Stony Brook University.
MAT 127 — Calculus C, Spring 12.
Review of concepts for the first midterm.

The goal of this review sheet is to check your understanding of some basic concepts on sequences and series. You should also try the practice problems available at:

www.math.sunysb.edu/~egorsky/mat127-spr12/index.html

Try to answer each question below with your own words, without copying from the textbook or from the class notes. Imagine that you are trying to explain these ideas to a friend that fell sick and missed the first two weeks of class.

Question 1. What is a sequence? Give examples.

Question 2. What is a series? Give examples.

Question 3. What is a the difference between a sequence and a series? Is every series also a sequence? Is every sequence also a series? Give examples.

Question 4. What is the sequence of partial sums of a series?

Question 5. What does it mean to say that a sequence converges? What is the limit of a sequence? Give examples.

Question 6. If a sequence does not converge, then it goes to ∞. True?

Question 7. What does it mean to say that a series converges? What is meant by the sum of a series? Give examples.

Question 8. What is a geometric series? And a harmonic series? How do you recognize them?

Question 9. Is the following statement true?

$$\text{If } \lim_{n \to \infty} a_n = 0 \text{ then } \sum_{n=1}^{\infty} a_n \text{ converges.}$$

Question 10. What is the difference between saying that $\lim_{n \to \infty} a_n = 10$ and $\sum_{n=1}^{\infty} a_n = 10$?

Question 11. True or False? Justify and give examples.

(a) If some limit approaches $\frac{\infty}{\infty}$, then it is equal to 1.

(b) If some limit approaches $\frac{\infty}{\infty}$, then it is impossible to find the answer because $\frac{\infty}{\infty}$ doesn't make sense mathematically.

(c) If $\sum_{n=1}^{\infty} a_n$ converges then $\lim_{n \to \infty} a_n = 0$.