

Math 300, Spring 2004, J. Baldwin

Some writing and mathematic exercises
Feb. 23, 2004

The two sides of this page should be turned in today. Items E through I should be completed and turned in on March 1. (Note that H and I are mathematical problems; the rest are writing exercises. But almost all of you have provided the answer to H in your first essay while I will require some thought.)

I. What is the difference between a definition and a theorem?

II. Define: a_1, a_2, \dots is a geometric sequence.

III. State the basic property about the convergence/divergence of geometric series.

IV. Find as many mistakes as you can in each of the following examples. List the errors, then rewrite the sentence in better form. The number in parentheses at the beginning of each phrase is the number of mistakes I saw. The mistakes may be grammatical, factual, logical, or stylistic.

A. (4) The Starter set of blocks is an harmonic series $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8} \dots$

B. (3) Each block is, in fact, a cube; meaning that their length, width, and height are equal.

C. (3) Even when the each new term gets closer to zero, the whole series diverges to infinity. The fact that the summation of the series of very small numbers makes this series very unique.

D. (3) Now lets examine the surface area of the Starter set. It is a subset of the Starter set, where we take every other number so the multiple is $\frac{1}{4}$ to get from one term to the next.

Punctuate!

E. Starter blocks are cubes with side lengths $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8} \dots$

$$1 = 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} \dots$$

Is the geometric series.

Too many words!

Rewrite each of the following sentences in a more direct and forceful manner.

F. To fit all of the blocks into the trunk, the following positioning must be taken into consideration.

G. The stacking up process for the Deluxe Set is putting one cube on top of another cube; the process continues to infinity.

Logical errors:

Give a counterexample to show why the following arguments are incorrect.
(This is easy for the first and harder for the second.)

H. The partial sums of the harmonic series keep getting larger and larger so the harmonic series diverges.

I. We can also claim the total surface area of the cubes in the Deluxe set is finite by computing the surface area of the box that contains them. The surface area of a $2 \times 1 \times 1$ box is 12, so the the total surface area of the cubes is 12.