

**MATH 113: DISCRETE STRUCTURES  
HOMEWORK DUE FRIDAY WEEK 2**

*Problem 1.* Let  $f : A \rightarrow B$  be a function. Show that a function  $g : B \rightarrow A$  such that  $f \circ g = \text{id}_B$  exists if and only if  $f$  is surjective.

*Problem 2.* Suppose that  $f$  and  $g$  are composable functions.

(a) If  $g \circ f$  is surjective, does  $g$  have to be surjective? Does  $f$  have to be surjective?

(b) If  $g \circ f$  is injective, does  $g$  have to be injective? Does  $f$  have to be injective?

(Explain all of your reasoning.)