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(1) $\lim_{x \to 0} f(x) = a/b$ $\quad f(x) = \frac{\sin ax}{bx}$.

Using l'hospital's rule;

$$\lim_{x \to 0} \frac{\sin ax}{bx} = \lim_{x \to 0} \frac{a \cos ax}{b}$$

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

$$= a/b \text{ . Shown.}$$

(2.) $f(x) = 5x - 21$.

Using $\delta = 0.1$ and $\delta = 0.01$, show $\lim_{x \to 6} f(x) = 9$

x	fx	x	$f(x)$
5.9	8.50		
5.91	8.55	6.01	9.05
5.92	8.60	6.02	9.10
5.93	8.65	6.03	9.15
5.94	8.70	6.04	9.20
5.95	8.75	6.05	9.25
5.96	8.80	6.06	9.30
5.97	8.85	6.07	9.35
5.98	8.90	6.08	9.40
5.99	8.95	6.09	9.45
		6.10	9.50

The $\lim_{x \to 6} f(x)$ approaches 9 as x approaches 6.

$\therefore \lim_{x \to 6} 5x - 21 = 9$.

③ $f(x) = (25-x^2)^{1/2}$ over the interval $(-5, 5)$.

finding the right hand limit at -5;

$\lim_{x \to -5^+} f(x)$. let $x = -5+h$.

$$\lim_{h \to 0} f(-5+h)$$

$$= \left[25-(-5+h)^2\right]^{1/2}$$

$$= \lim_{h \to 0}\left[25 - 25 + h^2 - 10h\right]^{1/2}$$

$$= \left[25-25\right]^{1/2} = 0$$

find the left hand limit at 5;

$\lim_{x \to 5^-} f(x)$ let $x = 5-h$.

$$\lim_{h \to 0} f(5-h) = \lim_{h \to 0}\left[25-(5+h)^2\right]^{1/2}$$

$$= \left[25-(25+h^2+10h)\right]^{1/2}$$

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

$$= 0.$$

As the Left hand side limit = Right hand limit;

$f(x)$ is continuous over the interval $(5, -5)$.