DIRECTIONS:

- No papers, phones, calculators, or gadgets are permitted to be out during the quiz.

- Show all work, clearly and in order **You will lose points if any of these instructions are not followed.**

Questions	Points	Score
1	1	
2	2	
3	2	
Total	5	

Problem 1: (1 point) What is the definition of a finite set?

A set is said to be finite if there exists a bijection between that set and $\mathbb{N}_k$ for some $k \in \mathbb{N}$.

Problem 2: (2 points) If A is a finite set and $A \approx B$, prove that B is finite and $Card(A) = Card(B)$.

Proof: A is finite means that $A \approx \mathbb{N}_k$ and there exists a bijection $f : \mathbb{N}_k \to A$. But since $A \approx B$ that means there exists a bijection $g : A \to B$. So $g \circ f : \mathbb{N}_k \to B$ is also a bijection so $B \approx \mathbb{N}_k$ and $Card(B) = k$.

Q.E.D.

Problem 3: (2 points) Label the following true or false

(a) (0.5 points) ___F___ $\mathbb{N}$ is finite.

(b) (0.5 points) ___T___ $A \approx \emptyset \iff A = \emptyset$.

(c) (0.5 points) ___F___ If A and B are countable, then $A \times B$ is equinumerous to either A or B.

(d) (0.5 points) ___T___ $\mathbb{N} \approx \mathbb{N} \cup \{0\}$.