f. prove that the series $\sum_1^{\infty}(-1)^{n-1}$ diverges.

Divergence Test

If $\lim_{n\to\infty} a_n \neq 0,\ \sum_1^{\infty} a_n \to diverges$

If $\lim_{n\to\infty} a_n = 0,\ \sum_1^{\infty} a_n \to diverges/converges$

$a_n \leq (-1)^{n-1}$, find $\lim_{n\to\infty}(-1)^{n-1}$

When listing the first 5 terms, we get { 1, -1, 1, -1, 1 } which shows that when n is odd, the term is 1 and when n is even, the term is -1. Therefore, $\lim_{n\to\infty}(-1)^{n-1}$ is 1 and -1. Since, $\sum_1^{\infty}(-1)^{n-1}$ is not 0, then it diverges.