

Answer on Question #73987 – Math – Calculus

Question

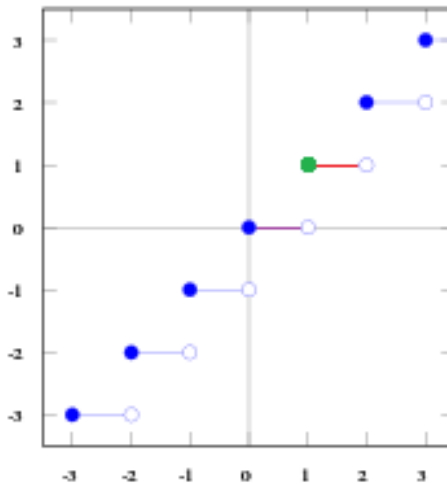
The greatest integer function is continuous on \mathbb{R} . Is it true or false? Also give reason for your answer.

Solution

Assume that it is true. By definition of continuity on \mathbb{R} , the greatest integer function should be continuous at any point. But this raises a contradiction: this function is not continuous at least at $x = 1$:

$$\lim_{x \rightarrow 1^-} \text{GIF}(x) = 0, \text{ but } \lim_{x \rightarrow 1^+} \text{GIF}(x) = 1,$$

i. e. the left-hand and right-hand limits exist, but they are not equal.



Answer:

It is false. The greatest integer function is not continuous at $1 \in \mathbb{R}$ (in particular, one-sided limits are not equal).