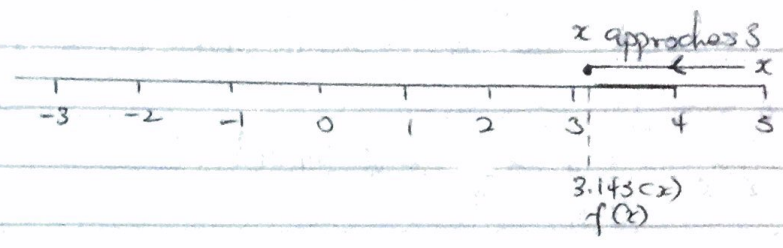


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1) Given a function to be as $f(x) = x$
 Find $\lim_{x \rightarrow 3} f(x)$

Answer:

If $\lim_{x \rightarrow 3} f(x) = \bar{x}$



Then $\lim_{x \rightarrow 3} f(x) = \bar{x}$

Since $\bar{x} = 3.143$

$\therefore \lim_{x \rightarrow 3} f(x) = 3.143$

2) The model of a system has been developed by an Engineer to be given as $f(x) = 5x - 21$

Given that $\delta = 0.1$ and using a step of 0.01, demonstrate, in tabular form, that the limit of the model as $x \rightarrow 6$ is equal to 9

Answer:

$x = 6$, $\delta = 0.1$, Using step of 0.01

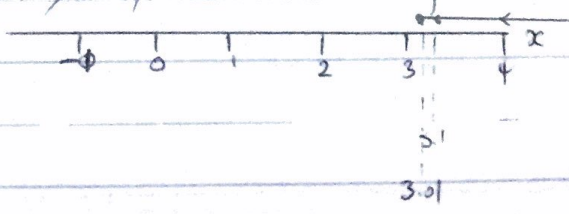
Condition	x	$f(x)$
Step of 0.01	$6 + 0.01$	$5(6.01) - 21 = 9.05$
$\delta = 0.1$	$6 + 0.1$	$5(6.1) - 21 = 9.5$
$x = 6$	6	$5(6) - 21 = 9$

$\therefore \lim_{x \rightarrow 6} 5x - 21 = 9$

3) Find the limit of the model given as $\lim_{x \rightarrow 3} \frac{3-x}{|3-x|}$

Answer:

Using $x = 3$ $\lim_{x \rightarrow 3} \frac{3-x}{|3-x|} = \frac{0}{0} = \text{undefined}$



Using $x = 3.1$

$$\lim_{x \rightarrow 3^+} \frac{3-x}{|3-x|} = \frac{-0.1}{|-0.1|} = \frac{-0.1}{0.1} = -1$$

Using $x = 3.01$

$$\lim_{x \rightarrow 3^+} \frac{3-3.01}{|3-3.01|} = \frac{-0.01}{|-0.01|} = \frac{-0.01}{0.01} = -1$$

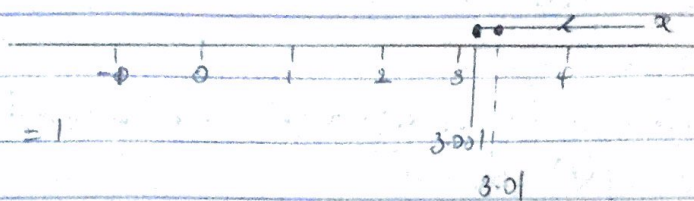
$$\therefore \lim_{x \rightarrow 3^+} \frac{3-x}{|3-x|} = -1$$

4) Evaluate the limit of the model given as $\lim_{x \rightarrow 3} \frac{x-3}{|x-3|}$. If it exists.

Answer:

$$\lim_{x \rightarrow 3} \frac{x-3}{|x-3|} = \frac{3-3}{|3-3|} = \frac{0}{0} = \text{undefined}$$

$$\text{Using } x = 3.01 = \frac{3.01-3}{|3.01-3|} = 1$$



$$\text{Using } x = 3.001 = \frac{3.001-3}{|3.001-3|} = 1$$

$$\lim_{x \rightarrow 3} \frac{x-3}{|x-3|} = \frac{3-3}{|3-3|} = \frac{0}{0} = \text{undefined}$$

$$\text{Using } x = 3.0001 = \frac{3.0001-3}{|3.0001-3|} = 1$$

$$\text{Using } x = 3.00001 = \frac{3.00001-3}{|3.00001-3|} = 1$$

$$\text{Using } x = 2.9 = \frac{2.9-3}{|2.9-3|} = -1$$



$$\text{Using } x = 2.99 = \frac{2.99-3}{|2.99-3|} = -1$$

2.9 2.99

$$\lim_{x \rightarrow 3} \frac{x-3}{|x-3|} \neq \lim_{x \rightarrow 3} \frac{x-3}{x-3} \quad \therefore \lim_{x \rightarrow 3} \frac{x-3}{|x-3|} = \text{Does not exist}$$

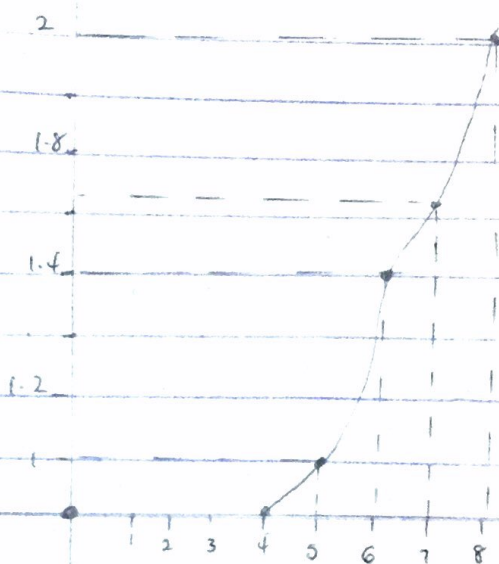
Show that the function given is equation $f(x) = \sqrt{x-4}$ is continuous on the interval $(4, 8)$.

$$f(x) = \sqrt{x-4}$$

Substituting 4 for x $f(x) = \sqrt{4-4} = \sqrt{0} = \underline{\underline{0}}$

Substituting 8 for x $f(x) = \sqrt{8-4} = \sqrt{4} = \underline{\underline{2}}$

x	$f(x)$
4	0
5	1.0
6	1.41
7	1.73
8	2



*) Given a function $f(x) = \pi$ from $\lim_{x \rightarrow 3} f(x)$

Since there is no function to substitute the limit of x , we can say that $f(x) = \pi$

$$\pi = \pi$$

$$\therefore \underline{\underline{3.147}}$$