

Homework 8, Math 215

1. Find the inverse for the function  $f(x) = x^3 + 1$ .
2. Let  $f : X \rightarrow Y$  be a function with graph  $G \subset X \times Y$ . Prove that  $f$  is surjective if and only if  $\forall y \in Y, X \times \{y\} \cap G \neq \emptyset$ .
3. Suppose  $f : X \rightarrow Y$  is a function. Prove that there exists a function  $g : Y \rightarrow X$  such that  $f \circ g = I_Y$  if and only if  $f$  is a surjection.
4. Of 182 students who take three core Mathematics course, (algebra, Calculus, Reasoning), 129 like reasoning, 129 like algebra, 129 like calculus, 85 like reasoning and algebra, 89 like reasoning and calculus 86 like algebra and calculus and 54 like all three. How many like none of the courses?
5. Find a bijection between the set of all positive integers and the set of odd positive integers.