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17/ENG07/1043 Elect Elect Engineering
ENG 281 Engineering maths

1) Given a function to be as in Equation (1)

$f(x) = \overline{11}$

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

solution

$f(x) = \overline{11}$

$\lim_{x \to 3} = \overline{11}$

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

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

Solution

$f(x)$	$x - \delta$	$x + \delta$	$f(x)$
8.50	5.90	6.10	9.50
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

from the table;

Since the left hand Limit and the right hand limit all approaches 9

therefore we can say;

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

3 -find the limit of the model equation given in equation 3

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

solution

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

4 Evaluate the limit of the model, given the equation 4 if it exist

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

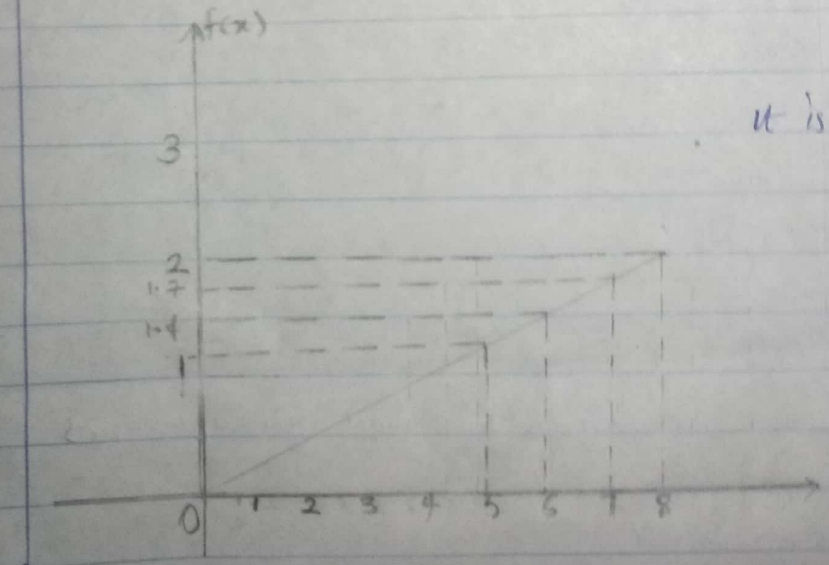
$$\lim_{x \to 3^+} \frac{x-3}{|x-3|} = \lim_{\delta \to 3^+} \frac{(3+\delta)-3}{|3+\delta-3|} = \frac{\delta}{\delta} = 1$$

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

$$\lim_{x \to 3} \frac{x-3}{|x-3|} = \lim_{\delta \to 3} = \text{doesn't exist}$$

5 Show that the function given in Equation (5)
$f(x) = \sqrt{x-4}$ is continuous on the interval $[4, 8]$

x	4	5	6	7	8
$f(x)$	0	1	1.4	1.7	2



It is continuous