

§1.2: Introduction to Limits

“I WILL...

...Fill out a table to identify a limit

...Use a graph given to identify a limit”

I. What is a limit?

A. Limit is defined of finding the maximum height, or y -value, a function can reach as x _____ or _____ of a certain number.

B. Calculate the y -value of a function that is usually unobtainable by using algebra

II. Structure of a Limit

A. _____ stands for limit, indicating that the expression is, in fact, a limit.

B. _____ is any valid function

C. $x \rightarrow$ _____ indicates the number x is approaching or is reaching its limit at. C is a real number.

Ex 1: Use a table to estimate numerically of $\lim_{x \rightarrow 2} (3x - 2) =$ _____

x	1.9	1.99	1.999	2	2.001	2.01	2.1
y				???			

Ex 2: Use a table to estimate numerically of $\lim_{x \rightarrow 0} \frac{\sqrt{x+5} - \sqrt{5}}{x} =$ _____

x	-0.1	-0.01	-0.001	0	0.001	0.01	0.1
y				???			

Ex 3: Use a table to estimate numerically of $\lim_{x \rightarrow 0} \frac{\cos x - 1}{x} =$ _____

x	-0.1	-0.01	-0.001	0	0.001	0.01	0.1
y				???			

Your Turn: Use a table to estimate numerically of $\lim_{x \rightarrow 0} \frac{x}{\sqrt{x+1} - 1} =$ _____

(Make sure to put parenthesis around the appropriate equation)

x	-0.01	-0.001	-0.0001	0	0.0001	0.001	0.01
y				???			

III. When does a limit fail to exist?

A. _____

B. _____

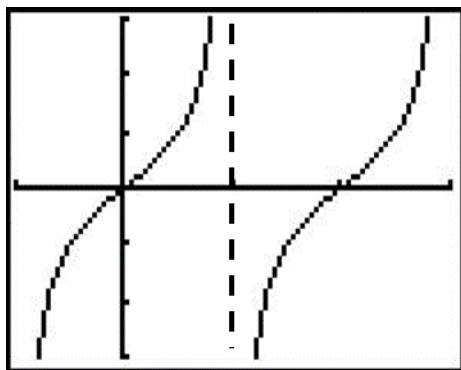
C. _____

Ex 4: Use a table to estimate numerically of $\lim_{x \rightarrow 0} \frac{|x|}{x} =$ _____

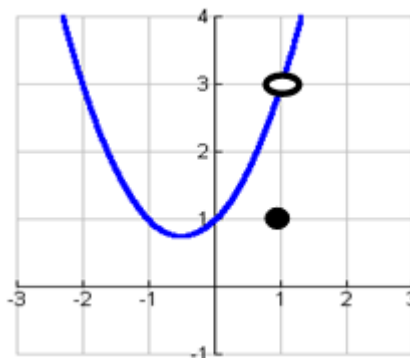
x	-0.1	-0.01	-0.001	0	0.001	0.01	0.1
y				???			

Your Turn: Use the graph to find limit (if it exists) of

$$\lim_{x \rightarrow \pi/2} \tan x$$



Ex 6: Use the graph to determine the limits of the following:



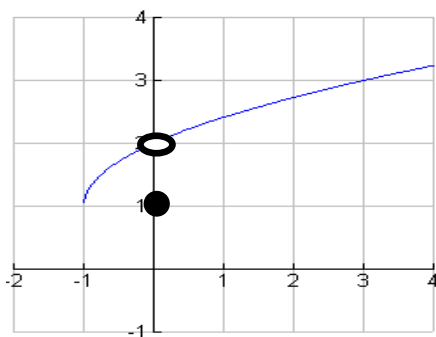
(A) $f(-1)$

(B) $\lim_{x \rightarrow -1} \frac{x^3 - 1}{x - 1}$

(C) $\lim_{x \rightarrow 0} \frac{x^3 - 1}{x - 1}$

(D) $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$

Ex 7: Use the graph to determine the limits of the following:



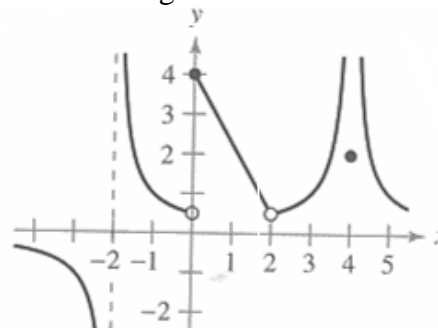
(A) $f(0)$

(B) $\lim_{x \rightarrow 3} \frac{x}{\sqrt{x+1}-1}$

(C) $\lim_{x \rightarrow -2} \frac{x}{\sqrt{x+1}-1}$

(D) $\lim_{x \rightarrow 0} \frac{x}{\sqrt{x+1}-1}$

Your Turn: Use the graph to determine the limits of the following:



(A) $f(-2)$

(B) $\lim_{x \rightarrow -2} f(x)$

(C) $\lim_{x \rightarrow 0} f(x)$

(D) $\lim_{x \rightarrow 2} f(x)$

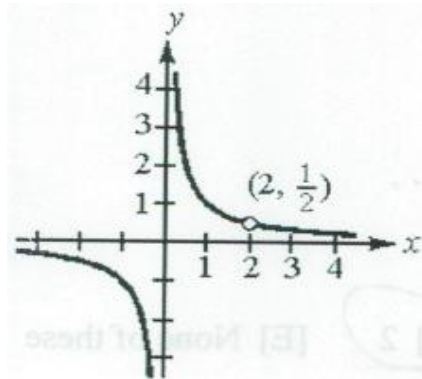
AP 1) Use the graph to find the $\lim_{x \rightarrow 2} f(x)$ (if it exists) for $f(x) = \frac{x-2}{x^2-2x}$

(A) $3/2$

(B) Limit does not exist

(C) 1

(D) $1/2$



Vocabulary	Connections and Process	Answer and Justification

Assignment: Page 55: 1–25 odd, omit 9. If the limit fails to exist, explain why.