

EVAN OGHENEVUA FAVOUR

CHEMICAL ENGINEERING

M/ENGG01011

ENR 281

Assignment

1) Given a function to be as an equation (x)

$$f(x) = \pi \text{ find } \lim_{x \rightarrow 3} f(x)$$

$$x \rightarrow 3$$

$$f(x) = \pi$$

2. The model of a system has been developed by an engineer to be given as in equation (2)

$$f(x) = 5x - 21$$

Given that  $\delta = 1$  and using a step of 0.01 demonstrate in tabular form that limit of the model as  $x \rightarrow 6$  is equal to 9.

$f(x)$	$a - \delta$	$a + \delta$	$f(x)$
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

Since the right hand limit (RHL) and left hand limit (LHL) are equal to 9 therefore

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

$$x \rightarrow 6$$

3. Find the limit of the model given as

$$\lim_{x \rightarrow 3^+} 3 - x$$

$$x \rightarrow 3^+ \quad | 3 - x |$$

Solution

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

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

$$= \frac{-x}{x} = -1$$

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

Solution

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

$$= \frac{3-3}{|3-3|}$$

$$= \frac{0}{0}$$

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

