AGWANIRU ROSEMART ONYINYECHI
17/ENG01/003
CHEMICAL ENGINEERING
~~Maths~~

① Given a function $f(x) = \bar{\pi}$
find $\lim_{x \to 3} f(x)$

solution

$f(x) = \bar{\pi}$

since there is no function to substitute the limit of ~~x~~ we can then say that

$f(x) = \bar{\pi}$

$= 3.142$

The model of a system has be developed by an engineer to be as given in eqn 2.

② $f(x) = 5x - 21$ (2)

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

solution

$f(x)$	$x - \delta$	6	$x + \delta$	$f(x)$
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	5.95		6.01	9.05
9.00	6.00		6.00	9.00

3 Find the limit of the model eqn (3)

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

Solution

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

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

4) Evaluate the limit of the model given in Equation 4 if it exist

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

Solution

The right-hand side of the equation

$$\lim_{x \to 3^+} \frac{x-3}{|x-3|} = \lim_{\delta \to 0} \frac{3+\delta-3}{|3+\delta-3|} = \frac{0+\delta}{|0+\delta|} = \frac{\delta}{+\delta} = 1 //$$

The left-hand side of the equation

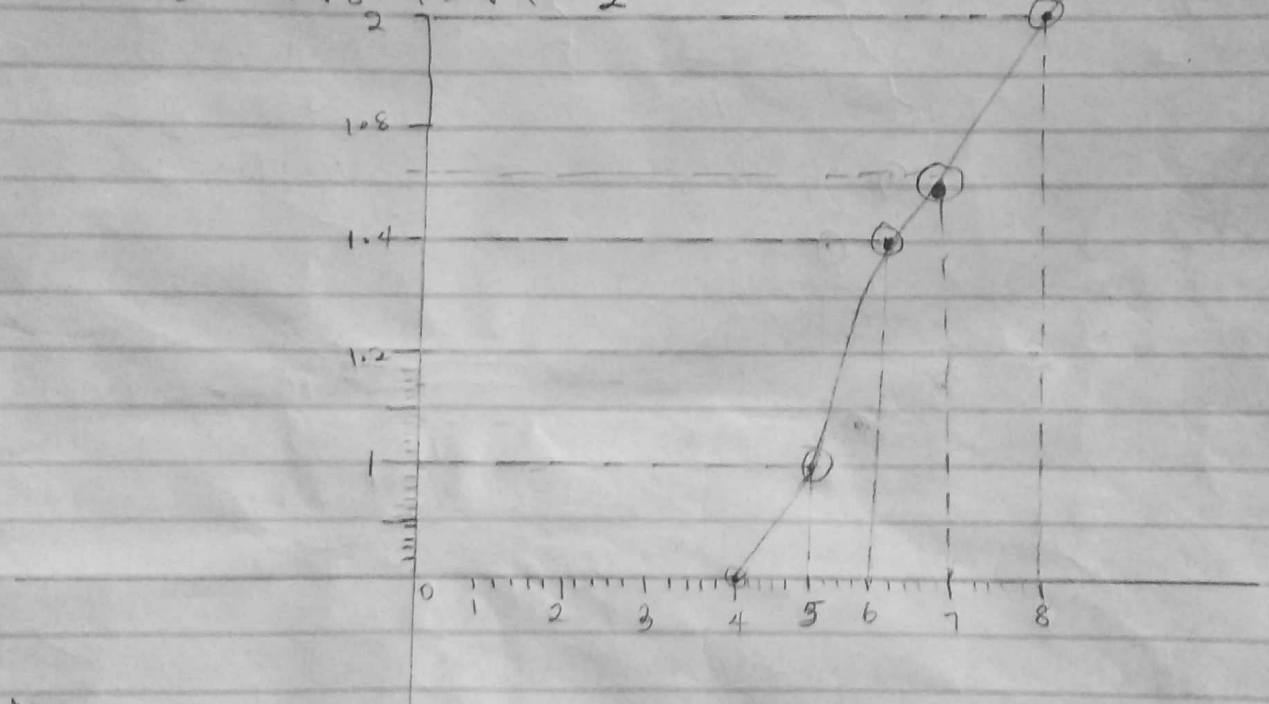
$$\lim_{x \to 3^-} \frac{x-3}{|x-3|} = \lim_{\delta \to 0} \frac{3-\delta-3}{|3-\delta-3|} = \frac{0-\delta}{|0-\delta|} = \frac{\delta}{-\delta} = -1$$

The $\lim_{x \to 3} \frac{x-3}{|x-3|}$ does not exist, the left-hand side is not equal to the right hand side of the limit.

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

Solution

x	f(x)
4	$\sqrt{4-4}=0$
5	$\sqrt{5-4}=\sqrt{1}=1$
6	$\sqrt{6-4}=\sqrt{2}=1.41$
7	$\sqrt{7-4}=\sqrt{3}=1.73$
8	$\sqrt{8-4}=\sqrt{4}=2$



It is a continous function because I drew the graph without lifting my hand
It is also continous because it is defined on the intervals.