10-1 Notes Limits Graphically Name _____
Pre-Caclulus

We write: lim $x \to a\ f(x) = L$ We say: The limit of f(x), as x approaches a, equals L.
We mean: as x gets closer and closer to a, the y value gets closer and closer to L.

I. Limits from a Table

1. Find the limit from the right and from the left.

$$\lim_{t \to 0} \frac{\sqrt{t^2+9}-3}{t^2}$$

from the right

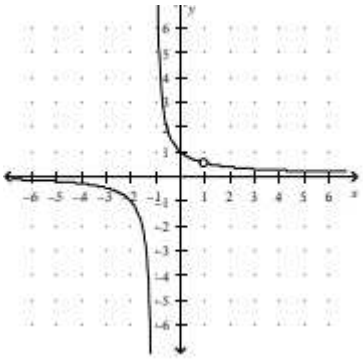
t	0.5	0.1	0.01	0.001
f(x)				

from the left

t	- 0.5	- 0.1	- 0.01	- 0.001
f(x)				

2. Find the limit from a table and estimate using the graph of (what are the restrictions?):

$$\lim_{x \to 1} \frac{x-1}{x^2-1}$$

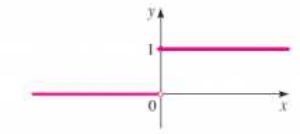


II. Limits from a Graph

A. Limits that Do Not Exist

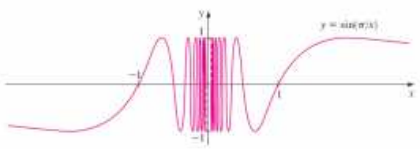
Jump/Gap

$$H(t) = \begin{cases} 0 & \text{if } t < 0 \\ 1 & \text{if } t \geq 0 \end{cases}$$



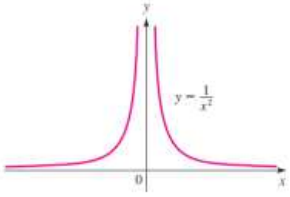
Oscillates

Find $\lim_{x \to 0} \sin \frac{\pi}{x}$



Vertical Asymptotes

$\lim_{x \to 0} \frac{1}{x^2}$



B. One-Sided Limits

Left Sided Limit

$$\lim_{x\to a^-} f(x) = L$$

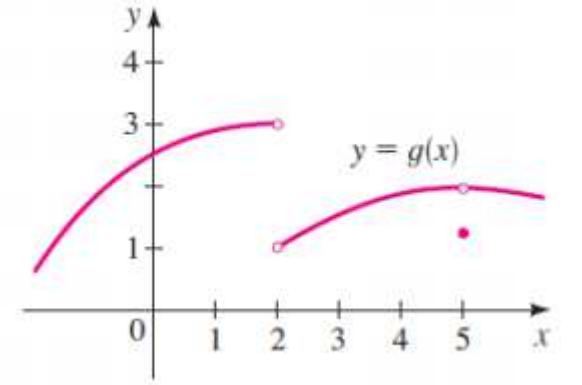
Right Sided Limit

$$\lim_{x\to a^+} f(x) = L$$

$$\lim_{x\to a} f(x) = L \text{ if and only if } \lim_{x\to a^-} f(x) = L \text{ AND } \lim_{x\to a^+} f(x) = L$$

C. Find the limits from the graph provided

1.



a. $\lim_{x\to 2^-} g(x)$

b. $\lim_{x\to 2^+} g(x)$

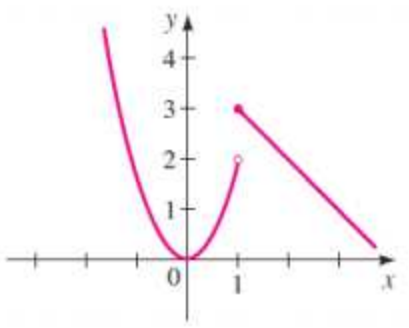
c. $\lim_{x\to 2} g(x)$

d. $\lim_{x\to 5^-} g(x)$

e. $\lim_{x\to 5^+} g(x)$

f. $\lim_{x\to 5} g(x)$

2.



$$f(x) = \begin{cases} 2x^2 & \text{if } x < 1 \\ 4 - x & \text{if } x \geq 1 \end{cases}$$

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

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

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