

Assignment

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Course ENG281

- Given a function to be as in $f(x) = \pi$, Find $\lim_{x \rightarrow 3} f(x)$

Solutions

$$\lim_{x \rightarrow 3} f(x) = \lim_{x \rightarrow 3} \pi$$

- 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 $x \rightarrow 6$ equal to 9

Solution

Lm	$a - \delta$	$a + \delta$	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	9.5
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 given as

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

Solution

$$\begin{aligned} \lim_{x \rightarrow 3^+} \frac{3-x}{|3-x|} &= \lim_{x \rightarrow 0} \frac{3-(3-x)}{|3-(3+x)|} \\ &= \frac{3-3-x}{|3-3-x|} = \frac{-x}{-x} = -1 \end{aligned}$$

4) Evaluate the limit of the model given as 0

$$\lim_{x \rightarrow 3} \frac{x-3}{|x-3|} \quad \text{if it exists}$$

Solution

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

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

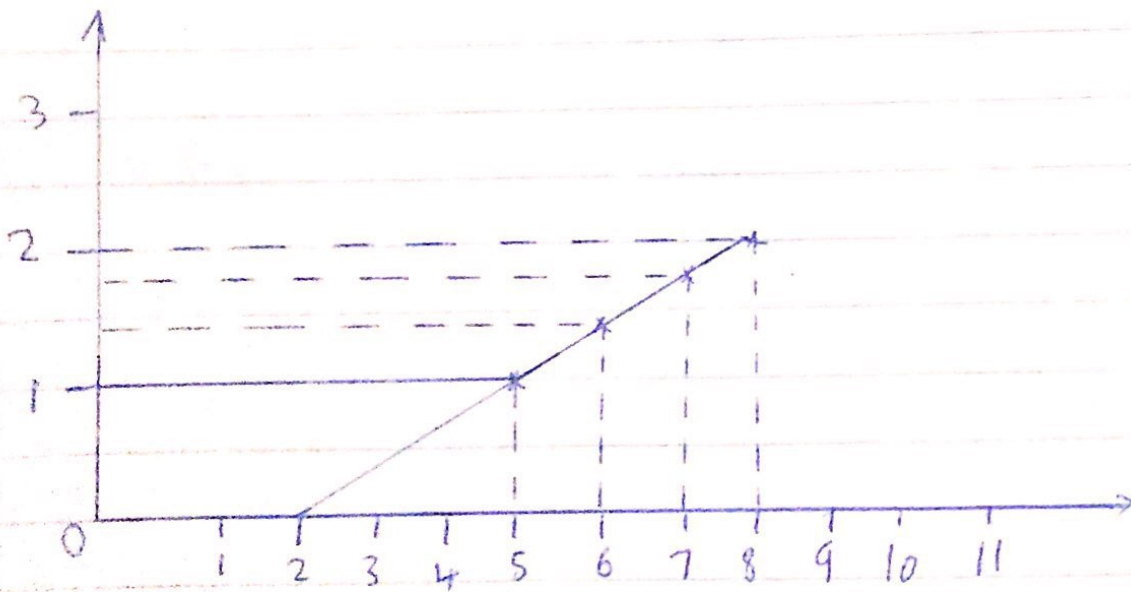
The limit doesn't exist

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

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

Solution

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.