

162 Homework 1, Due Tuesday January 13

1. Suppose that  $f : X \rightarrow Y$  and  $g : Y \rightarrow Z$  are 1 - 1 functions. Show that  $g \circ f : X \rightarrow Z$  is 1 - 1.
2. Now suppose  $f : X \rightarrow Y$  and  $g : Y \rightarrow Z$  are onto. Show that  $g \circ f : X \rightarrow Z$  is onto.
3. Prove Lemma I from the notes.
4. Prove the second half of Theorem 31.