

Show all work needed to reach your answers.

1. (4 points) Let  $a_n \in \mathbb{R}$  and consider the sequence  $\{a_n\}$ . What does it mean to say that  $\{a_n\}$  is *strictly increasing*?
  
  
  
  
  
  
  
  
  
  
2. Let  $f : A \rightarrow B$  be a function, and let  $S \subseteq B$  and  $T \subseteq B$ .
  - (a) (4 points) Please define  $f^{-1}(S)$ , the *inverse image* of  $S$ .
  
  
  
  
  
  
  
  - (b) (6 points) Please prove that  $f^{-1}(S \cap T) \subseteq f^{-1}(S) \cap f^{-1}(T)$ .
  
  
  
  
  
  
  
  - (c) (6 points) Please prove or disprove:  $f^{-1}(S) \cap f^{-1}(T) \subseteq f^{-1}(S \cap T)$