

Planned Measurement Formula
 by: N/A 6/025
 Mechanical Engineering
 ENG 281
 Assignment

1) Show that the limit of the function
 $f(x) = \sin x - 9x$ as x approaches 0
 is 0

Solution

$$f(x) = \sin x - 9x$$

$$= 0 - 0$$

Using L'Hopital's rule

$$f(x) = \sin x - 9x$$

$$\therefore f(x) = 2x$$

$$f(x) = \sin x - 9x = 0 \quad \Delta x = 0.01$$

$$f(x) = \sin(x) - 9x$$

$$= 9$$

$$x \rightarrow 9 = 6$$

$$x = 6, f(20) = 9$$

LHS

RHS

x	f(x)	x	f(x)
5.90	8.50	6.10	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

x	f(x)	x	f(x)
5.98	8.90	6.02	9.10
5.99	8.95	6.01	9.05
6.00	9.00	6.00	9.00

2) Show that the function
 $f(x) = (25-x^2)^{1/2}$ is continuous on
 the interval $(-5, 5)$

Solution

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

$$\text{at } x = -5$$

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

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

$$= 0$$

$$\text{at } x = 5$$

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

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

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

The functions is continuous on
 the intervals