

## HW 2-8

① If  $p, q \in \mathbb{R}$ , prove  $|p| - |q| \leq |p - q|$ .

② Suppose  $\lim_{k \rightarrow \infty} x_k = x$  and  $c \in \mathbb{R}$  is such that  $\forall k \in \mathbb{N} \quad x_k \geq c$ . Prove that  $x \geq c$ .

③ If  $\lim_{j \rightarrow \infty} y_j = y$ , prove  $\lim_{j \rightarrow \infty} |y_j| = |y|$ .

## 2-10

①  $\lim_{m \rightarrow \infty} \frac{m(m+2)}{m^3 - 3} = ?$

② If in a convergent sequence we change (the values of) finitely many terms, show that the new sequence is still convergent, with the same limit as the original.

③ Is the following variant of ② in the previous assignment true? "Suppose  $\lim_{k \rightarrow \infty} x_k = x$  and  $c \in \mathbb{R}$  is such that  $\forall k \in \mathbb{N} \quad x_k > c$ . Then  $x > c$ ." [If true, prove it; if false, give example to falsify it.]