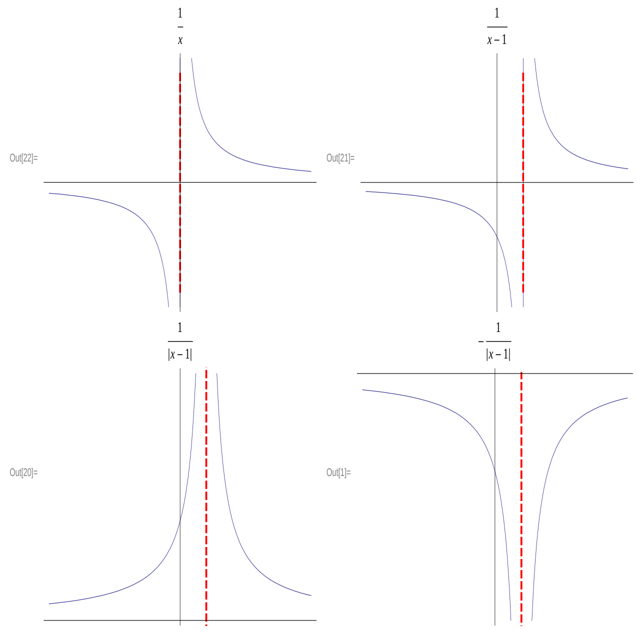

The red dashed line is at x=1. Once again as x approaches from either side to $x = 1$ the function values become arbitrarily small without a bound so $\lim_{x\to1^-} \frac{-1}{|x-1|} = -\infty$ and $\lim_{x\to1^+} \frac{-1}{|x-1|} = -\infty$ implies $\lim_{x\to1} \frac{-1}{|x-1|} = -\infty$, And $x = 1$ is a vertical asymptote

Vertical Asymptotes comes into discussion most of the time when we have to divide by zero hence especially with regards to rational functions. But you have to be careful considering the issue of vertical asymptotes when it comes to rational functions as you can observe in the Rule below:

Locating Vertical Asymptotes of Rational Functions If $f(x) = \frac{p(x)}{q(x)}$is a rational function, where $q(c) = 0$ and $p(c) \neq 0$, then $x = c$ is a vertical asymptote of the graph of f (x).

Example Let $f(x) = \frac{x^2+x-2}{x^2-1} = \frac{(x-1)(x+2)}{(x-1)(x+1)}$. And find the $\lim\limits_{x\to1} f(x)$?

Note that the rule stated above does not work for f(x) because
$p(1) = 1^2 + 1 - 2 = 0$ as well as $q(1) = 1^2 - 1 = 0$.
So $f(1) = \frac{0}{0}$ is the <u>indeterminate form</u>. This form usually says you need to do more work with your rational function such as using the factored out form of f and get rid of the $x - 1$ term in the numerator and denominator and re-assess the limit again as follows: