

L-E	a-δ	a	a+δ	L+E
8.90	5.98	6.00	6.02	$f(x) = 5x - 21 = 5(6.02) - 21 = 9.10$
8.95	5.99	6.00	6.01	$f(x) = 5x - 21 = 5(6.01) - 21 = 9.05$
9.00	6.00	6.00	6.00	$f(x) = 5x - 21 = 5(6.00) - 21 = 9.00$

WORKINGS OF L-E

$$\begin{aligned}
 f(x) &= 5x - 21 = 5(5.90) - 21 = 8.50 \\
 f(x) &= 5x - 21 = 5(5.91) - 21 = 8.55 \\
 f(x) &= 5x - 21 = 5(5.92) - 21 = 8.60 \\
 f(x) &= 5x - 21 = 5(5.93) - 21 = 8.65 \\
 f(x) &= 5x - 21 = 5(5.94) - 21 = 8.70 \\
 f(x) &= 5x - 21 = 5(5.95) - 21 = 8.75 \\
 f(x) &= 5x - 21 = 5(5.96) - 21 = 8.80 \\
 f(x) &= 5x - 21 = 5(5.97) - 21 = 8.85 \\
 f(x) &= 5x - 21 = 5(5.98) - 21 = 8.90 \\
 f(x) &= 5x - 21 = 5(5.99) - 21 = 8.95 \\
 f(x) &= 5x - 21 = 5(6.00) - 21 = 9.00
 \end{aligned}$$

3) Show whether the following function in equation (1.3) is continuous on the interval $(-5, 5)$ $f(x) = (25 - x^2)^{1/2}$

Solution

$$\begin{aligned}
 f(x) &= (25 - x^2)^{1/2} \quad (-5, 5) \quad f(x) = \sqrt{25 - x^2} \\
 f(x) &= \sqrt{25 - (-5)^2} = 0 \\
 f(x) &= f(-4) = \sqrt{25 - (-4)^2} = 3 \\
 f(x) &= f(-3) = \sqrt{25 - (-3)^2} = 4 \\
 f(x) &= f(-2) = \sqrt{25 - (-2)^2} = 4.58 \\
 f(x) &= f(-1) = \sqrt{25 - (-1)^2} = 4.899
 \end{aligned}$$

$$\begin{aligned}
 f(x) &= f(0) = \sqrt{25 - (0)^2} = 5 \\
 f(x) &= f(1) = \sqrt{25 - (1)^2} = 4.899 \\
 f(x) &= f(2) = \sqrt{25 - (2)^2} = 4.58 \\
 f(x) &= f(3) = \sqrt{25 - (3)^2} = 4 \\
 f(x) &= f(4) = \sqrt{25 - (4)^2} = 3 \\
 f(x) &= f(5) = \sqrt{25 - (5)^2} = 0
 \end{aligned}$$

It is continuous
at the interval
 $(-5, 5)$

OBE CORNELIUS MBA

18/ENG06/049

MECHANICAL ENGINEERING

ENG 281 (ENGINEERING MATHEMATICS)

$$1) \lim_{x \rightarrow 0} \frac{\sin ax}{bx}$$

$$= \lim_{x \rightarrow 0} \sin ax \times \frac{1}{bx}$$

$$\lim_{x \rightarrow 0} \frac{\sin ax}{ax} \times \frac{ax}{bx}$$

$$= \frac{\sin ax}{ax} \times \frac{a}{b}$$

$$= \frac{a}{b} \times \lim_{x \rightarrow 0} \frac{\sin ax}{ax}$$

$$\text{Using } \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$x = ax$$

$$= \frac{a}{b} \times 1 = \frac{a}{b}$$

$$\therefore \lim_{x \rightarrow 0} \frac{\sin ax}{bx} = \frac{a}{b}$$

2) $f(x) = 5x - 21$ as $x \rightarrow 6$ Limit = 9

$$\delta = 0.1 \quad \& \Delta \delta = 0.01$$

L-8	a- δ	a	a+ δ	L+E (work)
8.50	5.90	6.00	6.10	$f(x) = 5(x) - 21 = 5(6.10) - 21 = 9.50$
8.55	5.91	6.00	6.09	$f(x) = 5(x) - 21 = 5(6.09) - 21 = 9.45$
8.60	5.92	6.00	6.08	$f(x) = 5(x) - 21 = 5(6.08) - 21 = 9.40$
8.65	5.93	6.00	6.07	$f(x) = 5(x) - 21 = 5(6.07) - 21 = 9.35$
8.70	5.94	6.00	6.06	$f(x) = 5(x) - 21 = 5(6.06) - 21 = 9.30$
8.75	5.95	6.00	6.05	$f(x) = 5(x) - 21 = 5(6.05) - 21 = 9.25$
8.80	5.96	6.00	6.04	$f(x) = 5(x) - 21 = 5(6.04) - 21 = 9.20$
8.85	5.97	6.00	6.03	$f(x) = 5(x) - 21 = 5(6.03) - 21 = 9.15$