Homework 2

Please hand in the solutions per mail to schwarz@karlin.mff.cuni.cz until Saturday the 17th of October.

1. Consider the set/sequence $\{\frac{n^2+1}{n^4}\}_{n=1}^{\infty}$.

i Is this set a bounded set?
ii Does the set have an infimum? Is the infimum a minimum?
iii Does the set have an supremum? Is the supremum a maximum?
iv Is the sequence convergent?

2. Consider the sequence $a_n = n^2 + 1$ and $b_n = (-1)^n$. Find the limit (if it exists) of

i $\frac{a_n}{b_n}$,
ii $a_n b_n$,
iii $\frac{b_n}{a_n}$,
iv $\frac{1}{a_n + b_n}$.

3. Consider the sequence $a_n = \frac{n^2+1}{n^2}$. For $\epsilon = \frac{1}{1000000}$ find $n_0 \in \mathbb{N}$, such that

$$|a_n - 1| < \epsilon \text{ for all } n \geq n_0.$$