Homework 7 for M361K

- Please label your homework clearly with your name.
- Homework must be neatly written and must be stapled.
- Feel free to discuss your solutions with other students but try to solve the problems by yourself first.

Due Tuesday April 4th

(1) Determine a condition on $|x-1|$ that will ensure $|x^2-1| < \frac{1}{2}$.
(2) Using the definition of the limit show that

$$\lim_{x\to 2}(x^2+4x) = 12$$

Hint: You have to estimate $|x^2+4x-12|$ in term of $|x-2|$ but factorizing gives $|x^2+4x-12| = |(x+6)(x-2)|$. Provided $|x-2|<1$ then $|x+6|<9$ (why?).
(3) Let $A \subseteq \mathbb{R}$ and $c \in \mathbb{R}$ be a cluster point of A. Show that $\lim_{x\to c} f(x) = L$ if and only if $\lim_{x\to c} |f(x)-L| = 0$.

Hint: Nothing clever here! Just use the definition.