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Matric No: 17/Eng01/030

Course: Engineering Mathematics Assignment.

1. Given a function to be as in $f(x) = x$,

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

Solution.

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

2. The model of a system has been developed by an Engineer to be as given in the equation.

$f(x) = 5x - 2d.$

Given that $\delta = 0.1$ and using a step of 0.02, demonstrate in tabular form of the model as $x \to 6$ is equal to a.

Solution

Lm	a - δ	x - 3	at δ	Lm
8.5	5.90		0.1	9.5
8.55	5.91		6.09	9.45
8.60	5.92		6.08	9.40
8.65	5.93		6.07	9.35
8.70	5.94		6.06	9.30
8.75	5.95		6.05	9.25
8.80	5.96		6.04	9.20
8.85	5.97		6.03	9.15
8.90	5.98		6.02	9.10
8.95	5.99		6.01	9.05
9.00	6.00		6.00	9.00

3. Since the Right Hand Limit and Left Hand Limit are equal to 9;

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

3. Find the limit of the model given as $\lim_{x \to 3} \frac{3-x}{|x-3|}$, or $\lim_{x \to 3} \frac{3-x}{|3-x|}$

Solution.

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

$$= \lim_{\delta \to 0} \frac{3-(3+x)}{|3-(3+x)|}$$

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

4. Evaluate the limit of the model given on equation (4), if it exists.

$$\lim_{x \to 3} \frac{x-3}{|x-3|}$$

where RHS

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

LHS

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

∴ Where; RHS ≠ LHS ∴ $\lim_{x \to 3}$ does not exist.

$$\lim_{x \to 3} \frac{x-3}{|x-3|}$$

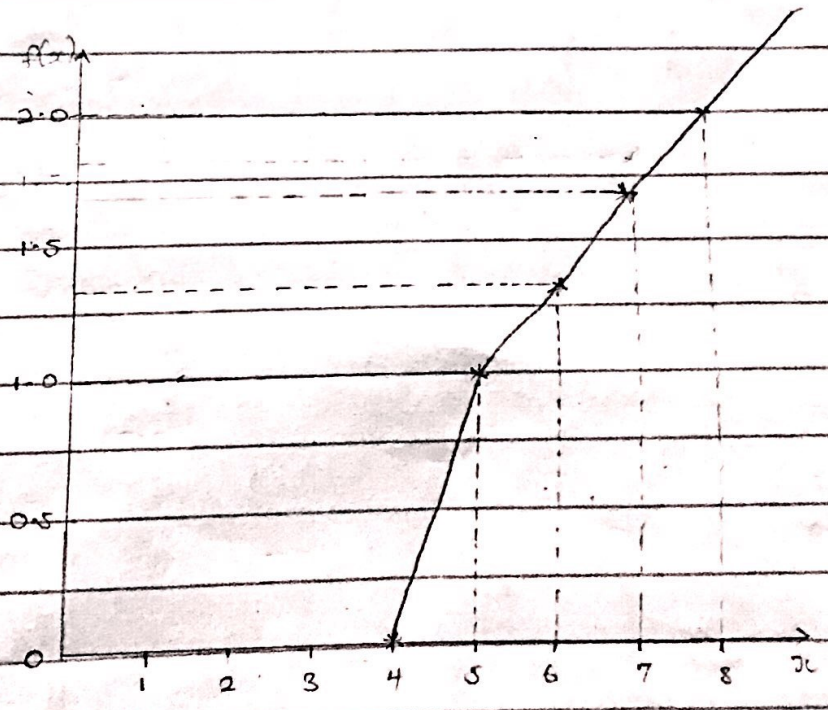
$$= \frac{3-3}{|3-3|} = \frac{0}{0} = \text{undefined}$$

∴ Therefore the limit does not exist.

5. Show that the function given in equation (5)

$f(x) = \sqrt{x-4}$ on interval $(4, 8)$ is continuous

x	$f(x)$
4	0
5	1
6	$\sqrt{2}$ = 1.141
7	$\sqrt{3}$ = 1.17
8	2



Therefore it is a continuous graph.