

Ch. 1.5 Notes: Limits approaching infinity (V.A.s)

Infinite Limits: a limit where the function increases or decreases without bound as x approaches c

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

* If the limit as x approaches c from either right or left is $\pm \infty$, then $x=c$ is a vertical asymptote.

Rational functions: $y = \frac{f(x)}{g(x)}$

← If $g(x)$ doesn't cancel, then it's an asymptote.

Ex. 1 Find all vertical asymptotes of $f(x) = \frac{x^2 - 3x + 2}{x^2 - 4}$

Ex. 2 Determine $\lim_{x \rightarrow 2^-} f(x)$ and $\lim_{x \rightarrow 2^+} f(x)$ for $f(x) = \frac{x+1}{x-2}$

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

Steps: (one-sided limits)

- 1) plug in x -value
- 2) If undefined, simplify and re-plug in value
- 3) If still undefined, plug decimal values, determine signs of numerator/denominator, decide if $+\infty/-\infty$



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

$$b) \lim_{x \rightarrow 2^+} \frac{x+1}{x-2} =$$