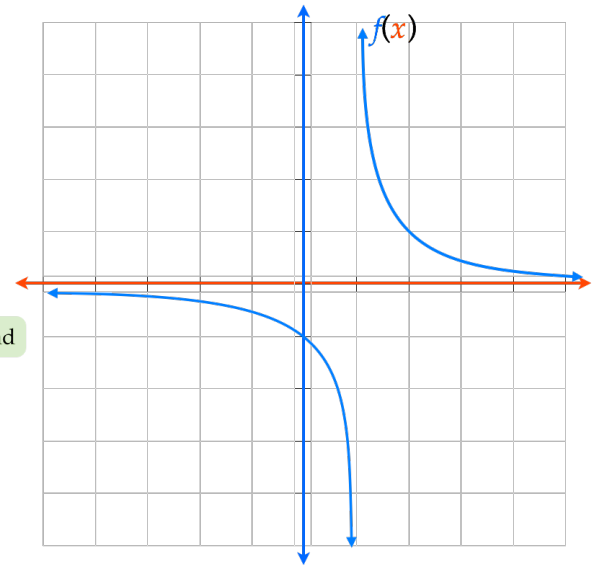
www.iTutoring.com - NOTES

Infinite Limits and Vertical Asymptotes

Name _____

Date _____ Period _____

$$f(x) = \frac{1}{x-1}$$



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

As $x \to 1$ from the left, $f(x)$ decreases without bound

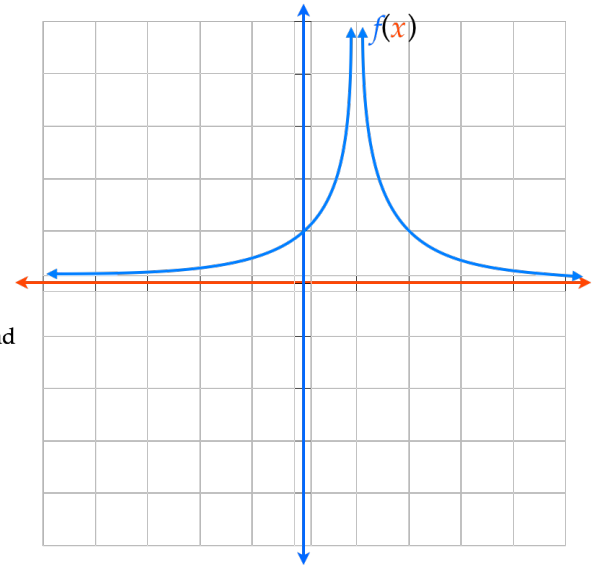
$\lim_{x \to 1^+} f(x)$

As $x \to 1$ from the right, $f(x)$ increases without bound

The "=" does not mean the limit exits, rather it tells how the limit fails to exist by denoting the "unbound behavior"

Limits must equal a constant number.

$$f(x) = \frac{1}{(x-1)^2}$$



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

As $x \to 1$ from the left, $f(x)$ increases without bound

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

As $x \to 1$ from the right, $f(x)$ increases without bound

$\lim_{x \to 1} f(x)$

$$f(x) = \frac{-1}{(x-1)^2}$$

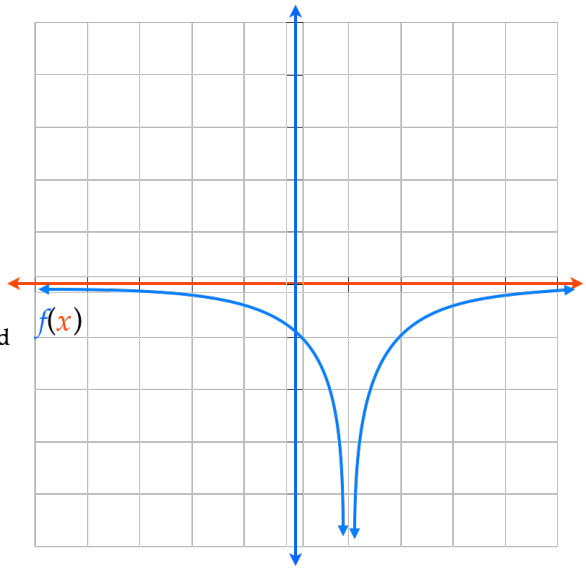
$\lim_{x \to 1^-} f(x)$

As $x \to 1$ from the left, $f(x)$ decreases without bound

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

As $x \to 1$ from the right, $f(x)$ decreases without bound

$\lim_{x \to 1} f(x)$



How to find Vertical Asymptotes

Given $f(x) = \frac{g(x)}{h(x)}$ if $\begin{matrix} g(c) \neq 0 \\ h(c) = 0 \end{matrix}$, then $f(x)$ has a vertical asymptote at $x = c$.

Determine the following vertical asymptotes of the following functions

$$f(x) = \frac{3x}{5(x-4)}$$

How to find Vertical Asymptotes

Given $f(x) = \dfrac{g(x)}{h(x)}$ if $\begin{matrix} g(c) \neq 0 \\ h(c) = 0 \end{matrix}$, then $f(x)$ has a vertical asymptote at $x = c$.

Determine the following vertical asymptotes of the following functions

$$f(x) = \frac{x^2}{x^2 - 9}$$

How to find Vertical Asymptotes

Given $f(x) = \dfrac{g(x)}{h(x)}$ if $\begin{matrix} g(c) \neq 0 \\ h(c) = 0 \end{matrix}$, then $f(x)$ has a vertical asymptote at $x = c$.

Determine the following vertical asymptotes of the following functions

$$f(x) = \frac{x^2 - x - 6}{x^2 + 6x + 8}$$

$$f(x) = \frac{x^2 + 2x}{x + 1}$$

$$\lim_{x \to 4} \frac{3x}{5(x - 4)} = \frac{12}{0}$$

$$\lim_{x \to 3} \frac{x^2}{x^2 - 9}$$

$$\lim_{x \to -4} \frac{x^2 - x - 6}{x^2 + 6x + 8}$$