x	$f(x)$
5.9	8.5
5.91	8.55
5.92	8.60
5.93	8.65
5.94	8.70
5.95	8.75
5.96	8.80
5.97	8.80
5.98	8.90
5.99	8.95
6.00	9.00

x	$f(x)$
6.1	9.5
6.09	9.45
6.08	9.40
6.09	9.35
6.06	9.30
6.05	9.25
6.04	9.20
6.03	9.15
6.02	9.10
6.01	9.05
6.00	9.00

c. Show whether the function given in equation (1.3) is continuous on the interval [-5, 5]

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

Soln

$x \to -5$

$f(x) = (25-(-5)^2)^{1/2}$

$= 0$

$x \to -4$

$f(x) = (25-(-4)^2)^{1/2} = 3$

$x \to -3$

$f(x) = (25-(-3)^2)^{1/2} = 4$

$x \to -2$

$f(x) = (25-(-2)^2)^{1/2} = 4.58$

$x \to -1$

$f(x) = (25-(-1)^2)^{1/2} = 4.89$

$x \to 0$

$f(x) = (25-(-0)^2)^{1/2}$

$x \to 1$

$f(x) = (25-(1)^2)^{1/2} = 4.89$

$x \to 2$

$f(x) = (25-(2)^2)^{1/2} = 4.58$

$x \to 3$

$f(x) = (25-(3)^2)^{1/2} = 4.$

$x \to 4$

$f(x) = (25-(4)^2)^{1/2} = 3$

$x \to 5$

$f(x) = (25-(5)^2)^{1/2} = 0$

$\therefore$ The function on the interval [-5, 5] is continuous

Name - Adedokun Precious Adeola
Department - Computer Engineering
Matric NO - 18/ENG02/006
Date - 1st October 2019

a. Show that the limit of the function given in equation (1.1) as x approaches 0 is a/b.

$$f(x) = \frac{\sin ax}{bx}$$

soln

$$f(x) = \frac{\sin ax}{bx} = \frac{\sin a(0)}{b(0)} = \frac{0}{0} \{\text{undefined}\}$$

Using L'hopital's Rule

$$\lim_{x \to 0} f(x) = \frac{\sin ax}{bx}$$

$$= \frac{a\cos ax}{b}$$

$$\lim_{x \to 0} f(x) = \frac{a\cos a(0)}{b} = \frac{a}{b}$$

b. The model of a system has been developed to be as given in equation (1.2)

$$f(x) = 5x - 21$$

Given that $\delta = 0.1$ and $\Delta\delta = 0.01$, demonstrate in a tabular form that the limit of the model as $x \to 6$ is equal to 9.

soln

$\delta = 0.1, \Delta\delta = 0.01 = \varepsilon = 0.05$

$6 - 0.1 = 5.9$ [left hand side]

$6 + 0.1 = 6.1$ [right hand side]

$9 - 0.5 = 8.5$ [left hand side]

$9 + 0.5 = 9.5$ [right hand side.