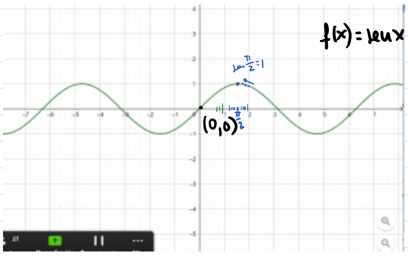
Límites y trigonometría

martes, 28 de abril de 2020 11:28

$f(x) = \operatorname{sen} x$

$f(x) = \cos x$

$f(x) = \operatorname{tg} x$



$(0, \operatorname{sen} 0) = (0,0)$

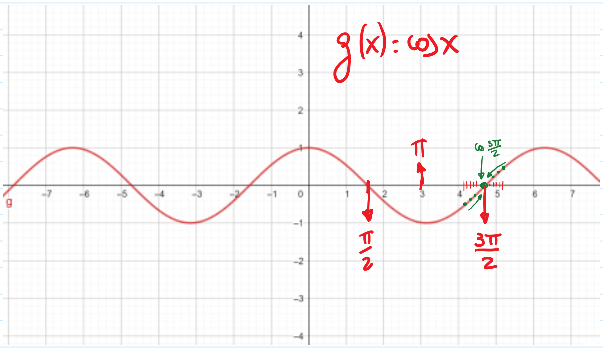
$\lim_{x \to 0} (\operatorname{sen} x) = 0$

$\lim_{x \to \frac{\pi}{2}} (\operatorname{sen} x) = 1$

TRIG $\longrightarrow$ RADIANES $\qquad \frac{\pi}{2} = 90^\circ$

$$\lim_{x \to a} (\operatorname{sen} x) = \operatorname{sen}\left(\lim_{x \to a} x\right) = \boxed{\operatorname{sen} a}$$

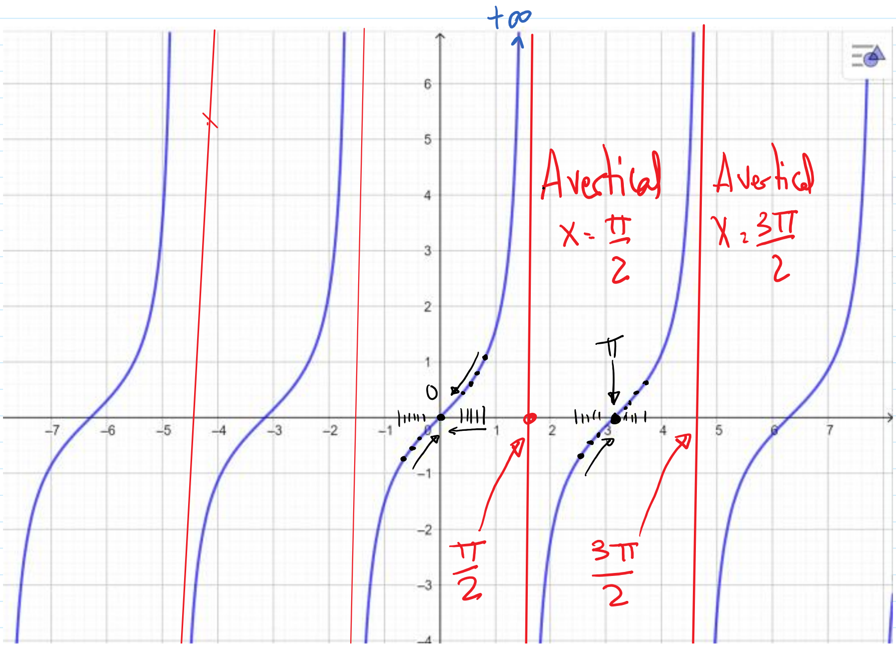
$f(x) = \operatorname{sen} x$ CONTINUA



$$\lim_{x \to \frac{3\pi}{2}} (\cos x) = \cos\frac{3\pi}{2} = 0$$

$$\lim_{x \to a} \cos x = \cos\left(\lim_{x \to a} x\right) = \cos(a)$$

$g(x) = \cos x$ CONTINUA



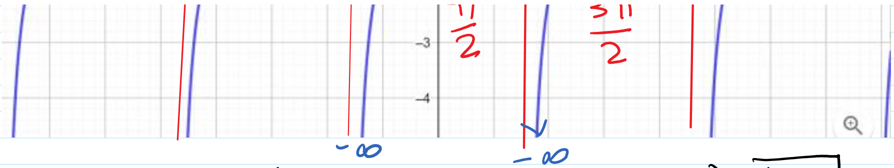
$h(x) = \operatorname{tg} x$

$\lim_{x \to 0} \operatorname{tg} x = \operatorname{tg} 0 = 0$

$\lim_{x \to \pi} \operatorname{tg} x = \operatorname{tg} \pi = 0$

$\operatorname{tg} \pi = (\operatorname{tg} 180^\circ) = 0$

$\frac{\pi}{2}, \frac{3\pi}{2}, 2\pi + \frac{\pi}{2}, 2\pi + \frac{3\pi}{2}, \ldots$



$h(x) = tg\,x \qquad \lim_{x\to a} tg\,x = tg\left(\lim_{x\to a} x\right) = \boxed{tg\,a}$

$h(x) = tg$ NO ES CONTINUA $\quad x = \frac{\pi}{2} \quad x = \frac{3\pi}{2} \quad$ SI $a \neq \frac{\pi}{2} + k\pi$

$x = \frac{\pi}{2} + 2k\pi \quad x = \frac{3\pi}{2} + 2k\pi$

$h\left(\frac{\pi}{2}\right) = tg\,\frac{\pi}{2}$ = NO EXISTE

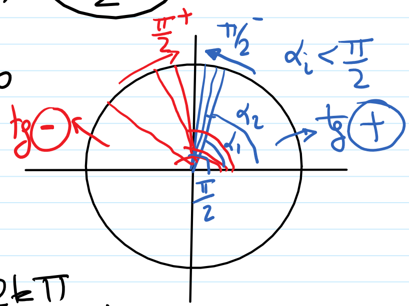
$tg\,\frac{\pi}{2} = \frac{sen\,\frac{\pi}{2}}{cos\,\frac{\pi}{2}} = \frac{1}{0} \qquad 1 \,\underline{|0}$ no existe

La función $h(x) = tg\,x$

$\lim_{x\to \frac{\pi}{2}} tg\,x = tg\left(\lim_{x\to\frac{\pi}{2}} x\right) = tg\,\frac{\pi}{2}$ no existe

$\lim_{x\to \frac{\pi}{2}^+} tg\,x = \lim_{\substack{x\to\frac{\pi}{2} \\ x>\pi/2}} tg\,x = -\infty$

$\lim_{x\to \frac{\pi}{2}^-} tg\,x = +\infty$



$tg\,x$ DISCONTINUA $\quad x = \frac{\pi}{2} + 2k\pi \quad k\in\mathbb{Z}$

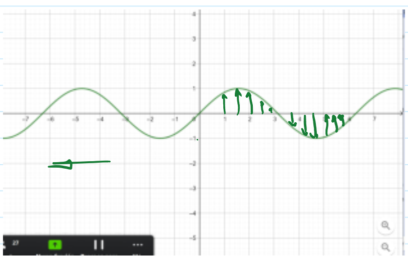
$x = \frac{3\pi}{2} + 2k\pi$

DISCONTINUA EN INFINITOS PUNTOS

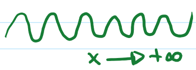
A. VERTICAL EN INFINITAS RECTAS $\quad x = \frac{\pi}{2} + 2k\pi$

$x = \frac{3\pi}{2} + 2k\pi$

¿Y en el ∞? ¿Cuál es la tendencia de las líneas $f(x)$ en $+\infty$ ó $-\infty$?



$\lim_{x\to+\infty} (sen\,x)$ = no existe



$\lim_{x\to-\infty} (sen\,x)$ = no existe

$\lim_{x\to\pm\infty} (cos\,x)$ = no existe

$\lim_{x\to\pm\infty} (tg\,x)$ = no existe

$\lim_{x\to 0} sen\,\frac{1}{x} = (sen\,\infty)$ = NO EXISTE

$x\to 0 \quad \frac{1}{x}\to\infty$

$\lim_{x\to\frac{\pi}{2}} \frac{1}{sen\left(x-\frac{\pi}{2}\right)} = \frac{1}{sen\left(\lim_{x\to\frac{\pi}{2}}\left(x-\frac{\pi}{2}\right)\right)} = \frac{1}{sen\,0} = \frac{1}{0} = \infty$