

# AJISAFE BOLUNATIFE AYOMIDE

CIVIL ENGINEERING

17/ENG03/008

ENG 281 ASSIGNMENT I

1.)

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

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

$x \rightarrow 3$

$$f(x) = \pi$$

$$f(x) = 3.142$$

Since there is no function to substitute the value of  $x$

2.) $f(x)$	$x - \delta$	$x = 6$	$x + \delta$	$f(x)$
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

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

$$= \frac{-h}{|h|} = -1$$

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

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

$\therefore$  as  $h > 0$ , so  $|h| = h$

and;

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

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

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

at interval  $[4, 8]$

$$x = 4$$

$$\begin{aligned} \lim_{x \rightarrow a} f(x) &= \lim_{h \rightarrow 0} \sqrt{(4+h)-4} \\ &= \lim_{h \rightarrow 0} \sqrt{4+h-4} \\ &= \lim_{h \rightarrow 0} \sqrt{h} \\ &= \sqrt{0} \\ &= 0 \text{ --- (i)} \end{aligned}$$

$$\text{Also } f(a) = \sqrt{4-4}$$

$$f(4) = 0 \text{ --- (ii)}$$

From (i) and (ii)

$$\lim_{x \rightarrow a} f(x) = f(a)$$

$$x \rightarrow a$$

Thus,  $f(x)$  is continuous at  $x = a$