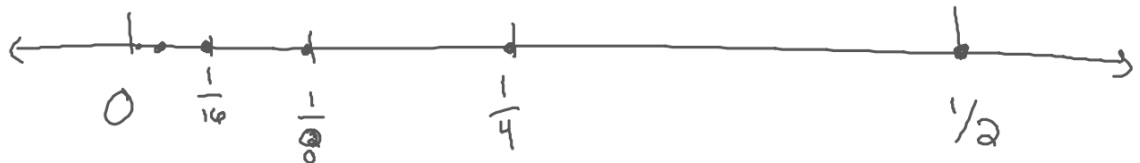


7.1 Limits and Convergence

-start with sequences

$$u_n = \frac{1}{2^n} = \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots$$

infinite sequence where $n \rightarrow \infty$
as n approaches infinity



this sequence gets closer and closer (approaches) 0, but never touches it.

Sequences like this are called convergent

because, as the term number increases, the values of the terms approach a fixed value known as the Limit, L , of the sequence.

We write this as
the limit of $\lim_{n \rightarrow \infty} u_n = L$
as n approaches ∞ is

for our example: $\lim_{n \rightarrow \infty} \frac{1}{2^n} = 0$

* if a sequence is not convergent, we say
it is divergent

Ex) Consider the sequence, 0.3, 0.33, 0.333, 0.3333, ...
and determine if it converges or diverges

$$\lim_{n \rightarrow \infty} (\quad) = \frac{1}{3}$$

Since a limit exists, the sequence converges
to limit $L = \frac{1}{3}$