

OKIPALA CHARLES CHIEMERIE
 CIVIL ENGINEERING
 17/ENG03/040

1) Given a function $f(x) = \pi$

$$\lim_{x \rightarrow 3} f(x) \quad f(x) = \pi = 3.1412$$

Since there is no function to substitute the limit of x

2) $f(x)$	$x - \delta$	$x = 6$	$x + \delta$	$f(x)$
8.50	5.90	$x = 6$	6.10	9.50
8.55	5.91	$x = 6$	6.09	9.45
8.60	5.92	$x = 6$	6.08	9.40
8.65	5.93	$x = 6$	6.07	9.35
8.70	5.94	$x = 6$	6.06	9.30
8.75	5.95	$x = 6$	6.05	9.25
8.80	5.96	$x = 6$	6.04	9.20
8.85	5.97	$x = 6$	6.03	9.15
8.90	5.98	$x = 6$	6.02	9.10
8.95	5.99	$x = 6$	6.01	9.05
9.00	6.00	$x = 6$	6.00	9.00

Since the limits are defined both on the L.H.S and R.H.S so it can be said the limit is real and thus exists.

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

$$= \frac{3-3-\delta}{|3-3-\delta|}$$

$$= \frac{-\delta}{|-\delta|} = \frac{-\delta}{\delta} = \underline{\underline{-1}}$$

$$4) \lim_{x \rightarrow 3} \frac{x-3}{|x-3|} = \frac{(3)-3}{|(3)-3|} = \frac{0}{0} \text{ (undefined)}$$

Since $\lim_{x \rightarrow 3} \frac{x-3}{|x-3|}$ is undefined we substitute

$(3+\delta)$ and $(3-\delta)$ for x

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

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

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

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

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

x	$f(x) = \sqrt{x-4}$
4	0
5	1.0
6	1.41
7	1.73
8	2

