(1) (15 Points) Let \((a_n)\) be the sequence defined by
\[
\begin{align*}
  a_n &= (-1)^n & \text{for } n < 50, \text{ and} \\
  a_n &= (n^2 - n + 1)/(2n^2 + 3) & \text{for } n \geq 50.
\end{align*}
\]
Prove \(\lim_{n \to \infty} a_n = \frac{1}{2}\), by taking an arbitrary \(\varepsilon > 0\) and then finding explicitly in terms of \(\varepsilon\) an integer \(N\) such that for all \(n > N\), \(|a_n - \frac{1}{2}| < \varepsilon\).

This problem will be graded on correct mathematical reasoning using inequalities and absolute values.