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MATHS ASSIGNMENT ENG 281

(1) Given the function $f(x) = x$ find $\lim_{x \rightarrow 3} f(x)$

Answer:

There is not a means of substitution for $x = 3$ therefore it is UNDEFINED.

(2) The model of a system has been developed by an engineer to be as given as $f(x) = \sqrt{x} - 21$ (given $\delta = 0.1$, and using a step of 0.01 , demonstrate in tabular form that the limit of the model as $x \rightarrow 6 = 9$.

$f(x)$	$x - \delta$	x	$x + \delta$	$f(x)$
8.05	5.90	6	6.1	9.50
8.55	5.11	6	6.09	9.45
8.60	5.92	6	6.08	9.40
8.65	5.93	6	6.07	9.35
8.70	5.94	6	6.06	9.30
8.75	5.95	6	6.05	9.25
8.80	5.96	6	6.04	9.20
8.85	5.97	6	6.03	9.15
8.90	5.98	6	6.02	9.10
8.95	5.99	6	6.01	9.05
9	6.00	6	6.00	9.00

The limit is defined both on the LHS & RHS therefore it exists (present)

Q The limit of the model equation given below

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

$$\lim_{x \rightarrow 3^+} \frac{3-x}{|3-x|} = \frac{3-3+\delta x}{|3-3+\delta x|} = 1$$

(4) Evaluate the limit of the model given.

$$\lim_{x \rightarrow 3^+} \frac{x-3}{|x-3|} = \frac{3+\delta-3}{|3+\delta-3|} = \frac{\delta}{|\delta|} = 1$$

$$\lim_{x \rightarrow 3^-} \frac{x-3}{|x-3|} = \frac{3-\delta-3}{|3-\delta-3|} = \frac{-\delta}{|-\delta|} = \frac{-\delta}{\delta} = -1$$

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

(5) Show that the function given in equation $f(x) = \sqrt{x-4}$ is continuous on the interval $(4, 8)$.

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

$$\text{Sub 4 for } x = \sqrt{4-4} = \sqrt{0} = 0 \dots \dots \textcircled{1}$$

$$\text{Sub 8 for } x = \sqrt{8-4} = \sqrt{4} = 2 \dots \dots \textcircled{2}$$

x Component y Component

4	0
5	1.4
6	1.41
7	1.73
8	2

from the graph figure 1.0, the function can be said to be