

2-2 Limits Involving Infinity

Learning Targets

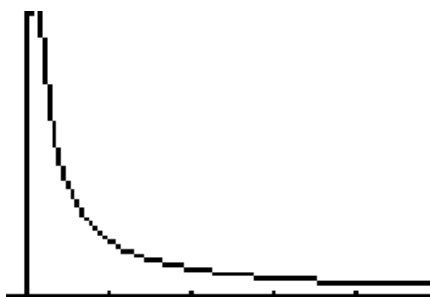
- I can find the value of a limit involving infinity by looking at the graph of a function.
- I can calculate limits involving infinity algebraically.

Find the limit.

1. $\lim_{x \rightarrow \infty} \frac{1}{x} = 0$

X	Y1
1	1
10	.1
100	.01
1000	.001
10000	1E-4
100000	1E-5

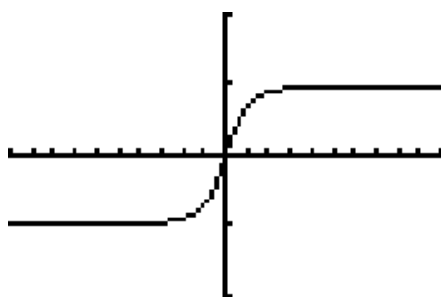
X=



$$2. \lim_{x \rightarrow \infty} \frac{\sin x}{x} = 0$$



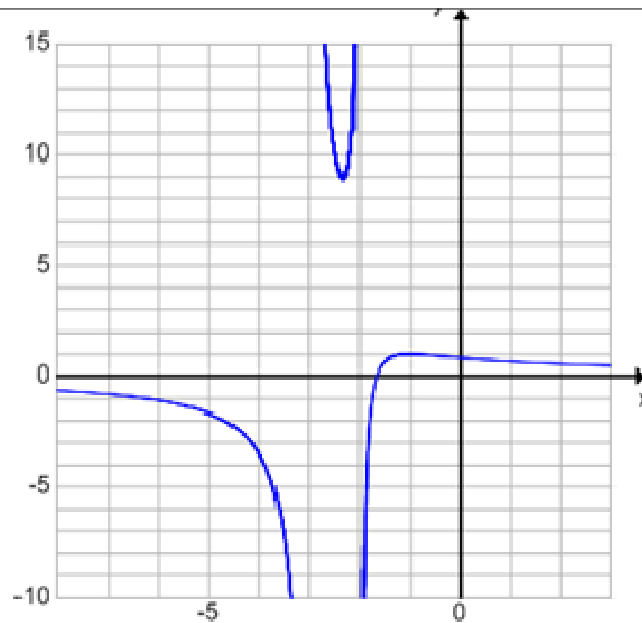
$$3. \lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^2 + 1}}$$



X	Y1
1	.70711
10	.99504
100	.99995
1000	1
10000	1
100000	1

Y1 = .99999999995

$$f(x) = \frac{3x+5}{x^2+5x+6}$$



$$1. \lim_{x \rightarrow -2^-} f(x) = \infty$$

$$2. \lim_{x \rightarrow -2^+} f(x) = -\infty$$

$$4. \lim_{x \rightarrow \infty} f(x) = 0$$

$$3. \lim_{x \rightarrow -2} f(x) = \text{DNE}$$

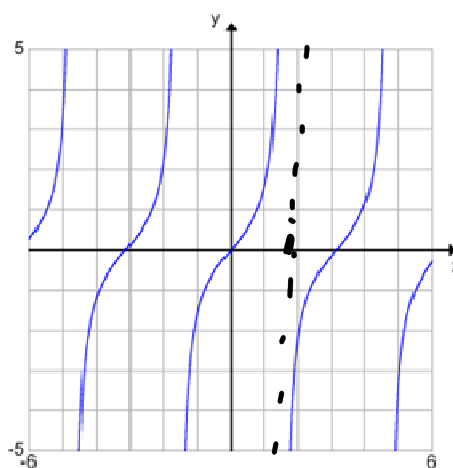
$$5. \lim_{x \rightarrow -\infty} f(x) = 0$$

a. $\lim_{x \rightarrow \frac{\pi}{2}} \tan x$ DNE

b. $\lim_{x \rightarrow \frac{\pi}{2}^-} \tan x$ $+\infty$

c. $\lim_{x \rightarrow \frac{\pi}{2}^+} \tan x$ $-\infty$

d. $\lim_{x \rightarrow \infty} \tan x$ DNE



Find the limit.

$$\lim_{x \rightarrow \infty} \frac{(3x^4 - 2x^3 + 3x^2 - 5x + 6) \cdot \frac{1}{x^4}}{(2x^4 + 3x^2 - x + 1) \cdot \frac{1}{x^4}}$$

$$= \lim_{x \rightarrow \infty} \frac{\frac{3x^4}{x^4} - \frac{2x^3}{x^4} + \frac{3x^2}{x^4} - \frac{5x}{x^4} + \frac{6}{x^4}}{\frac{2x^4}{x^4} + \frac{3x^2}{x^4} - \frac{x}{x^4} + \frac{1}{x^4}}$$

$$= \lim_{x \rightarrow \infty} \frac{3 - \frac{2}{x} + \frac{3}{x^2} - \frac{5}{x^3} + \frac{6}{x^4}}{2 + \frac{3}{x^2} - \frac{1}{x^3} + \frac{1}{x^4}}$$

$\left(= \frac{3}{2} \right)$

Homework:

p. 76 #1-8, 12-34, 53, 54, 56

Learning Targets

- I can find the value of a limit involving infinity by looking at the graph of a function.
- I can calculate limits involving infinity algebraically.