

## Homework #10 (Due September 17)

• Read pp. 39-48.

• Need to know definitions of convergent sequence (both def. 2.2.3 and 2.2.3 B)

Do the following problems:

1. Let  $A_n = [\frac{1}{n}, n]$ . Find  $\bigcup_{n=1}^{\infty} A_n$  and prove your answer.

2. Let  $a_n = \frac{2n^3}{n^3+4}$ . Find  $\lim_{n \rightarrow \infty} a_n = L$  and

for  $\varepsilon = .1$  and  $\varepsilon = .01$  find the smallest  $N(\varepsilon) \in \mathbb{N}$

such that  $\forall n \geq N(\varepsilon), |a_n - L| < \varepsilon$ .

3. Find the following limits and prove your answers:

a)  $\lim_{n \rightarrow \infty} \frac{4n-1}{n+5}$ ;

b)  $\lim_{n \rightarrow \infty} \frac{2n^3}{n^3-n}$ ;

c)  $\lim_{n \rightarrow \infty} \sqrt{n+1} - \sqrt{n}$  (Multiply and divide by a conjugate.)

4. Do # 2.2.1, 2.2.6 from the textbook.