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level: 200
Course code: Eng 281

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

Soln

$$\lim_{x \to 3} = \lim_{x \to 3} x$$

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, in tabular form of the model as $x \to 6$ equal to 9

Soln

lm	a-8	6	a+8	lm
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 $\lim_{x \to 6} (5x - 21) = 9$

3) Find the limit of the model given as

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

Soln

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

$$= \frac{3-3-x}{|3-3+x|} = \frac{-x}{x} = -1 \qquad \frac{-\delta}{-\delta} = -1$$

4) Evaluate the limit of the model given as $\lim_{x \to 3} \frac{x-3}{|x-3|}$ if it exists.

Soln

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

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

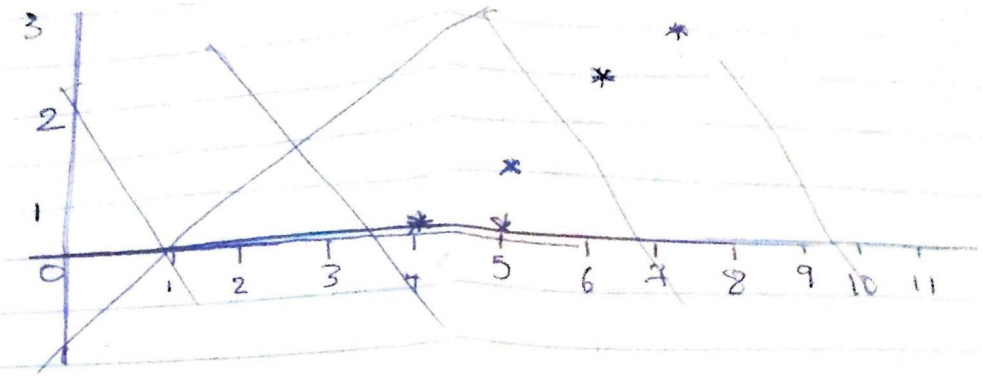
The limit does not exist

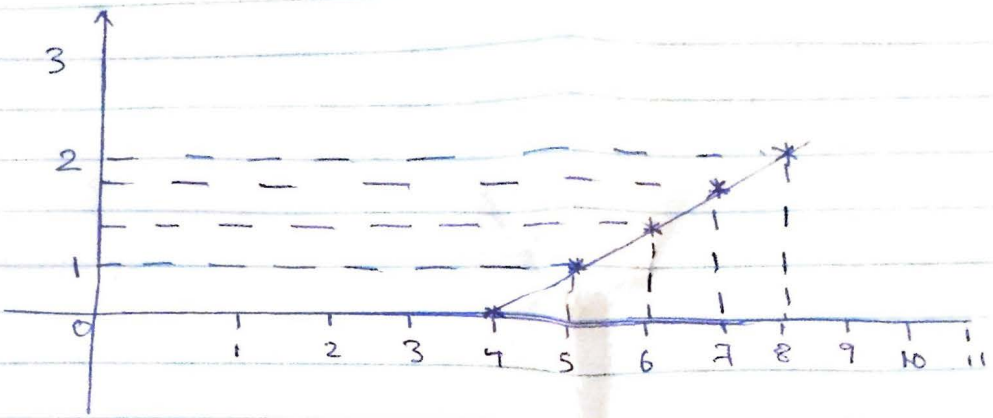
) Show that the function given in the equation below is continuous on the interval $(4, 8)$

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

Soln

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 $f(x) = \sqrt{3x-4}$ at interval $[4, 8]$ is continous because there was no point where the function was undefined