$$\lim_{x\to 0} \frac{\sin x}{x} = \_\_\_$$

OR

$$\lim_{x\to 0} \frac{x}{\sin x} = \_\_\_$$

$$\lim_{x\to 0} \frac{\sin x}{x} = 1$$

OR

$$\lim_{☺\to 0} \frac{\sin(☺)}{☺} = 1$$

$$\lim_{x\to 0} \frac{1-\cos x}{x} = \_\_\_$$

OR

$$\lim_{x\to 0} \frac{\cos x - 1}{x} = \_\_\_$$

$$\lim_{x\to 0} \frac{1-\cos x}{x} = 0$$

OR

$$\lim_{☺\to 0} \frac{1-\cos(☺)}{☺} = 0$$

Evaluate:

1. $\lim_{x\to 0} \frac{3(1-\cos x)}{x}$

2. $\lim_{x\to 0} \frac{\cos x \tan x}{x}$

1. $$\lim_{x\to 0} \frac{3(1-\cos x)}{x} = 3\lim_{x\to 0} \frac{1-\cos x}{x} = 3(0) = \boxed{0}$$

2. $$\lim_{x\to 0} \frac{\cos x \tan x}{x} = \lim_{x\to 0} \frac{\cancel{\cos x}\left(\frac{\sin x}{\cancel{\cos x}}\right)}{x} = \lim_{x\to 0} \frac{\sin x}{x} = \boxed{1}$$

What is the Intermediate Value Theorem?

I.V.T. Says if you have a continuous function on $[a,b]$ then your graph passes through all y-values inbetween (c,d) if

$f(a)=c$ & $f(b)=d$

Show that $g(x)=x^2-4$ has at least 1 zero on the interval $(-1,4)$

$\boxed{1}$ $g(x)=x^2-4$ is continuous $(-\infty,\infty)$
so continuous $[-1,4]$

$\boxed{2.}$ $g(-1)=(-1)^2-4=-3$
$g(4)=(4)^2-4=12$

Then by I.V.T
$g(x)=0$ on $(-1,4)$

zero/Root/x-intercept : $(x,0)$