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ENIG 281

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- 1) Given a function to be as an equation (1)  
 $f(x)$ , find  $\lim_{x \rightarrow 3} (f(x))$

$$\lim_{x \rightarrow 3} = \pi$$

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- 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  $0 < 0.1$  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.

$f(x)$	$9 - 0$	$9 + 0$	$f(x)$
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	8.00	6.00	9.00

Since the right hand limit (RHL) and left hand limit (LHL) are equal to 9, therefore

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

- 3) Find the limit of the model given as  
 $\lim_{x \rightarrow 3} \frac{3-x}{13-x}$

Answers

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

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

1) Evaluate the limit of the model given as

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

Answer

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

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

The limit does not exist

2) 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

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.

