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

Eq (1.1) - $f(x) = \sin ax/bx$

Solution

$x \to 0 \quad \frac{\sin a(0)}{b(0)} = \frac{0}{0}$

Using L' Auptals rule $= \frac{\sin ax}{bx}$

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

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

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

$f(x) = 5x - 21$

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

$\delta = 0.1 \quad \Delta f = 0.01 \quad \varepsilon = 0.05$

$6 - 0.1 = 5.9$ (Right hand rule)

$6 + 0.1 = 6.1$ (Right hand rule)

$9 - 0.5 = 8.5$ (~~Right~~ Left hand rule)

$9 + 0.5 = 9.5$ (Left hand rule)

x	$f(x)$	x	$f(x)$
5.9	8.5	6.1	9.5
5.91	8.55	6.09	9.45
5.92	8.6	6.08	9.4
5.93	8.65	6.07	9.35
5.94	8.7	6.06	9.3
5.95	8.75	6.05	9.25
5.96	8.8	6.04	9.2
5.97	8.85	6.03	9.15
5.98	8.9	6.02	9.1
5.99	8.95	6.01	9.05
6.0	9	6	9

3. Show whether the function given in equation (1.3) is continous on the interval $(-5, 5)$

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

x	-5	-4	-3	-2	-1	0	1	2	3	4	5
$f(x)$	0	3	4	4.58	4.89	5	4.89	4.58	4	3	0

The function $f(x) = (25 - x^2)^{1/2}$ is continous