

Name: _____

HOMEWORK II

For problems 1-4, let $f : A \rightarrow B$, $S, T \subseteq A$ and $U, V \subseteq B$.

- (1) Show that $f(S \cap T) \subseteq f(S) \cap f(T)$.
- (2) Is it true that $f(S) \cap f(T) \subseteq f(S \cap T)$? If so, prove it.
- (3) Prove that $f^{-1}(U \cap V) = f^{-1}(U) \cap f^{-1}(V)$.
- (4) Suppose that $S \subseteq A$ and that A is countable (finite or infinite). Show that S is also countable.