Math 311, Fall 2018

Quiz 1

Name:

(1) Give the definition of an onto/surjective function. Your answer should begin with: A function $f : A \to B$ is onto if ...

Answer 1: A function $f : A \to B$ is onto if $im(f) = B$.

Answer 2: A function $f : A \to B$ is onto if for every $b \in B$ there is an $a \in A$ such that $f(a) = b$.

(2) What is the definition of a countably infinite set?

Answer: A set S is countable infinite if there is a bijection between S and the natural numbers.

(3) Fill in the blanks in the statement of the principle of mathematical induction:

Theorem 1. *Principle of Mathematical Induction*
If $P(n)$ is a statement containing the variable n such that
(a) *P(1) is a true statement, and*

(b) *For each $k \in \mathbb{N}$ if $P(k)$ is true then $P(k+1)$ is true,*

then $P(n)$ is true for all $n \in \mathbb{N}$.