Math-42 Sections 01, 02, 05

Homework #4

Due: Week of 2/24

Reading

Section 1.3-1.5

Problem

One of the most important definitions in mathematics (calculus in particular) is that of the limit of a sequence. Consider the infinite sequence: $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots$. Such a sequence can be represented as follows:

$$a_n = \frac{1}{n}, n \in \mathbb{N}$$

Note that the elements of the sequence get arbitrarily close to 0 as $n \to \infty$. We call such a point the *limit* of the sequence.

The formal definition for "L is the limit of a sequence a_n" is as follows:

$$\forall\, \epsilon > 0, \exists\, N \in \mathbb{N}, \forall\, n \in \mathbb{N}, n > N \implies |a_n - L| < \epsilon$$

Negate this proposition to obtain the definition of "L is NOT the limit of a sequence a_n."