

NAME: Nneji Ifeanyi Daniel

MATRIC NO: 99139650CF / Direct Entry

COURSE: ENG 281 / Engineering Mathematics

DEPARTMENT: Computer Engineering

DATE: 29/9/19

## ASSIGNMENT SOLUTION

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

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

multiply and divide by  $ax$

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

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

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

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

$\delta = 0.1$  and  $\Delta\delta = 0.01$

$L - \epsilon$	$a - \delta$	$a$	$a + \delta$	$L + \epsilon$
8.5	5.9	6	6.1	9.5
8.55	5.91		6.09	9.45
8.6	5.92		6.08	9.4
8.65	5.93		6.07	9.35
8.7	5.94		6.06	9.3
8.75	5.95		6.05	9.25
8.8	5.96		6.04	9.2
8.85	5.97		6.03	9.15
8.9	5.98		6.02	9.1
8.95	5.99		6.01	9.05
9	6		6	9

3.  $(25-x^2)^{1/2}$  at the intervals  $(-5, 5)$ . ~~See~~ Show whether the function is continuous

$$f(x) = (25-x^2)^{1/2}$$

$$(25-x^2)^{1/2} = \sqrt{25-x^2}$$

from -5 to 5

$$\sqrt{25-(-5)^2} = 0$$

$$\sqrt{25-(-4)^2} = 3$$

$$\sqrt{25-(-3)^2} = 4$$

$$\sqrt{25-(-2)^2} = 4.58$$

$$\sqrt{25-(-1)^2} = 4.899$$

$$\sqrt{25-(0)^2} = 5$$

$$\sqrt{25-(1)^2} = 4.899$$

$$\sqrt{25-(2)^2} = 4.58$$

$$\sqrt{25-(3)^2} = 4$$

$$\sqrt{25-(4)^2} = 3$$

$$\sqrt{25-(5)^2} = 0$$

$f(x) = \sqrt{25-x^2}$  is continuous for all ~~the~~ values ranging from -5 to 5.