Names: _____

COMPSCI 250 Discussion #3: Practicing Predicate Proofs
Group Response Sheet

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Here are four practice statements to prove. For this exercise, you should go slightly overboard in justifying your steps. In the first example you should use variables x of type X, y of type Y, and z of type Z. In the other three examples all the variables are of type A.

1. Let X, Y, and Z be three sets, and let $f : X \to Y$ and $g : Y \to Z$ be functions (both total and well-defined). Assume that f and g are each onto functions, and let $h : X \to Z$ be defined by the rule $h(x) = g(f(x))$. **Prove that h is onto**.

2. Let R be a binary relation on A. Assume that R is transitive and symmetric. Also assume $\forall x : \exists y : R(x,y)$. **Prove that R is reflexive**.

3. Let R and S be two binary relations on the same set A. Assume that both R and S are antisymmetric. Define T to be the intersection of R and S, so that $\forall x : \forall y : T(x,y) \leftrightarrow (R(x,y) \wedge S(x,y))$. **Prove that T is antisymmetric**.