1 Instructions

You should write up and print out your solutions to this assignment, and hand them in at class time, and submit them using Sakai.

Answer all questions. Unless we feel there is some ambiguity, we are not writing “What to turn in” sections on this assignment because we think it is obvious that you should answer the questions and turn in your answers. If you have questions about what to turn in please ask us.

NB: (equal? class (or lecture recitation)) → #t

You must work alone on short assignments.

Cheating is a very serious issue, and we take it as such; please read over the Course Information and the Duke Honor Code.

You must write and sign a pledge on your assignment, that you acted honestly in completing the assignment.

Reading to help with this assignment: Lecture 15 notes.

2 Assignment

Let $f : A \to B$ and $g : B \to C$.

(a) If $C_0 \subset C$, show that $(g \circ f)^{-1}(C_0) = f^{-1}(g^{-1}(C_0))$.

(b) If $f$ and $g$ are injective, show that $g \circ f$ is injective.

(c) If $g \circ f$ is injective, what can you say about injectivity of $f$ and $g$?

(d) If $f$ and $g$ are surjective, show that $g \circ f$ is surjective.

(e) If $g \circ f$ is surjective, what can you say about surjectivity of $f$ and $g$?

(f) Summarize your answers to (b)–(e) in the form of a theorem.