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 17/ENG402/1039
 CIVIL ENGINEERING
 ENGINEERING MATHS

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

There is no x in the function

$\therefore f(x) = \pi$
 $x \rightarrow 3$

$f(x) = \pi$

$f(x) = 3.142$

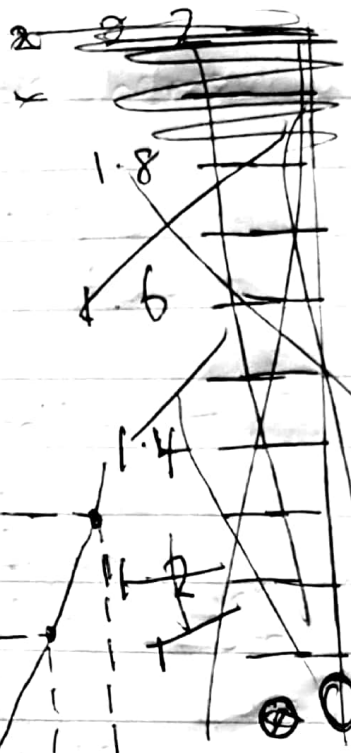
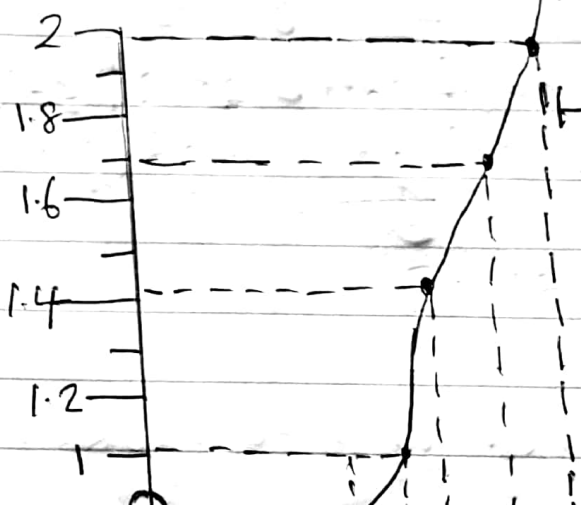
Since there is no function to substitute the value of x

$f(x)$	$x=5$	$x=6$	$x=5$	$f(x)$
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	6.00		6.00	9.00

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

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

4	0
5	1.0
6	1.41
7	1.73
8	2



③ Find the limit of the model question given below

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

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

④ Evaluate the limit of the model given below

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

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

Substitution takes place

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

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

Therefore since the R.H.S and L.H.S limits do not coincide the limit of $\frac{x-3}{|x-3|}$ as the equation tends to 3 doesn't exist

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

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

$$\text{Substituting } 4 \text{ for } x \quad f(x) = \sqrt{(4)-4} = \sqrt{0} = 0$$

$$\text{Substituting } 8 \text{ for } x \quad f(x) = \sqrt{(8)-4} = \sqrt{4} = 2$$