TMATH 126: Quiz 2

You may use any work of yours that you made from last week. This includes, practice problems from the book and worked out WebAssign problems. This *does not* include photocopies of notes from the book or tutorials shown on WebAssign. You may also use a calculator, but you are not allowed to use any device that can access the internet.

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 An infinite sum of nonzero terms will never converge to a finite number.

   T F If $\sum_{n=1}^{\infty} a_n$ is convergent, then $\lim_{n\to\infty} a_n = 0$.

   T F If $\{a_n\}$ is a sequence such that $\lim_{n\to\infty} a_n = 0$, then $\sum_{n=1}^{\infty} a_n$ is convergent.

2. Consider the sequence: $\left\{3, \frac{3}{5}, \frac{3}{25}, \frac{3}{125}, \frac{3}{625}...\right\}$.

   (a) [2] Find a formula for the n^{th} term where we start counting at one.

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

3. [6] Find the following limits (if they exit):

$\lim_{n\to\infty} \sin\left(\frac{-n\pi}{6n+3}\right)$

$\sum_{n+1}^{\infty} \frac{3n^2-n}{n^2+4}$

4. If the nth partial sum of a series $\sum_{n=1}^{\infty} a_n$ is $s_n = n2^{-n} + 5$.

   (a) [3] Find $\sum_{n=1}^{\infty} a_n$ if it exists. Justify your answer.

   (b) [2] Find $\lim_{x\to\infty} a_n$ if it exists. Justify your answer.