *all* your 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.

   T F Sequences are a list of numbers.

   T F The recursive sequence $a_n = -a_{n-1}$ diverges no mater the choice of a_1.

2. Consider the sequence: $\left\{\frac{3}{2}, \frac{5}{4}, \frac{7}{8}, \frac{9}{16} \ldots\right\}$.

   (a) (WebHW #3) [3] Find a formula for the n^{th} term where a_1 is the first term.

   (b) (§11.1 #30) [2] Find the limit of the terms in the above sequence as $n \to \infty$, if it exists. Justify your work!

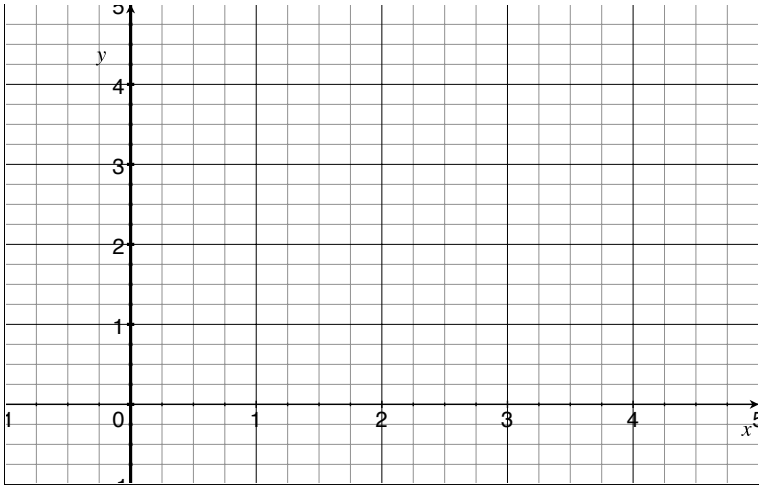
3. [2] Create a sequence that does not converge.

4. [3] (WebHW2 #8) Determine if the following sequences converge or diverge. If it converges, find the limit.

   $a_n = \tan\left(\dfrac{2\pi n}{7-12n}\right)$

5. (Summer '11 Quiz 1#4)
   Consider the recursively defined sequence $a_n = \frac{1}{2}^{a_{n-1}} + 1$.

   (a) [1] If $a_1 = -1$, write down the first three terms of the sequence.



   (b) [2] If $a_1 = -1$, does the sequence converge?
   If the sequence does converge, identify the limit on the graph.

   (c) [1] What values can a_1 be to guarantee that the sequence a_n will converge?