

NNOBO CHUBIKE WILLIAM

MECHATRONICS

17/ENG 05/023

ENG 281

ENGINEERING MATHS

(1) $f(x) = \pi$

Find the $\lim_{x \rightarrow 3} f(x)$

Ans; the \lim does not exist.

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

$\delta = 0.1$ & $\text{step} = 0.01$, $a = 6$

LEFT HAND SIDE

$a - \delta$	$f(x)$
5.9	8.5
5.91	8.55
5.92	8.6
5.93	8.65
5.94	8.7
5.95	8.75
5.96	8.8
5.97	8.85
5.98	8.9
5.99	8.95
6	9

RIGHT HAND SIDE

$a + \delta$	$f(x)$
6.1	9.5
6.09	9.45
6.08	9.4
6.07	9.35
6.06	9.3
6.05	9.25
6.04	9.2
6.03	9.15
6.02	9.1
6.0	9.05
6.00	9

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

RHS from $(x \rightarrow 3^+)$

$$x = 3 + 0.1$$
$$= 3.1$$

$$\therefore \lim_{x \rightarrow 3^+} \frac{3-3.1}{|3-3.1|}$$
$$= \frac{-0.1}{|-0.1|} = \frac{-0.1}{0.1} = \underline{-1}$$

$$(4) \lim_{x \rightarrow 3} \frac{x-3}{|x-3|}$$

Left Hand Side

$$x = 3 - 0.1 \\ = 2.9$$

Right Hand Side

$$x = 3 + 0.1 \\ = 3.1$$

\therefore LHS

$$\lim_{x \rightarrow 3^-} \frac{2.9-3}{|2.9-3|} = \frac{-0.1}{|-0.1|} = -1$$

RHS

$$\lim_{x \rightarrow 3^+} \frac{3.1-3}{|3.1-3|} = \frac{0.1}{0.1} = 1$$

\therefore The limit does not exist since LHS \neq RHS

(5) $f(x) = \sqrt{x-4}$
for continuity $[4, 8] \Rightarrow 4, 5, 6, 7, 8$

If $x=4$

$$f(x) = \sqrt{4-4} \\ = 0$$

$x=5$

$$f(x) = \sqrt{5-4} \\ = 1$$

$x=6$

$$f(x) = \sqrt{6-4} \\ = 1.4$$

$x=7$

$$f(x) = \sqrt{7-4} \\ = 1.7$$

$x=8$

$$f(x) = \sqrt{8-4} \\ = 2$$

CONTINUITY GRAPH

