limit w/ trigs.

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

* $$\lim_{x \to \frac{\pi}{6}} \frac{\sin 2x}{3x} = \frac{\sqrt{3}}{\pi}$$

$$\frac{\sin\left(2 \cdot \frac{\pi}{6}\right)}{3\left(\frac{\pi}{6}\right)} = \frac{\frac{\sqrt{3}}{2}}{\frac{\pi}{2}}$$

1) $$\lim_{x \to \pi} \frac{\sin(\overbrace{x-\pi}^{\to 0})}{\underbrace{x-\pi}_{\to 0}} = 1$$

2) $$\lim_{x \to \infty} x \sin\left(\frac{1}{x}\right) = \lim_{x \to \infty} \frac{\sin\left(\overbrace{\frac{1}{x}}^{\to 0}\right)}{\underbrace{\frac{1}{x}}_{\to 0}} = 1$$

3) $$\lim_{x \to 0} x\csc(x) = \lim_{x \to 0} \frac{x}{\sin x} = 1$$

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$$\lim_{x\to 0}\frac{\tan ax}{bx}=\frac{a}{b} \qquad \lim_{x\to\infty}\frac{\sin x}{x}=0$$

$$\lim_{x\to 0}\frac{(1-\cos x)(1+\cos x)}{x(1+\cos x)}=\lim_{x\to 0}\frac{\overset{\to 1}{\sin x}\cdot\overset{\to 0}{\sin x}}{x\,\underset{\to 2}{(1+\cos x)}}=0$$

Properties of ln.

$$\ln(xy) = \ln x + \ln y$$

$$\ln\left(\frac{x}{y}\right) = \ln x - \ln y$$

$$\ln x^c = c \cdot \ln x$$

$$\ln e^k = k$$

$$e^{\ln k} = k$$

$$|x| = \sqrt{x^2}$$

$$\lim_{x \to -\infty} \frac{\sqrt{9x^6 - x}}{x^3 + 1} \approx \lim_{x \to -\infty} \frac{\sqrt{9x^6}}{x^3} = \lim_{x \to -\infty} \frac{3|x^3|}{x^3} = -3$$

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10. For the given equation below,

$$\lim_{h\to 0}\frac{\boxed{e^h}-1}{h}=f'(c)$$

a) What is $\boxed{f(x)}$? e^x

b) What is the value of c? 0

c) Evaluate the given limit expression. 1

$$\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}=f'(x)$$

$$\lim_{h\to 0}\frac{f(c+h)-f(c)}{h}=f'(c)$$

$$e^h=e^{0+h}$$

if $f(x)=e^x$

$f(0+h)=e^{0+h}$

$f(x)=e^x$

$f'(x)=e^x$

$f'(0)=e^0=1$

9. $\lim_{x\to\infty} \frac{\sin(10x)}{x-4} = \underline{\underline{0}}$

$-1 \le \quad \le 1$

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3. $\lim_{A\to 0} \frac{1-\cos A}{2\sin^2 A}$ is

a) 0 b) 1/8 c) 1/4 d) 1 e) nonexistent

$$\lim_{A\to 0} \frac{1-\cos A}{2(1-\cos^2 A)} = \lim_{A\to 0} \frac{\cancel{1-\cos A}}{2\cancel{(1-\cos A)}(1+\cos A)}$$

$$= \lim_{A\to 0} \frac{1}{2(1+\cos A)} = \frac{1}{4}$$

$a^2-b^2=(a-b)(a+b)$