

Individual Homework Week 7

You have looked at compositions in algebra and calculus. Here is a formal definition.

Definition: Let A , B and C be sets and f and g be functions such that $f : A \rightarrow B$ and $g : B \rightarrow C$. Then the composite of f and g is the relation from A to C : $g \circ f = \{(x, z) : \text{there exists } y \in B \text{ such that } (x, y) \in f \text{ and } (y, z) \in g\}$.

Prove the following:

- (1) Let A , B and C be sets and f and g be functions such that $f : A \rightarrow B$ and $g : B \rightarrow C$. If f is one-to-one and g is one-to-one, then $g \circ f$ is one-to-one.
- (2) Let A , B and C be sets and f and g be functions such that $f : A \rightarrow B$ and $g : B \rightarrow C$. If $g \circ f$ is one-to-one, then f is one-to-one.