Math 300A Winter 2011 Quiz 2

Question 1: Complete the following definition: Let *f* be a function from U to V; *f* is *one-one* ____

(NOTE: Here are several among many possible answers.)

Let *f* be a function from U to V; *f* is *one-one* if for any distinct x and y in U, f(x) does not equal f(y).

Let *f* be a function from U to V; *f* is *one-one* *if for any x and y, f(x) = f(y) implies x = y.*

Let *f* be a function from U to V; so f is subset of pairs (u,v) in UxV. Then *f* is *one-one* *if no element v appears more than once in the pairs that are elements of f.*

Let *f* be a function from U to V; *f* is *one-one* *if for every v in the image of f, there is a unique u in U, such that f(u) = v.*

Question 2:

Let *f* : Z -> Z be defined as {(x, 4x+5): x ∈ Z}

a) Is *f* onto? Yes _____ No _____ X_____

Give a brief but convincing reason (i.e. a quick proof) that your answer is correct.

If the pair (x,6) is in f, then 4x + 5 must equal 6, so x = ¼. This is a rational number but not an integer, so this pair is not in *f* and 6 is not in the image of *f.*

b) Is *f* one-one? Yes __X_____ No _____

Give a brief but convincing reason (i.e. a quick proof) that your answer is correct.

If $f(x_1) = f(x_2)$, then $4x_1 + 5 = 4x_2 + 5$, so $4x_1 = 4x_2$, and thus $x_1 = x_2$. This satisfies the definition of 1-1.