

# TMATH 126: Quiz 1

You may use:

- any kind of calculator that cannot access the internet and
- a double-sided  $3 \times 5$ " 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 Let  $p \geq 1$ , then the sequence  $a_n = \left(\frac{1}{n}\right)^p$  converges.

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

2. Consider the sequence:  $\left\{1, \frac{-1}{3}, \frac{1}{5}, \frac{-1}{7}, \frac{1}{9}, \dots\right\}$ .

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

(b) [1] Find the limit of the terms in the above sequence as  $n \rightarrow \infty$ .

3. [5] Determine if the following sequences converge or diverge. If it converges, find the limit.

(§11.1 #27)

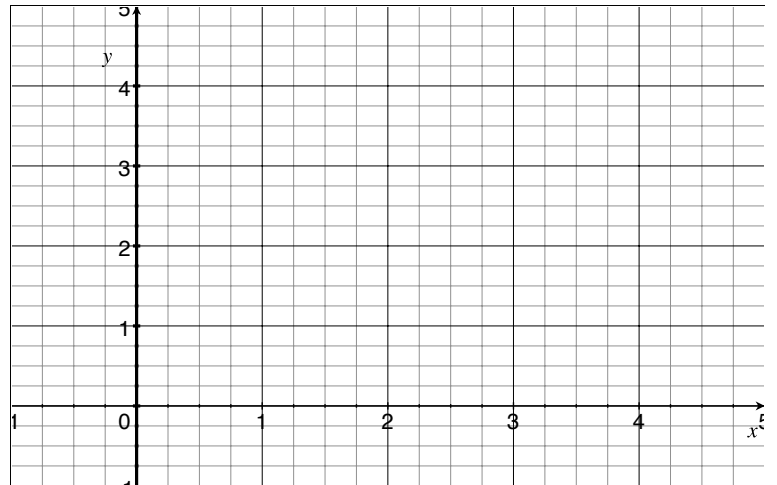
$$a_n = e^{\frac{1}{n}}$$

(Seq Wks #1)

$$a_n = \frac{3^n}{2^{n-1}}$$

4. (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) [2] What values can  $a_1$  be to guarantee that the sequence  $a_n$  will converge?