1. Define what is meant by "a sequence $\{a_n\}_{n\geq 1}$".
2. We say $\lim_{n\to\infty} a_n = 3$ if

   For every $\epsilon > 0$ there exists $N > 0$ such that $\mid a_n - 3 \mid < \epsilon$ whenever $n \geq N$.

   (a) Provide an example of sequence that converges to 3.
   (b) Write a logical statement that is equivalent to saying $\lim_{n\to\infty} a_n \neq 3$
   (c) Provide an example of sequence that does not converges to 3.
   (d) Provide an example of sequence that does not converges to any real number.
   (e) Write a logical statement that is equivalent to saying that the sequence a_n does not converge to any real number.
3. A sequence $\{a_n\}$ is a bounded sequence if there is a $M > 0$ such that a_n is in the interval $(-M, M)$ for all $n \in \mathbb{N}$.
   (a) Write a logical statement that is equivalent to saying that the sequence a_n is bounded.
   (b) Provide an example of a bounded sequence: which converges and which does not converge.
   (c) Write a logical statement that is equivalent to saying that the sequence a_n is not bounded.
   (d) Write a logical statement that is equivalent to saying that the sequence a_n diverges to ∞.
   (e) Write a logical statement that is equivalent to saying that the sequence a_n diverges to $-\infty$.
   (f) Provide an example of a sequence : that is not bounded and diverges to $+\infty$; that is not bounded diverges to $-\infty$; and that is not bounded and neither diverges to $\pm\infty$.
   (g) Provide an example (if any) of an ubounded sequence that converges to 0.