

Answer on Question #51196 – Math - Algebra

Question

if $f(x_1)=f(x_2)$ then $x_1=x_2$ then it's an injective function or x_1 is not equal to x_2 then $f(x_1)$ is not equal to $f(x_2)$ then it's also injective.

is it necessary to abide both the rules to be injective or any one?

Solution

It isn't necessary to abide both the rules to be injective, because they are equivalent. Really, rewrite the first rule symbolically:

$$\forall x_1, x_2 \quad f(x_1) = f(x_2) \Rightarrow x_1 = x_2$$

which is logically equivalent to the contrapositive:

$$\forall x_1, x_2 \quad x_1 \neq x_2 \Rightarrow f(x_1) \neq f(x_2)$$

which is symbolic form of the second rule. Both of them – the definition of injection.