

## ANALYSIS QUIZ 1

- 1) State Cauchy's inequality and the triangle inequality.
  
- 2) If  $\mathbf{x} = (x_1, x_2, \dots, x_n) \in \mathbb{R}^n$ , prove that  $\max(|x_1|, |x_2|, \dots, |x_n|) \leq |\mathbf{x}|$ .
  
- 3) Give the definition in symbols of  $B(\epsilon, \mathbf{a})$ , the ball of radius  $\epsilon$ , centered at  $\mathbf{a}$ , in  $\mathbb{R}^n$ .
  
- 4) For  $S \subset \mathbb{R}^n$ , define
  - $S^{\text{int}}$
  - $\partial S$
  - $\bar{S}$
  - $S^c$
  
- 5) If  $S \subset \mathbb{R}^n$  is closed, what can you say about its complement,  $S^c$ ? What is  $\bar{S} \cap \overline{S^c}$ ?
  
- 6) Write in symbols what it means for
  - A sequence  $(\mathbf{x}_k) \subset \mathbb{R}^n$  to have a limit  $\mathbf{x}$ .
  
  - A function  $f : \mathbb{R}^n \rightarrow \mathbb{R}^m$  to be continuous at  $a \in \mathbb{R}^n$ .