

1. Given a function to be as in Equation (1)
 $f(x) = x$, find $\lim_{x \rightarrow 3} f(x)$

Ans = The limit does not exist.

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

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

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

Solution

$f(x)$	9.0	9.0	$f(x)$
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 limit (LHL) equal to 9,

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

3. Find the limit of the model equation given in Equation (3). $\lim_{x \rightarrow 3} (x - 3)$

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

Solution

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

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

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

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

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 Equation (5)

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

is continuous on the interval $[4, 8]$.

Solution

x	$f(x) = \sqrt{x-4}$
4	0
5	1.0
6	1.4
7	1.7
8	2.0

