

Seminar 12: *Some sequences, some limits: aiming for calculus*
A+S 101-003: High school mathematics from a more advanced point of view

1. We will need a volunteer to take class notes.
2. We discussed taking up a new topic and agreed upon a Calculus topic.
3. Last time: we discovered a nice conceptual proof of Pascal's Lemma (which states that $\binom{n-1}{r-1} + \binom{n-1}{r} = \binom{n}{r}$). We defined and interpreted Pascal's famous triangle and discussed some of its properties.
4. We continued to discuss an appropriate calculus-related topic and came to agreement: limits and applications to derivatives and integrals.

We will discuss today

1. Sequences
2. When a sequence has a limit (using intuitive notions of "limit")
3. Briefly discuss the formal definition of the limit of a sequence (by directed discovery)
4. Find sequences that come up in interesting geometric and/or real-world situations and having limits that might mean something neat.
5. Sums— when does an infinite sum have a limit? Where do such sums occur in the real-world, in geometry?
6. We'll move from discrete mathematics to the world of continuous mathematics and discuss limits of certain functions. We'll discuss velocity as a limit. We'll discuss area as a limit (and connect up with integration.)