

$x$	$f(x)$	$x$	$f(x)$
5.9	8.5	6.1	9.5
5.91	8.55	6.09	9.45
5.92	8.60	6.08	9.40
5.93	8.65	6.07	9.35
5.94	8.70	6.06	9.30
5.95	8.75	6.05	9.25
5.96	8.80	6.04	9.20
5.97	8.85	6.03	9.15
5.98	8.90	6.02	9.10
5.99	8.95	6.01	9.05
6.0	9	6.00	

3 Show the function given in equation (13) is continuous on the interval  $(-5, 5)$

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

(1)  $-5$

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

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

$$= (0)^{1/2}$$

$$= 0$$

(2)  $-4$

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

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

$$= (9)^{1/2}$$

$$= 3$$

$$\begin{aligned} (3) \quad & -3 \\ & (25 - x^2)^{1/2} \\ & = (25 - (-3)^2)^{1/2} \\ & = 4 \end{aligned}$$

$$\begin{aligned} (4) \quad & -2 \\ & (25 - x^2)^{1/2} \\ & = (25 - (-2)^2)^{1/2} \\ & = (21)^{1/2} \\ & = 4.58 \end{aligned}$$

$$\begin{aligned} (5) \quad & -1 \\ & (25 - x^2)^{1/2} \\ & = (25 - (-1)^2)^{1/2} \\ & = (24)^{1/2} \\ & = 4.89 \end{aligned}$$

$$\begin{aligned} (6) \quad & 0 \\ & (25 - (0)^2)^{1/2} \\ & = (25)^{1/2} \\ & = 5 \end{aligned}$$

$$\begin{aligned} (7) \quad & 1 \\ & (25 - x^2)^{1/2} \\ & = (25 - (1)^2)^{1/2} \\ & = (24)^{1/2} \\ & = 4.89 \end{aligned}$$

$$\begin{aligned} (8) \quad & 2 \\ & (25 - x^2)^{1/2} \\ & = (25 - 2^2)^{1/2} \end{aligned}$$

$$\begin{aligned} & (25 - 4)^{1/2} \\ & = (21)^{1/2} \\ & = 4.58 \end{aligned}$$

$$\begin{aligned} (9) \quad & 3 \\ & (25 - 3^2)^{1/2} \\ & = (25 - 9)^{1/2} \\ & = (16)^{1/2} \\ & = 4 \end{aligned}$$

$$\begin{aligned} (10) \quad & 4 \\ & (25 - 4^2)^{1/2} \\ & = (25 - 16)^{1/2} \\ & = (9)^{1/2} \\ & = 3 \end{aligned}$$

$$\begin{aligned} (11) \quad & 5 \\ & (25 - 5^2)^{1/2} \\ & = (25 - 25)^{1/2} \\ & = (0)^{1/2} \\ & = 0 \end{aligned}$$

The function is continuous

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

Solution

$$(1.1) = f(x) = \frac{\sin ax}{bx}$$

$$x \rightarrow 0 \quad \frac{\sin(ax)}{b(x)} = \frac{0}{0}$$

Using L'Hopital's rules =  $\frac{\sin ax}{bx}$

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

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

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

$$f(x) = 5x - 2$$

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

Solution

$$\sigma = 0.1, \quad \Delta\sigma = 0.01, \quad \Sigma = 0.05$$

$$6 - 0.1 = 5.9 \quad (\text{left hand rule})$$

$$6 + 0.1 = 6.1 \quad (\text{right hand rule})$$

$$9 - 0.5 = 8.5 \quad (\text{left hand rule})$$

$$9 + 0.5 = 9.5 \quad (\text{right hand rule})$$