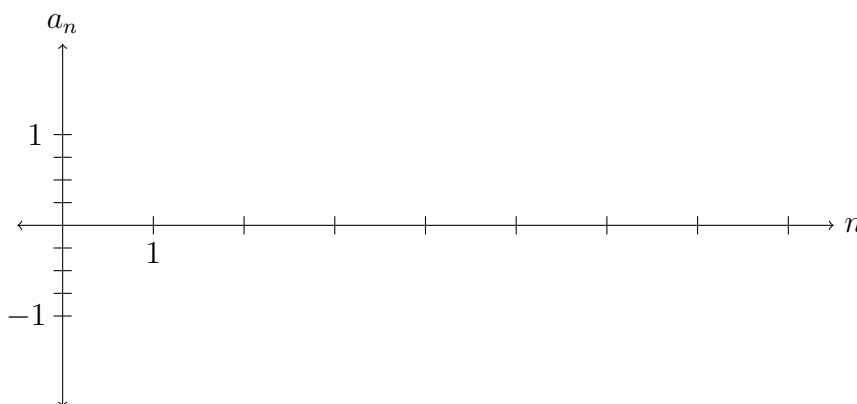

Sequences

Solutions should show all of your work, not just a single final answer.

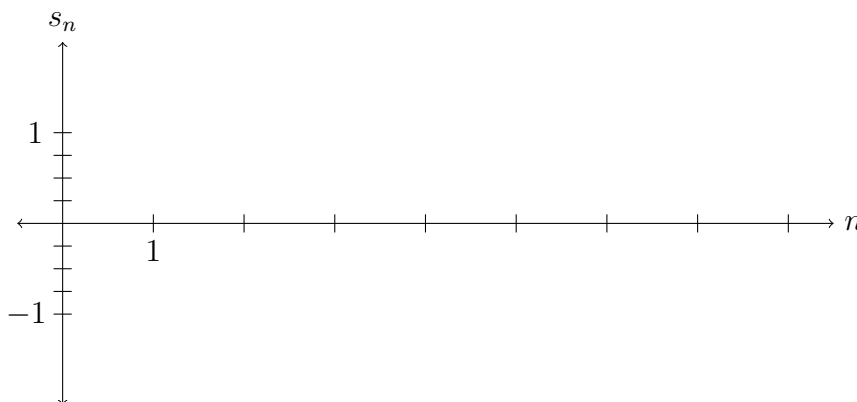
1. Let $a_n = \frac{(-1)^{n-1}}{n}$.

(a) Plot a_n vs. n for $n = 1, 2, 3, 4, 5, 6, 7, 8$.



(b) Compute $s_n = \sum_{k=1}^n a_k$ for $n = 1, 2, \dots, 8$ to three digits after the decimal point and then plot s_n vs. n for $n = 1, 2, \dots, 8$.

n	1	2	3	4	5	6	7	8
s_n								



2. For each of the following recurrence relations compute a_n for $n = 0, 1, \dots, 5$ and then find an explicit formula for a_n in terms of n .

(a) $a_{n+1} = a_n - 2$ where $a_0 = 3$.

(b) $a_{n+1} = 2 - a_n$ where $a_0 = 0$.

(c) $a_{n+1} = 3a_n$ where $a_0 = 2$.

3. Determine the limit of the sequence or state the limit does not exist. If there is a limit, show the calculations that explain how you are finding the limit.

(a) $\left\{ \frac{n^4}{n^4 + 1} \right\}$ for $n \geq 1$.

(b) $\left\{ \frac{\cos n}{\sqrt{n}} \right\}$ for $n \geq 1$.

(c) $\left\{ \left(1 + \frac{1}{2n} \right)^n \right\}$ for $n \geq 1$.

4. Is the sequence $\{2^n/3^n\}$ for $n \geq 0$ increasing, decreasing, or neither? Is it monotonic? Is it bounded above or below? If it converges, what is its limit.
5. T/F (with justification): Every bounded sequence is convergent.