

$$x \rightarrow 0$$

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

~~$$f(x) = (25 - (0)^2)^{\frac{1}{2}}$$
$$= 5$$~~

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

$$x = 2$$

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

$$x \rightarrow 3$$

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

$$x \rightarrow 4$$

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

$$x \rightarrow 5$$

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

The function of the interval $[-3, 5]$ is
Continuous

x	$F(x)$	x	$F(x)$
5.9	8.5	6.1	9.50
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
6.00	9.00	6.00	9.00

Q. Show whether the function given in the eqn below is continuous on the interval $[-5, 5]$

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

Join

$$x \rightarrow -5$$

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

$$= 0$$

$$x \rightarrow -4$$

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

$$= 3$$

$$x \rightarrow -3$$

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

$$= 4$$

$$x \rightarrow -2$$

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

$$= 4.5^{\frac{1}{2}}$$

$$x \rightarrow -1$$

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

$$= 4.89$$

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Engineering Math

- a Show that the limit of the function given in eqn (1.2) as x approaches 0 is $\frac{a}{b}$
$$f(x) = \frac{\sin ax}{bx}$$

Soln

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

$$= \frac{\sin a(0)}{b(0)} = \frac{0}{0} \text{ (undefined)}$$

Using L'Hopital's rule

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

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

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

- b The model of a system has been developed to be as given in eqn (1.2) $f(x) = 5x - 21$
Given that $\delta \leq 0.1$ and $\epsilon \leq 0.01$, demonstrate in a tabular form that the limit of the model as $x \rightarrow 6$ is equal to 9

Soln

$$\delta \leq 0.1, \epsilon \leq 0.01, \epsilon \leq 0.05$$

$$6 - 0.1 = 5.9 \text{ \{ left hand side \}}$$

$$6 + 0.1 = 6.1 \text{ \{ right hand side \}}$$

$$9 - 0.5 = 8.5 \text{ \{ left hand side \}}$$

$$9 + 0.5 = 9.5 \text{ \{ right hand side \}}$$