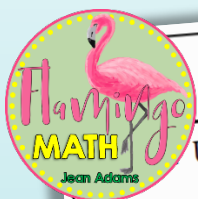


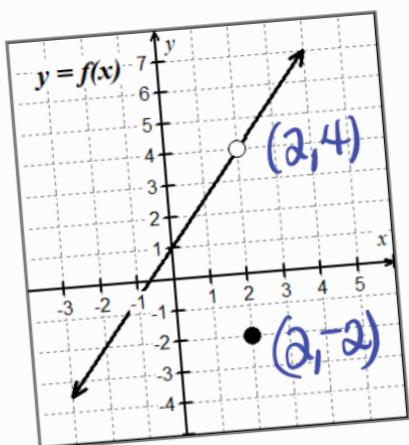
Precalculus Honors

Finding Limits Graphically



Limits That Do Not Exist

Use the graphs shown below to find the limits, if possible.



A. $\lim_{x \rightarrow 2^-} f(x) = 4$

B. $\lim_{x \rightarrow 2^+} f(x) = 4$

C. $f(2) = -2$

D. $\lim_{x \rightarrow 2} f(x) = 4$

} same, so the general limit exists

E. $\lim_{x \rightarrow 2} g(x) = 3$ } not the same, general limit

Completely Editable 10.1

Lesson 10.1: Intro to Limits

One-Sided Limits

The limit of f as x approaches a value from the left is a **left-hand limit**.

The limit of f as x approaches a value from the right is a **right-hand limit**.

General Limits

Limit at a point: A function will have a general limit if the function is approaching the same y -value from the left and from the right of the x -value.

EX #1: Cont.

Factor and Simplify

Coordinates of Hole

Domain

Range

Vertical Asymptote

Horizontal Asymptote

Understanding Limit Notation

Use the graph for EX #1 to complete the table below:

Can you explain what the value of a limit represents in terms of the graph?

Analysis of Limits by Tables

EX #2: Now let's consider the function $f(x) = \frac{3x^2 - 8x - 3}{x^2 - 9}$. Complete the tables below to analyze the behavior at each value.

x	-3.1	-3.01	-3.001	-3	-2.999	-2.99	-2.9
$f(x)$							

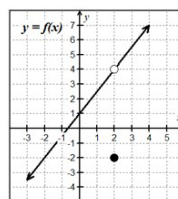
$$\lim_{x \rightarrow -3} \frac{3x^2 - 8x - 3}{x^2 - 9} =$$

$$\lim_{x \rightarrow -3^+} \frac{3x^2 - 8x - 3}{x^2 - 9} =$$

Explain how this value is related to the graph of the function.

Limits That Do Not Exist

EX #3: Use the graphs shown below to find the limits, if possible.

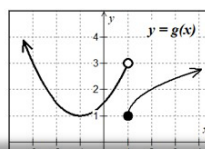


A. $\lim_{x \rightarrow 2} f(x) =$

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

C. $f(2) =$

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



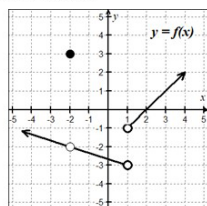
E. $\lim_{x \rightarrow 1} g(x) =$

F. $\lim_{x \rightarrow 1^+} g(x) =$

G. $g(1) =$

Finding Limits Graphically

EX #4: Use the graph of the piecewise function shown below to find each limit. If the limit does not exist, state why.



A. $\lim_{x \rightarrow 3} f(x) =$

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

C. $\lim_{x \rightarrow -2} f(x) =$

D. $f(-2) =$

E. $\lim_{x \rightarrow 0^+} f(x) =$

F. $\lim_{x \rightarrow 1^+} f(x) =$

G. $f(1) =$

H. $\lim_{x \rightarrow 2} f(x) =$

J. $\lim_{x \rightarrow 5} f(x) =$

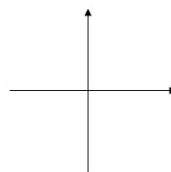
K. $\lim_{x \rightarrow -\infty} f(x) =$

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

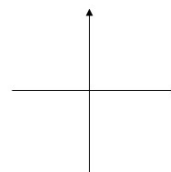
M. $\lim_{x \rightarrow 0} f(x) =$

The Existence of a Limit

EX #5: Sketch two different graphs where $f(a)$ is not defined. One graph showing how the limit exists and one showing how the limit does not exist. Explain your reasoning.



Explanation:



Explanation:

NOTES

10.1

Limits - A Graphical Approach Homework

Name _____

Date _____ Period _____

Problems 1 - 4, complete the table and use the result to estimate the limit. Graph the function and verify your result.

1. $\lim_{x \rightarrow 3} \frac{x-3}{x^2+2x-15} =$

x	2.9	2.99	2.999	3.001	3.01	3.1
f(x)						

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

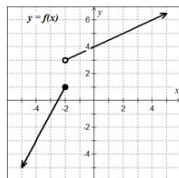
x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)						

3. $\lim_{x \rightarrow 4} \frac{x^2-16}{x-4} =$

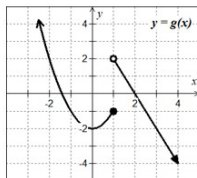
x	3.9	3.99	3.999	4.001	4.01	4.1
f(x)						

Problems 5 - 8, use the graph to find the limit (if it exists). If the limit does not exist, explain why.

5.



6.



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

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

A. $\lim_{x \rightarrow -2} g(x) =$

B. $\lim_{x \rightarrow 0} g(x) =$

C. $\lim_{x \rightarrow -2} f(x) =$

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

C. $g(1) =$

D. $\lim_{x \rightarrow 2} g(x) =$

E. $f(-2) =$

F. $\lim_{x \rightarrow -2} f(x) =$

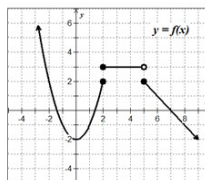
E. $\lim_{x \rightarrow 1} g(x) =$

F. $\lim_{x \rightarrow -\infty} g(x) =$

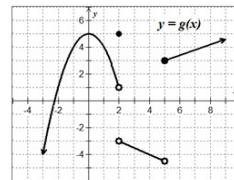
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7.



8.



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

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

A. $\lim_{x \rightarrow 2} g(x) =$

B. $\lim_{x \rightarrow 2} g(x) =$

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

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

C. $\lim_{x \rightarrow 0} g(x) =$

D. $\lim_{x \rightarrow \infty} g(x) =$

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

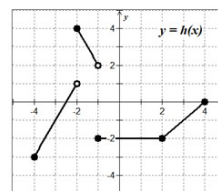
F. $\lim_{x \rightarrow 7} f(x) =$

E. $\lim_{x \rightarrow 4} g(x) =$

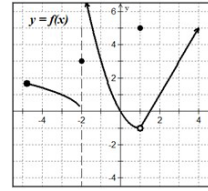
F. $\lim_{x \rightarrow 2} g(x) =$

Problems 9 - 10, Use the graph to decide whether the value of the given quantity exists. If it does, find it. If not, explain why.

9.



10.



A. $h(-1) =$

B. $\lim_{x \rightarrow -1} h(x) =$

A. $f(1) =$

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

C. $\lim_{x \rightarrow 4} h(x) =$

D. $\lim_{x \rightarrow -2} h(x) =$

C. $\lim_{x \rightarrow -2} f(x) =$

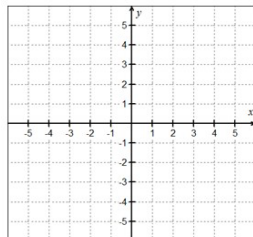
D. $\lim_{x \rightarrow 1} f(x) =$

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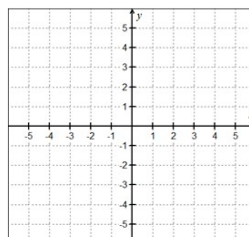
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Problems 11 - 12, sketch a graph of a function that fits the requirements described below.

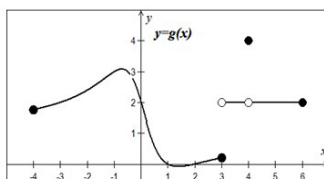
11. $\lim_{x \rightarrow 2} f(x) = 3$ $\lim_{x \rightarrow 2^+} f(x) = -2$ $f(2) = 1$



12. $\lim_{x \rightarrow -2} f(x) = -\infty$ $\lim_{x \rightarrow -2^+} f(x) = \infty$
f(2) is undefined but the limit exists



Problems 13 - 15, use the graph of the function, $g(x)$, below, to determine if the statements are true or false. For statements that are false, explain why.



15. $\lim_{x \rightarrow c} g(x)$ exists for every value of c on the interval $-4 < x < 3$

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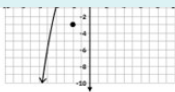
Practice Sets

Name

Date

Period

Lesson Warm-Ups



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

1D. $\lim_{x \rightarrow 0^+} f(x) =$

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

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

3. State any points of discontinuity in the graph.

2C. $\lim_{x \rightarrow 2} f(x) =$

2D. $f(-2) =$

Name

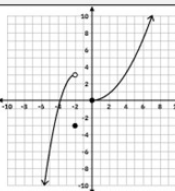
Date

Period

Lesson 10.1: Intro to Limits

Warm-Up # 2

Use the graph of $y = f(x)$, shown at right, to find the limit, if it exists.



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

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

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

1D. $\lim_{x \rightarrow 0^+} f(x) =$

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

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

3. State any points of discontinuity in the graph.

2C. $\lim_{x \rightarrow 2} f(x) =$

2D. $f(-2) =$

Approach Form A

Period

of, shown below

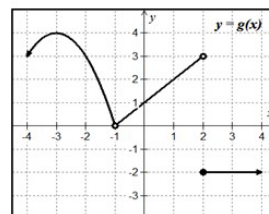
10.1 Limits: A Graphical Approach Form B

Name

Date

Period

Problems 1 - 8, use the graph of, shown below to find the limit, if it exists.



1. $\lim_{x \rightarrow -3} f(x) =$

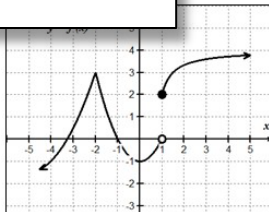
2. $\lim_{x \rightarrow 0} f(x) =$

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

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

5. $\lim_{x \rightarrow 2} f(x) =$

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



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

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

3. $\lim_{x \rightarrow 1^+} f(x) =$

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

5. $\lim_{x \rightarrow 1} f(x) =$

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

Daily Lesson Quiz

Grade:

Grade: