$$\lim_{x\to\frac{\pi}{2}} \frac{\frac{\pi}{2}-x}{\cos x} = \lim_{\theta\to 0} \frac{\theta}{\operatorname{sen}\theta} = 1$$

c. de variable:

$\frac{\pi}{2}-x=\theta$; $\lim_{x\to\pi/2}\theta = \lim_{x\to\pi/2}\left(\frac{\pi}{2}-x\right)=0$

$x=\frac{\pi}{2}-\theta$

$\cos x = \cos\left(\frac{\pi}{2}-\theta\right) = \cos\frac{\pi}{2}\cos\theta + \operatorname{sen}\frac{\pi}{2}\operatorname{sen}\theta = \operatorname{sen}\theta$

$$f(x)=\begin{cases}(x+3)^2-1 & \text{si } x<m\\ x+2 & \text{si } m\le x\le n\\ 4-(x-2)^2 & \text{si } x>n\end{cases}$$

1)
2)
3)
4) $\lim_{x\to m^-} f(x) = (m+3)^2-1$

$\lim_{x\to m^+} f(x) = m+2$ $\quad\therefore\quad (m+3)^2-1 = m+2$

$f(m) = m+2$ $\quad m^2+6m+9-1 = m+2$

$m^2+5m+6=0$

$(m+3)(m+2)=0$ $\quad\begin{cases}m_1=-3\\ m_2=-2\end{cases}$

$$f(x)=\begin{cases}-(x+2)^2 & \text{si } x\le -2\\ \frac{x}{3}+\frac{5}{3} & \text{si } -2<x\le 1\\ -(x-1)^2 & \text{si } x>1\end{cases}$$

1)
2)
3)
4) Analizando c. en el pto $x=-2$

$\lim_{x\to -2^-} f(x) = 0$ $\quad f(x)$ no es cont. en $x=-2$

$\lim_{x\to -2^+} f(x) = 1$

$f(-2)=0$

5) $x=1$

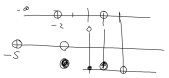
$\lim_{x\to 1^-} f(x) = 2$ $\quad$ no es cont. en $x=1$

$\lim_{x\to 1^+} f(x) = 0$

$f(1)=2$

$(-\infty,-2)\cup(-2,1)\cup(1,+\infty)$

a) $(-5,-2)$



$$\lim_{x\to 0}\frac{1-\cos x+2x^2}{x\operatorname{sen}x} = \lim_{x\to 0}\frac{1-\cos x}{x\operatorname{sen}x} + \lim_{x\to 0}\frac{2x^2}{x\operatorname{sen}x}$$

$$= \lim_{x\to 0}\frac{\operatorname{sen}^2 x}{x\operatorname{sen}x(1+\cos x)} + \lim_{x\to 0}\frac{2x}{\operatorname{sen}x}$$

$$= \lim_{x\to 0}\left(\frac{\operatorname{sen}x}{x}\right)\left(\frac{1}{1+\cos x}\right) + \lim_{x\to 0}(2)\cdot\lim_{x\to 0}\frac{x}{\operatorname{sen}x}$$

$$= \frac{1}{2}+2 = \frac{5}{2}$$

$y = f(x) = \frac{4x^2+2}{x^2-4} = \frac{4x^2+2}{(x+2)(x-2)}$

$\begin{cases}x\to -2 & y\to\infty\\ x\to -2 & \text{A.V}\\ x\to 2 & y\to\infty\\ x=2 & \text{A.V}\end{cases}$

$y\to 4$ $\quad x\to\infty$

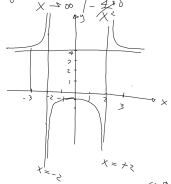
$y=4$ A.H

$\lim_{x\to\infty} y = \lim_{x\to\infty}\frac{4x^2+2}{x^2-4}$

$y = \lim_{x\to\infty}\frac{4+\frac{2}{x^2}}{1-\frac{4}{x^2}} = 4$

3)

$y = \frac{4x^2+2}{x^2-4}$



$x=-2$ $\quad x=2$

$$\lim_{\theta\to\overline{\pi}}\frac{\tan\theta}{(\theta-\overline{\pi})\sec\theta}\cdot\lim_{\theta\to\overline{\pi}}\frac{\frac{\operatorname{sen}\theta}{\cos\theta}}{(\theta-\overline{\pi})\cos\theta} = \lim_{z\to 0}\frac{-\operatorname{sen}z}{z}\cdot 1$$

$\lim_{\theta\to\overline{\pi}}\frac{\operatorname{sen}\theta}{\theta-\overline{\pi}}$ $\quad$ c. de V. $\quad \theta-\overline{\pi}=z$ $\quad \theta = z+\overline{\pi}$

$\lim_{\theta\to\overline{\pi}} z = \lim_{\theta\to\overline{\pi}}(\theta-\overline{\pi}) = 0$

$\operatorname{Sen}\theta = \operatorname{Sen}(z+\overline{\pi}) = \operatorname{Sen}z\cos\overline{\pi} + \cos z\operatorname{Sen}\overline{\pi}$

$= -\operatorname{Sen}z$

$y = x^2 - x$ $\quad$ en $P(2,2)$

$x_1 = 2$ $\quad x_2 = x_1+\Delta x$

$y_1 = 2$ $\quad y_2 = 2+\Delta y$

$y_2 = f(x_2) = (2+\Delta x)^2 - (2+\Delta x)$

$= 4+4\Delta x+\Delta x^2-2-\Delta x$

$-y_1 = -2$

$\Delta y = 4\Delta x+\Delta x^2-\Delta x$

$\lim_{\Delta x\to 0}\Delta y = \lim_{\Delta x\to 0}(\quad) = 0$