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Math 301

HW 8

1. is injective and not surjective.

Assume the function is an injection.

Assume the function is a surjection. Let

Contradiction.

Thus, the function is an injection and not a surjection.

2. construct

Let x and y the variables.

Let

G is indeed a surjection since for every f(x), there is g(f(x))=y

3.

Suppose B is an infinite set according to the given statement. A is also an infinite set since A may be an equal set to B that is an infinite set, so A is injective.

Since A and B are injective, by CBS

4.

Let f and g, such that and

, so g is injective. We know is an infinite set by def, so f is injective.

by CBS

5. a.

Thus, the statement is true

b.

6. It has exactly the same process as in 5 but replace the f to and replace W to Z and X to Y.

7.

Suppose f is invertible.

4 is because X is a subset or a equal set of A, X is applicable for both f and .

5 is from the def of equal set.

Thus, the given statement is true

8. is injective iff

Let and { for

Thus, the statement is true.