Math 6051/3051: Recitation 4

Naufil Sakran

Do any **four** of the following problems.

(1) Prove the following limit by definition:

$$\lim_{n\to\infty} \frac{(-1)^n}{n} = 0.$$

(2) Prove the following limit by definition:

$$\lim_{n\to\infty} \frac{2n-1}{3n+2} = \frac{2}{3}.$$

(3) Let (t_n) be a bounded sequence, i.e. there exists M such that $|t_n| \leq M$ for all $n > 0$. Let (s_n) such that $\lim_{n\to\infty} s_n = 0$. Show that

$$\lim_{n\to\infty} (s_n t_n) = 0.$$

(4) Prove the following limit:

$$\lim_{n\to\infty} \frac{a^n}{n!} = 0.$$

(5) For a sequence of positive real numbers, we have $\lim_{n\to\infty} s_n = +\infty$ if and only if $\lim_{n\to\infty} \left(\frac{1}{s_n}\right) = 0$.