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17/ENG04/071
ELECTRICAL ELECTRONICS ENGINEERING

1. Given a function to be as in equation (1)
$f(x)$, find $\lim_{x \to 3} f(x)$

$\lim_{x \to 3} = A$

$\lim_{x \to 3} = R$

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 0 - 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

| $f(x)$ | $a-0$ | $a+0$ | $f(x)$ |
|---|---|---|---|
| 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 |

Since the ~~limit~~ right hand limit (RHL) and left hand limit (LHL) are equal to 7, therefore

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

3. Find the limit of the model given as

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

Soln

$$\lim_{x \to 3^+} \frac{3-x}{|3-x|} \quad \text{①}$$

$$= \lim_{x \to 0} \frac{3-(3+x)}{|3-(3+x)|} = \frac{x}{x} = -1$$

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

Soln

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

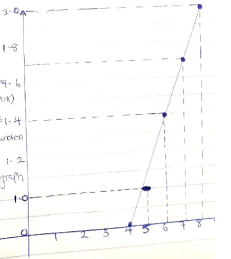
$$\lim_{x \to 3} = \frac{3-3}{|3-3|} = \frac{0}{0}$$

Undefined

The limit does not exist.

5. Show that the function given in the equation below is continuous on the interval $f(x) \sqrt{x-4}$

| x | $f(x) \sqrt{x-4}$ |
|---|---|
| 4 | 0 |
| 5 | 1.0 |
| 6 | 1.4 |
| 7 | 1.7 |
| 8 | 2.0 |




The graph above shows that the $f(x) \sqrt{x-4}$ of interval $(4, \infty)$ is continuous because there was no point where the function was undefined and the graphing a straight line graph