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1718E114 101E ~~1718E114 101E~~

ENG 281: Engineering Mathematics

CHEMICAL

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

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

Solution

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

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

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

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

Solve

Lim	$a - \delta$	a	$a + \delta$	Lim
8.50	5.90	6	6.1	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

Since the right hand limit and the left hand limit are equal to 9

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

3 Find the limit of the model equation given

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

Solve

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

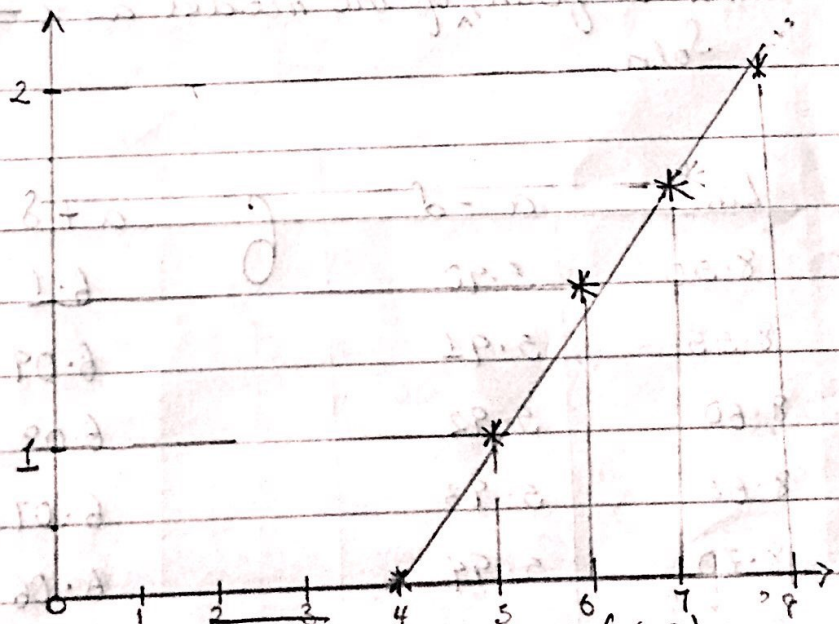
4 Evaluate the limit of the model given in Equation 4, if it exists

$$\lim_{x \rightarrow 3} \frac{x-3}{|x-3|} \Rightarrow \frac{3-3}{|3-3|} = \frac{0}{0} \Rightarrow \text{Undefined}$$

* The limit doesn't exist.

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

x	$f(x) = \sqrt{x-4}$
4	0
5	1
6	1.4
7	1.7
8	2.0



The graph above shows that the $f(x) = \sqrt{x-4}$ of interval $(4, 8)$ is continuous because there was no point where the function was undefined and the graph is a straight line graph.