Name:

1. For each of the following, given an example[1] of functions $f : A \to B$ and $g : B \to C$ that satisfy the stated conditions, or explain why no such example is possible:

[3] (a) The function f is a surjection, but the function $g \circ f$ is not a surjection.

[3] (b) The function f is an injection, but the function $g \circ f$ is not an injection.

2. Let $f : A \to B$ and $g : B \to A$ be functions, and let $I_B : B \to B$ denote the identity
[4] function on B. Prove that if $f \circ g = I_B$, then f is a surjection.

[1] Arrow diagrams are acceptable, as long as they clearly indicate (a) what the sets A, B, C are, and (b) how the functions are defined.

Total: 10 points