Homework 3

(1) Find supremum and infimum of the set $A = \left\{ (-1)^n \frac{1}{n};\ n \in \mathbb{N} \right\}$.

(2) Find the limit
$$\lim_{n \to \infty} \frac{n^4 + n^3 - 1}{7n^4 + n^3 + n}.$$

(3) Find the limit
$$\lim_{n \to \infty} \frac{(n+1)^3 - n^3}{n^2 + 1}.$$

(4) Find a convergent subsequence of the sequence $\left\{ \sin\left(n\frac{\pi}{2} \right) \right\}_{n=1}^{\infty}$.