Read directions carefully and show your work. Partial credit will be assigned based upon the correctness, completeness, and clarity of your answers.

1. Consider the sequence $\{a_k\}_{k=1}^{\infty}$ where $a_k = \cos(k\pi)$. Find the first 5 terms of this sequence. Does this sequence converge? If so, find its limit. If not, then explain why it diverges.

2. Consider the sequence $\{b_k\}_{k=1}^{\infty}$ where $b_k = \ln \left( \frac{4k}{2k+5} \right)$. Find the first 5 terms of this sequence. Does this sequence converge? If so, find its limit. If not, then explain why it diverges.