Modern algebra I, fall 2014. NAME:

Quiz 1

1. Mark the boxes that are followed by correct statements.

□ (A ∪ A) \ A = ∅ for any set A.
□ Composition of bijective maps is bijective.
□ There exists a surjective map from the set A = {a, b} to the set B = {1, 2, 3}.
□ If n is divisible by a prime p and d is a divisor of n, then d is divisible by p.
□ If ab = ac in a group G then b = c.

2. Mark the boxes next to those pairs (set, binary operation) that are groups.

□ (Z≥0, +), where Z≥0 = {n ∈ Z, n ≥ 0} is the set of nonnegative integers and the binary operation is addition.
□ (Q>0, ·), where Q>0 is the set of strictly positive integers Q>0 = \{x \in \mathbb{Q}, x > 0\}, and the binary operation is multiplication.
□ (Zn, −), the set of residues modulo n, with subtraction a ∘ b ≡ a − b (mod n) as the binary operation.
□ (2Z, +), where 2Z = \{2n : n ∈ \mathbb{Z}\} is the set of even integers and the binary operation is addition.
□ (2Z, ·), the set of even integers 2Z = \{2n : n ∈ \mathbb{Z}\}, and the binary operation is multiplication.
□ One-element set A = \{a\}, and the binary operation is a ∘ a = a.