

17/ENG06/016
Mech engineering

Given a function to be in equation (1)
 $f(x)$, τ find $\lim_{x \rightarrow \tau} f(x)$

$$\lim_{x \rightarrow \tau} = \tau$$

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$$x \rightarrow \tau$$

The model of a system has been developed by an engineer to be as given in equation (2) $f(x) = 5x$

Given that $\tau = 0$ using a step of 0.01, demonstrate in tabular form, that the limit of the model as $x \rightarrow 6$ is equal to 9

$f(x)$	$x = 0$	$x = 0$	$f(x)$
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 right hand limit (RHL) and left hand (LHL) are equal to 9, therefore

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

3 find the limit of the model given as

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

Soln

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

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

Evaluate the limit of the model given as $\lim_{x \rightarrow 0} \frac{x-3}{|x-3|}$

Soln.

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

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

undefined the lim does not exist

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

