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(7) $\lim_{x \rightarrow 0} \frac{\sin x}{x}$

x	-0.1	-0.01	-0.001	0.001	0.01
f(x)	.9983	.9999	1.000	1.000	0.9998

= 1

(8) $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x}$

x	-0.1	-0.01	-0.001	0.001	0.01
f(x)	-.05	-.005	-.0005	.0005	.005

= 0

(ex) $\lim_{x \rightarrow 0} \frac{3 \sin x}{x}$ = (ex) $\lim_{x \rightarrow 0} \frac{4 - 4 \cos x}{x}$

$\lim_{x \rightarrow 0} 3 \left(\frac{\sin x}{x} \right)$ $\lim_{x \rightarrow 0} \frac{4(1 - \cos x)}{x}$

$\frac{3(1)}{3}$ $\frac{4(0)}{4}$

(ex) $\lim_{x \rightarrow 0} \frac{\sin x}{3x}$

$\lim_{x \rightarrow 0} \frac{1}{3} \left(\frac{\sin x}{x} \right)$

$\frac{1}{3} (1)$

$\frac{1}{3}$

(68) $\lim_{\theta \rightarrow 0} \frac{\cos \theta \tan \theta}{\theta}$

$\lim_{\theta \rightarrow 0} \frac{\cos \theta \frac{\sin \theta}{\cos \theta}}{\theta}$

$\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$

(118) $\lim_{x \rightarrow \pi} \frac{\sin x}{x}$

$\frac{\sin \pi}{\pi}$

$0/\pi = 0$

(ex) $\lim_{x \rightarrow 0} \frac{1 - \cos x}{\sin x}$

$\lim_{x \rightarrow 0} \frac{1 - \cos x}{1} \cdot \frac{1}{\sin x} \left[\frac{x}{x} \right]$

$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} \cdot \frac{x}{\sin x}$

$1(0) = 0$

$$\textcircled{\text{Ex}} \lim_{x \rightarrow 0} \frac{\sin 4x}{5x}$$

$$\lim_{x \rightarrow 0} \frac{\sin 4x}{x} \cdot \frac{1}{5}$$

$$\lim_{x \rightarrow 0} \frac{4(\sin 4x)}{4x} \cdot \frac{1}{5}$$

$$4(1) \cdot \frac{1}{5}$$

$$\frac{4}{5}$$

$$\textcircled{\text{Ex}} \lim_{x \rightarrow 0^+} \frac{\csc 2x}{x}$$

$$\lim_{x \rightarrow 0^+} \frac{1}{\sin 2x \cdot x}$$

$$\frac{1}{(0.1)(0.1)}$$

$$= \infty$$

Given the piecewise function, for which value of a will $f(x)$ be continuous?

$$f(x) = \begin{cases} a(x-2)^2 & x \leq 0 \\ \sin \frac{2x}{x} & x > 0 \end{cases}$$

$$\lim_{x \rightarrow 0^-} a(x-2)^2$$

$$\lim_{x \rightarrow 0^-} a(-2)^2$$

$$4a$$

$$\lim_{x \rightarrow 0^+} \sin \frac{2x}{x} \left(\frac{2}{2} \right)$$

$$\lim_{x \rightarrow 0^+} 2 \left(\frac{\sin 2x}{2x} \right)$$

$$2(1)$$

$$2$$

$$4a = 2$$

$$a = \frac{1}{2}$$