

Remember - We don't expect that everyone will solve every problem, but we do expect that everyone make a serious attempt at every problem and explain what you tried when you can't solve a problem.

Math 1220, Fall 2017

Assignment due in Lecture 10/19

We say that a sequence (a_n) **tends to infinity** and write $a_n \rightarrow \infty$ as $n \rightarrow \infty$ if for all K there is $N \in \mathbb{N}$ such that for all $n > N$, $a_n > K$. Similarly, $a_n \rightarrow -\infty$ as $n \rightarrow \infty$ if for all K there is $N \in \mathbb{N}$ such that for all $n > N$, $a_n < K$.

Note: A sequence that tends to infinity is divergent.

1. Show that every increasing sequence that is not bounded from above tends to infinity, and that every decreasing sequence that is not bounded from below tends to $-\infty$.
2. Give an example of a sequence that tends to ∞ and is not increasing.
3. Show that if $a_n \rightarrow \infty$ as $n \rightarrow \infty$ then $\frac{1}{a_n} \rightarrow 0$ as $n \rightarrow \infty$.
4. Show that if $a_n \rightarrow \infty$ as $n \rightarrow \infty$ and b_n is bounded above then $a_n - b_n \rightarrow \infty$