

Homework 3

due on Friday, July 15

Read carefully sections 1.8-1.9 in Stoll's book and the notes about functions linked on the course web page. read section 2,3 of Chapter 1 in Shen's book. Solve the following problems.

Problem 1. Let $f : A \longrightarrow B$ be surjective. Let C be a subset of B . Prove that there is a surjective function from A onto C .

Problem 2. Let $f : A \longrightarrow B$ be a function. Prove that f is surjective if and only if for every subset S of A we have $B \setminus f(S) \subseteq f(A \setminus S)$.

Problem 3. Let $f : A \longrightarrow B$ be a function. Prove that f is injective if and only if the equality $f(S \cap T) = f(S) \cap f(T)$ holds for all subsets S, T of A .

Problem 4. Let $f : A \longrightarrow B$ and $g : B \longrightarrow C$ be bijections. Prove that gf is a bijection and that $(gf)^{-1} = f^{-1}g^{-1}$.