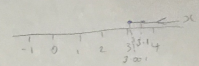
model given as $\lim_{x \to 3} \frac{x-3}{|x-3|}$ if

0

$= 1$



$= 1$

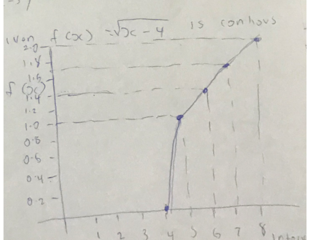
undefined

$= -1$

$= -1$

$\therefore \lim_{x \to 3} \frac{x-3}{|x-3|}$ does not exist

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



1 given a function to be as $f(x) = \pi$

find $\lim_{x \to 3} f(x)$

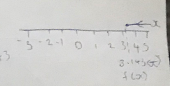
Ans

If $\lim_{x \to 3} f(x) = \pi$

Then $\lim f(3) = \pi$

Since $\pi = 3.143$

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



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 that the limit of the model as $x \to 6$ is equal to 9

Ans

$x = 6$ $\delta = 0.1$ using step of 0.01

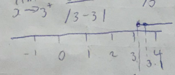
condition	x	$f(x)$
Step of 0.01	$6 + 0.01$	$5(6.01) - 21 = 9.05$
$\delta = 0.1$	$6 + 0.1$	$5(6.1) - 21 = 9.5$
$x = 6$	6	$5(6) - 21 = 9$

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

3 find the limit of the model given as $\lim_{x \to 3} \frac{3-x}{|3-x|}$

Ans

using $x = 3$ $\lim_{x \to 3^+} \frac{3-3}{|3-3|} = 0/0$ = undefined



using $x = 3.1$

$\lim_{x \to 3^+} \frac{3-3.1}{|3-3.1|} = \frac{-0.1}{0.1} = -1$

using $x = 3.01$

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

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