

$$3/ \quad h(x) = \frac{-2x}{\sqrt{x^2+4}}$$

Vertical
None

$$x^2+4=0$$

$$\sqrt{x^2}=\sqrt{-4}$$

$$\frac{1}{\infty} = 0$$

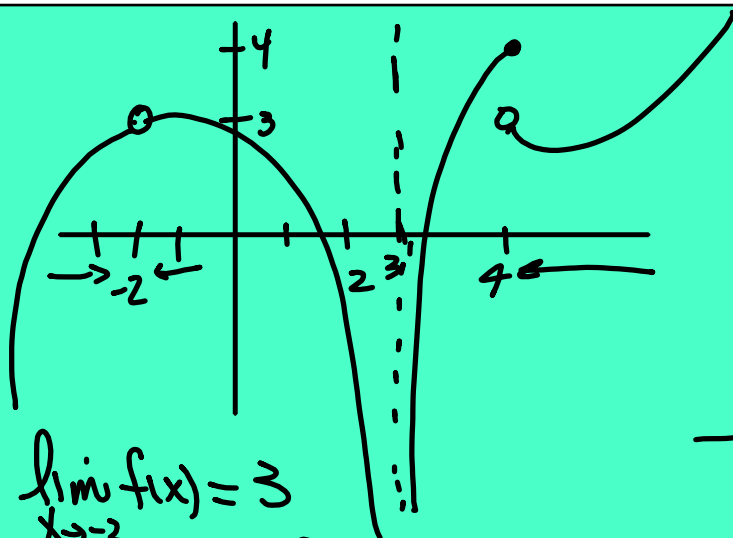
$$\frac{\infty}{9} = \infty$$

Horizontal

$$\lim_{x \rightarrow -\infty} \frac{-2x}{\sqrt{x^2}} = \lim_{x \rightarrow -\infty} \frac{-2x}{|x|} = \lim_{x \rightarrow -\infty} \frac{+2\cancel{x}}{+\cancel{x}} = 2$$

$$= \lim_{x \rightarrow \infty} \frac{-2x}{|x|} = \lim_{x \rightarrow \infty} \frac{-2\cancel{x}}{\cancel{x}} = -2$$

$y=2, y=-2$



$$\lim_{x \rightarrow -2} f(x) = 3$$

$f(-2) = \text{undefined}$

$$\lim_{x \rightarrow \infty} f(x) = -\infty$$

$$\lim_{x \rightarrow 4^-} f(x) = 4$$

$$\lim_{x \rightarrow 4^+} f(x) = 3$$

$$\lim_{x \rightarrow 4} f(x) = \text{DNE}$$

$$\lim_{x \rightarrow 3^-} f(x) = -\infty$$

$$\lim_{x \rightarrow 3^+} f(x) = -\infty$$

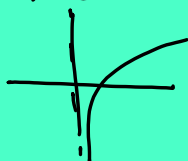
$$\lim_{x \rightarrow 3} f(x) = +\infty$$

$$\lim_{x \rightarrow -\infty} e^x = 0$$

$$\lim_{x \rightarrow \infty} e^x = \infty$$

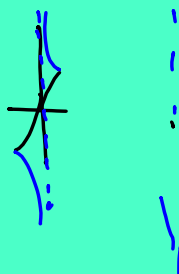
$$\lim_{x \rightarrow 0^+} \ln x = -\infty$$

$$\lim_{x \rightarrow \infty} \ln x = \infty$$



$$\begin{aligned} \lim_{x \rightarrow -\infty} \ln\left(\frac{e^x}{x^2}\right) &= \left(\frac{e^{-\infty}}{\infty^2}\right)^{\frac{1}{2}} \\ &= \ln(0) \\ &= -\infty \end{aligned}$$

$$\lim_{x \rightarrow 0^+} \frac{\tan^{-1} x}{\csc^{-1} \frac{1}{x}} = \frac{\tan^{-1} 0}{\csc^{-1} \infty} = \frac{0}{0}$$



$$f(x) = \begin{cases} 4x-1 & x \geq 1 \\ \frac{x+2}{x-1} & x < 1 \end{cases}$$

$$\lim_{x \rightarrow 1} f(x) = \text{DNE}$$

$$\lim_{x \rightarrow \infty} (8 + 7x - 4x^5)$$

$$\lim_{x \rightarrow \infty} -4x^5 = -4(\infty)^5 = -\infty$$

$$\lim_{x \rightarrow 1^+} 4x-1 = 3$$

$$\lim_{x \rightarrow 1^-} \frac{x+2}{x-1} = \frac{3}{0} = \frac{+}{-} = -\infty$$

$$\lim_{x \rightarrow -\infty} \cos\left(\frac{2-3\pi x}{2x+5}\right)$$

$$\lim_{x \rightarrow -\infty} \cos\left(\frac{-3\pi x}{2x}\right)$$

$$= \cos\left(-\frac{3\pi}{2}\right)$$



$$\lim_{x \rightarrow +\infty} \frac{2x}{(x-4)^2} = \frac{\infty}{\infty}$$

$$\lim_{x \rightarrow 4^-}$$

$$\lim_{x \rightarrow 4^+}$$

$$\lim_{x \rightarrow -2^-} \frac{5}{x+2} = \frac{5}{0} = \frac{+}{-} = -\infty$$

Use CAS to find:

$$\lim_{x \rightarrow 2^+} \frac{3x+1}{x^2-x-2}$$