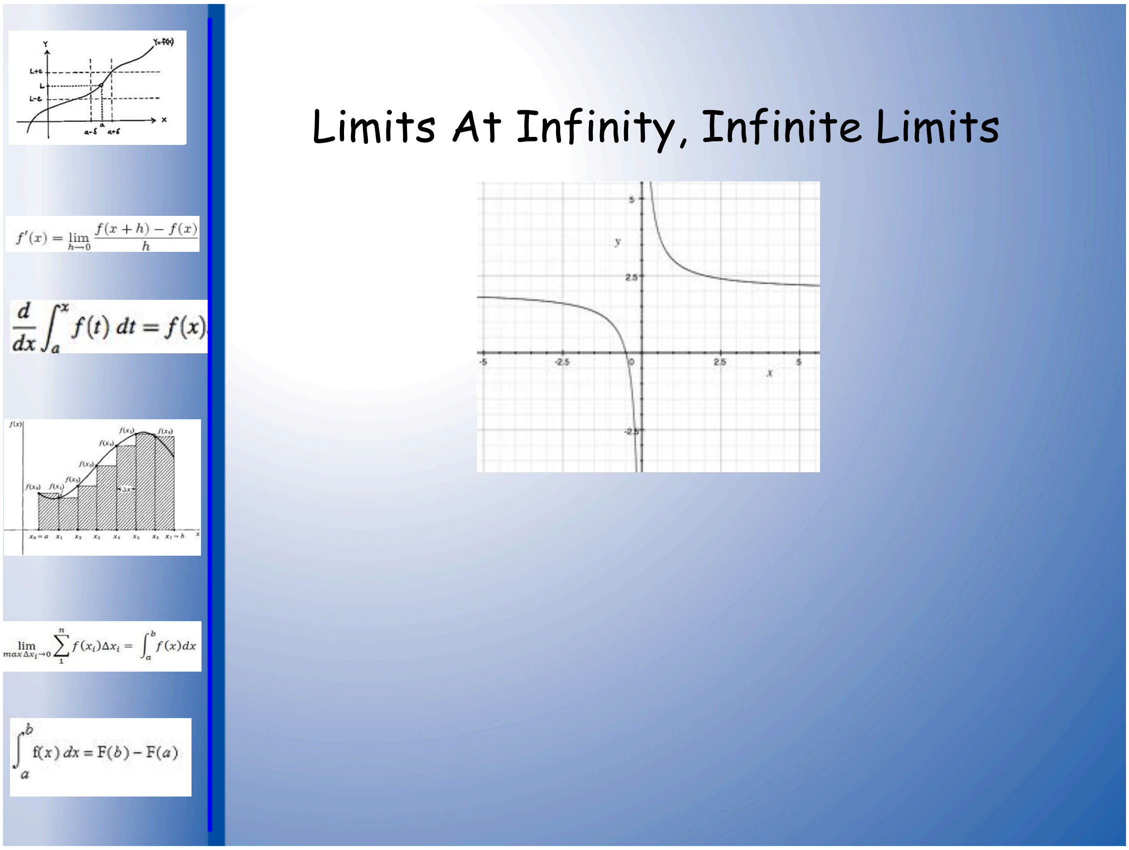
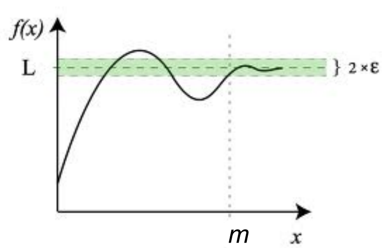


Definition: (Limit as $x \to \infty$)

is defined on [c,∞) for c ∈ R

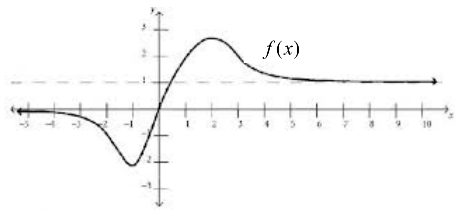
We say that if for every $\varepsilon > 0$ there is a corresponding number, m such that



EX 1 Intuitively (looking at the graph) determine these limits.

$\lim_{x \to \infty} f(x) =$

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



EX 2 Show that if *n* is a positive integer, then $\lim_{x \to \infty} \frac{1}{x^n} = 0$.

EX 3 $\lim_{x \to \infty} \frac{2x+3}{x^2+1} =$

EX 4 $\lim_{x \to \infty} \frac{3x^4 - 2x^3 + 53}{x^3 + 7} =$

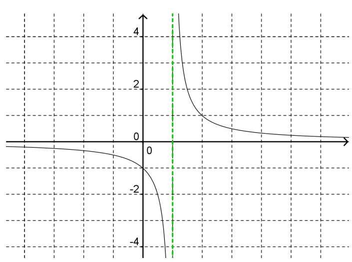
#X 5 $\lim_{x \to \infty} \frac{2x^2 + 5x - 1}{x^2 + 3x} =$

Definition: (Infinite limit)

We say $\lim_{x \to c^+} f(x) = \infty$ if for every positive number, m

there is a corresponding δ > 0 such that $0 < x - c < \delta \Rightarrow f(x) > m$

EX 6 Determine these limits looking at this graph of $f(x) = \frac{1}{x-1}$.



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

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

Ex 7 Find the horizontal and vertical asymptotes for this function,

then write a few limit statements including ∞. $f(x) = \frac{-2x}{x+3}$

Ex 8 a) Find the vertical and horizontal asymptotoes for this function.

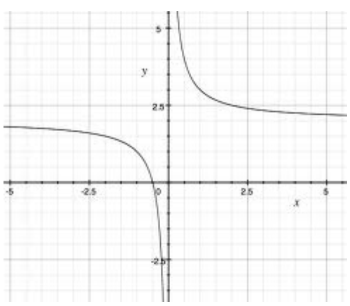
$$f(x) = \frac{2x}{\sqrt{x^2+5}}$$

b) Determine these limits:

$\lim\limits_{x\to\infty} f(x) =$ $\lim\limits_{x\to\sqrt{5}^+} f(x) =$

$\lim\limits_{x\to-\infty} f(x) =$ $\lim\limits_{x\to\sqrt{5}^-} f(x) =$

Determine these limits:



$\lim\limits_{x\to\infty} f(x) =$

$\lim\limits_{x\to 0^+} f(x) =$

$\lim\limits_{x\to-\infty} f(x) =$

$\lim\limits_{x\to 0^-} f(x) =$