

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: $f^{-1}(S) \cap f^{-1}(T) \subseteq f^{-1}(S \cap T)$