Infinite Limits

p. 128 - 137 (2.5)

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Graphically, an *infinite limit* increases/decreases without bound at a vertical asymptote.

Analytically, direct substitution yields a 0 in the denominator (no common factor or indeterminate form).

Numerically, substitute a decimal number approaching the limit to see if the y-values are approaching - or + infinity.

Describing the behavior to the left and right of a vertical asymptote is useful in graphing that particular function.

Find $\lim_{x \to 1^+} (f(x))$ and $\lim_{x \to 1^-} (f(x))$ for 1 - 2.

1. $y = \dfrac{x^2 + 5x}{x - 1} = \dfrac{x(x+5)}{x-1}$

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

2. $f(x) = \dfrac{1}{(x - 1)^4}$

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

3. a) Find $\lim_{x \to ((-\pi/2)^-} \tan(x) = \infty$ b) Find $\lim_{x \to (-\pi/2)^+} \tan(x) = -\infty$