Answer on Question #51195 – Math – Algebra

Question 1

f:R-{1/2}to R f(x)=(x+3)/(2x-1). IS IT INJECTIVE?

Solution

1)Definition:

f: X → Y is called injective if for any x1 ≠ x2 in X, it follows that f (x1) ≠ f (x2).

2) $f(x) = \frac{(x+3)}{(2x-1)}$, $x \neq \frac{1}{2}$ given.

3) Take $x_1 \neq x_2$, $x_1, x_2 \in R\backslash\{\frac{1}{2}\}$ and prove that $f(x_1) \neq f(x_2)$.

4) Suppose that $f(x_1) = f(x_2) \Longrightarrow \frac{(x_1+3)}{(2x_1-1)} = \frac{(x_2+3)}{(2x_2-1)} \Longrightarrow$

$(x_1 + 3) \cdot (2x_2 - 1) = (x_2 + 3) \cdot (2x_1 - 1) \Longrightarrow$

$2x_1 2x_2 - x_1 + 6x_2 - 3 = 2x_1 2x_2 - x_2 + 6x_1 - 3 \Longrightarrow$

$6x_2 + x_2 = 6x_1 + x_1 \Longrightarrow 7x_1 = 7x_2 \Longrightarrow x_1 = x_2$ that does not meet the condition $x_1 \neq x_2$, therefore that assumption is false.

This means that $f(x_1) \neq f(x_2)$and by definition of injective function,

$$f(x) = \frac{(x+3)}{(2x-1)} \; is\; injective.$$

Question2:

IF f(x1)=f(x2) and then x1=x2 it's injective.
so i want to check f(1)=4 f(2)=5/3. it never become same y value for different x value. but why to check is it injective or not we do f(x1)=f(x2) and then x1=x2?

Solution

1)Definition:

f: X → Y is called injective if for any x1 ≠ x2 in X, it follows that f (x1) ≠ f (x2).

2) $x_1 = 1, x_2 = 2$, f(x_1)=4, f(x_2)=5/3

3) For $x_1 \neq x_2$ matches $f(x_1) \neq f(x_2)$. As defined it's injective.

4) Equivalent mapping is an injection if

$(f\ (x_1) = f\ (x_2)) \Longrightarrow (x_1 = x_2)$

Map is injective if and only if there exists for the left inverse $\exists g$: $Y \to X$ $g \circ f = id_X$,

where ∘ denotes the composition and id_X the identity on X.