

19/06/2018

Mechanical Engineering

1) Given a function to be evaluated, find the limit.

No.
 f(x) = 5x - 21

2) The model of a system has been developed by an engineer like as given in the question.

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

Given that $\delta = 0.1$ and using a step of 0.02, demonstrate in tabular form of the model as $x \rightarrow 6$ is equal to 9.

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L_n	$a - \delta$	$a + \delta$	L_n
8.5	5.90	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 left-hand limit are equal to 9, therefore:

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

3) find the limit of the model equation given as,

$$\lim_{x \rightarrow 5} \frac{3-x}{3-x}$$

$$\begin{aligned} \text{Sol} \\ \lim_{x \rightarrow 2} \frac{x-1}{x+1} &= \lim_{x \rightarrow 2} \frac{3-(x+2)}{3-(x+1)} \\ &= \frac{3-1-2}{3-2+1} = \frac{-1}{2} = -\frac{1}{2} \end{aligned}$$

4 Evaluate the limit of the metal given as

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

Sol

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

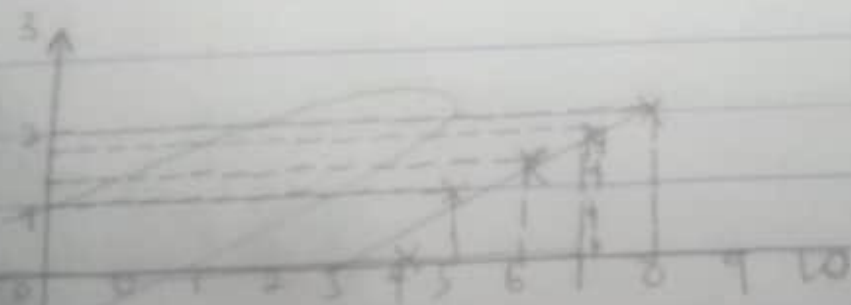
$$= \frac{3-3}{3-3} = \frac{0}{0} = \text{Undefined, the limit does not exist}$$

5 Show that the function given by the equation below is continuous on the interval $[4, 8]$

$$f(x) = \sqrt{x-4}$$

Sol

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 function $f(x)$
 $= \sqrt{x-4}$ at interval $[4, 8]$ is continuous because
 there was no point where the function was
 undefined.