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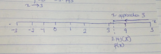
Matric No: 17/ENG06/044

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

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

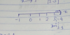
$x = 6$, $f = 0.1$, using step of 0.01

Condition	x	$f(x)$
step of 0.01	6+0.01	$5(6.01)-21 = 9.05$
f = 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
$\lim_{x \to 3} \frac{3-x}{|3-x|}$

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



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

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

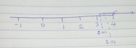
$\therefore \lim_{x \to 3^+} \frac{3-x}{|3-x|} = -1$

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

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

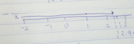
Using $x = 3.01 = \frac{3.01-3}{|3.01-3|} = 1$

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



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

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



using $x = 2.99 = \frac{2.99-3}{|2.99-3|} = -1$ 2.9

$\lim_{x \to 3^+} \frac{x-3}{|x-3|} \neq \lim_{x \to 3} \frac{x-3}{|x-3|}$ $\therefore \lim_{x \to 3^+} \frac{x-3}{|x-3|}$ Does not exist