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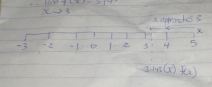
Matric No : 17/ENG03/014

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 $\lim f(x) = \pi$
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.

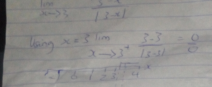
$x = 6$, $f = 0.1$, using step of 0.01

Condition	x	$f(x)$
Step of 0.01	$6 + 0.01$	$5(0.01) - 21 = 9.05$
$F = 0.1$	$6 + 0.1$	$5(6.1) - 21 = 9.5$
$x = 6$	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 $x = 3$ $\lim_{x \to 3^+} \frac{3-3}{|3-3|} = \frac{0}{0}$



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

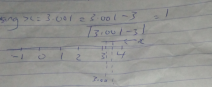
$\therefore \lim_{x \to 3^+} \frac{3 - x}{|3 - x|} = -1$

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

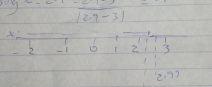
Using $x = 3.01 = \frac{3.01 - 3}{|3.01 - 3|} = 1$

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

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

Does not exist