Problem 1

Question:

Suppose that f is a function from a finite set A to a finite set B where $|A| = a$ and $|B| = b$, and $a > b$. Use the Pigeon-hole Principle and the definition of 1-1 to prove that f cannot be 1-1

Proof:

A function f from $S_1 \to S_2$ is 1-1, if for any 2 elements $a, b \in S_1$: if $f(a) = f(b)$ then $a = b$. In the above case, we have 2 finite sets: A, B, where $|A| > |B|$.