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Matric : 18/ENG07/011
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ENG 281

(a) Show that the limit of the function given Equation (1.1) as x approaches 0 is $\frac{a}{b}$

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

Solution

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

let $x \Rightarrow 0$

$\frac{\sin a(0)}{b(0)} = \frac{0}{0}$ ← indeterminate

Using L'hopital

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

$x \Rightarrow 0$

$= \frac{a\cos 0}{b}$

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

$= \frac{a}{b}$

$\therefore$ Hence $x \Rightarrow 0$

$f(x) = \frac{a}{b}$

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

at -5

$(25 - (-5)^2)^{\frac{1}{2}}$

$(25 - 25)^{\frac{1}{2}}$

$= 0$

at $x \Rightarrow -4$

$(25 - (-4)^2)^{\frac{1}{2}}$

$= (25 - 16)^{\frac{1}{2}}$

$= 3$

at $x \Rightarrow -3$

$(25 - (-3)^2)^{\frac{1}{2}}$

$= 4$

at $x \Rightarrow -2$

$(25 - (-2)^2)^{\frac{1}{2}}$

$= 4.58$

at $x = -1$

$(25) - (-1)^2)^{\frac{1}{2}}$

$= 4.9$

at $x = 0$

$(25 - 0)^{\frac{1}{2}}$

$= 5$

at $x = 1$

$(25 - (1)^2)^{\frac{1}{2}}$

$= 4.9$

at $x = 2$

$(25 - (2)^2)^{\frac{1}{2}}$

$= 4.58$

at $x = 3$

$(25 - (3)^2)^{\frac{1}{2}}$

$= 4$

at $x = 4$

$(25 - 4^2)^{\frac{1}{2}}$

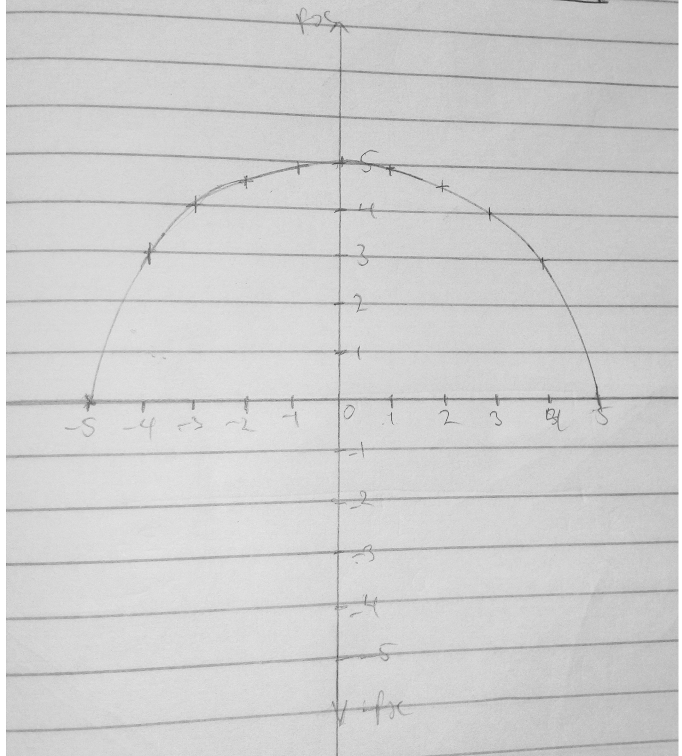
$= 3$

at $x \Rightarrow 5$

$(25 - (5)^2)^{\frac{1}{2}}$

$= 0$

-5	-4	-3	-2	-1	0	1	2	3	4	5
0	3	4	4.58	4.9	5	4.9	4.58	4	3	0



hereby the $f(x)$ is continuous

$x \Rightarrow 6$

5.9   6   6.1

$L - \varepsilon$ L $L + \varepsilon$

$L - \varepsilon$	$a - \gamma$	a	$a + \gamma$	$L + \varepsilon$
8.50	5.9	6	6.1	9.5
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
			6.02	9.10