Sec 8.1: Sequences

First let's think back to PreCal and look at some sequences.

A sequence is a function whose domain is the set of positive integers and is essentially a list of numbers that have a pattern to them.

a_n is called the nth term

Write the first five terms of the sequence and the 72nd term.

$$a_n = \frac{2}{n!}$$

Draw a graph of the first few terms of the sequence.

One special sequence that you looked at in PreCal was the geometric sequence.

Does anyone remember what makes a sequence geometric?

Decide if the following sequences are geometric. If so, identify the common ratio,, find the tenth term, and give an explicit rule for the sequence.

$1,-2,4,-8,16,\ldots$

$\frac{1}{2},\frac{1}{4},\frac{1}{8},\frac{1}{16},\ldots$

$1,3,5,7,9,\ldots$

$10^{-2},10^{-1},1,10,10^{2},\ldots$

Often we want to know if a series will converge to a certain number, that is that the limit of the terms tend towards a specific value.

We say that a sequence *converges* if it *has a finite limit* as $n \to \infty$.

We say that a sequence *diverges* if it *does not have a finitie limit* as $n \to \infty$.

Determine whether the sequence converges or diverges.

$$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots \frac{n}{n+1}$$

$$a_n = \frac{(n)!}{(n+2)!}$$

Determine whether the sequence converges or diverges.

$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \cdots \frac{1}{2^n}$

$a_n = \frac{n}{1-2n}$

$a_n = \frac{\ln(n)}{n}$

$a_n = \frac{(n)!}{(n-1)!}$

$a_n = 3 + (-1)^n$