WORKSHEET #4 – MATH 311W

We will study functions.

1. Suppose that $f : X \to Y$ and $g : Y \to Z$ are injective functions. Prove that $g \circ f$ is injective.

2. Suppose that $f : X \to Y$ and $g : Y \to Z$ are surjective functions. Prove that $g \circ f$ is surjective.

3. Suppose that $f : X \to Y$ and $g : Y \to Z$ are functions and that $g \circ f$ is surjective. Prove that g is surjective.

4. Suppose that $f : X \to Y$ and $g : Y \to Z$ are functions and that $g \circ f$ is injective. Prove that f is injective.

5. Suppose that $f : X \to Y$ and $g : Y \to Z$ are functions and that $g \circ f$ is injective. Give an example that proves that g is not necessarily injective.

6. Suppose that $f : X \to Y$ and $g : Y \to Z$ are functions and that $g \circ f$ is surjective. Give an example that proves that f is not necessarily injective.