

1. [-/1 Points]

DETAILS

SCALCET9 2.XP.1.001.

PRACTICE ANOTHER

A cardiac monitor is used to measure the heart rate of a patient after surgery. It compiles the number of heartbeats after t minutes. When data in the table are graphed, the slope of the tangent line represents the heart rate in beats per minute.

t (min)	36	38	40	42	44
Heartbeats	2,510	2,650	2,790	2,920	3,054

The monitor estimates this value by calculating the slope of a secant line. Use the data to estimate the patient's heart rate after 42 minutes using the secant line between the points with the given values of t . (Round your answers to one decimal place.)

- (a)
- $t = 36$
- and
- $t = 42$

- (b)
- $t = 38$
- and
- $t = 42$

- (c)
- $t = 40$
- and
- $t = 42$

- (d)
- $t = 42$
- and
- $t = 44$

Need Help?

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2. [-/1 Points]

DETAILS

SCALCET9 2.1.007.

PRACTICE ANOTHER

The table shows the position of a motorcyclist after accelerating from rest.

t (seconds)	0	1	2	3	4	5	6
s (feet)	0	4.9	10.6	23.1	50.2	109.4	238.1

(a) Find the average velocity (in ft/s) for each time period.

(i) [2, 4]

 ft/s

(ii) [3, 4]

 ft/s

(iii) [4, 5]

 ft/s

(iv) [4, 6]

 ft/s

(b) Plot the points in the table to create a graph of s as a function of t to estimate the instantaneous velocity (in ft/s) when $t = 3$. (Round your answer to one decimal place.)

 ft/s**Need Help?**

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3. [-/1 Points]

DETAILS

SCALCET9 2.2.002.

PRACTICE ANOTHER

Explain what it means to say that $\lim_{x \rightarrow 1^-} f(x) = 5$ and $\lim_{x \rightarrow 1^+} f(x) = 4$.

- As x approaches 1, $f(x)$ approaches 5, but $f(1) = 4$.
- As x approaches 1, $f(x)$ approaches 4, but $f(1) = 5$.
- As x approaches 1 from the left, $f(x)$ approaches 5. As x approaches 1 from the right, $f(x)$ approaches 4.
- As x approaches 1 from the right, $f(x)$ approaches 5. As x approaches 1 from the left, $f(x)$ approaches 4.

In this situation is it possible that $\lim_{x \rightarrow 1} f(x)$ exists? Explain.

- Yes, $f(x)$ could have a hole at $(1, 5)$ and be defined such that $f(1) = 4$.
- Yes, $f(x)$ could have a hole at $(1, 4)$ and be defined such that $f(1) = 5$.
- Yes, if $f(x)$ has a vertical asymptote at $x = 1$, it can be defined such that $\lim_{x \rightarrow 1^-} f(x) = 5$, $\lim_{x \rightarrow 1^+} f(x) = 4$, and $\lim_{x \rightarrow 1} f(x)$ exists.

No, cannot exist $\lim_{x \rightarrow 1} f(x) \neq$.

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4. [-/1 Points]

DETAILS

SCALCET9 2.2.003.

PRACTICE ANOTHER

Explain the meaning of each of the following.

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

- The values of $f(x)$ can be made arbitrarily close to 0 by taking x sufficiently close to (but not equal to) -5 .
- $f(-5) = \infty$
- The values of $f(x)$ can be made arbitrarily large by taking x sufficiently close to (but not equal to) -5 .
- The values of $f(x)$ can be made arbitrarily close to -5 by taking x sufficiently large.

(b) $\lim_{x \rightarrow 6^+} f(x) = -\infty$

- The values of $f(x)$ can be made arbitrarily close to $-\infty$ by taking x sufficiently close to 6.
- $f(6) = -\infty$
- As x approaches 6, $f(x)$ approaches $-\infty$.
- The values of $f(x)$ can be made negative with arbitrarily large absolute values by taking x sufficiently close to, but greater than, 6.

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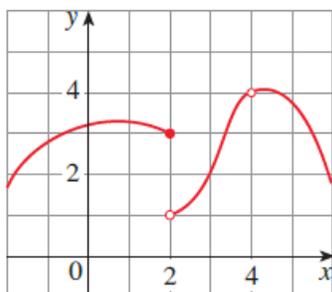
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5. [-/1 Points]

DETAILS

SCALCET9 2.2.004.

Use the given graph of f to state the value of each quantity, if it exists. (If an answer does not exist, enter DNE.)



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

(b) $\lim_{x \rightarrow 2^+} f(x)$

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

(d) $f(2)$

(e) $\lim_{x \rightarrow 4} f(x)$

(f) $f(4)$

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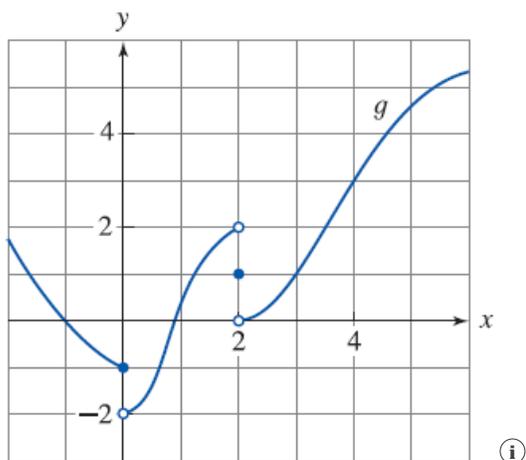
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6. [-/1 Points]

DETAILS

SCALCET9 2.XP.2.002.

Use the graph of g to find the value of each expression. (If an answer does not exist, enter DNE.)



i

(a) $\lim_{x \rightarrow 0^-} g(x)$

(b) $\lim_{x \rightarrow 0^+} g(x)$

(c) $\lim_{x \rightarrow 0} g(x)$

(d) $\lim_{x \rightarrow 2^-} g(x)$

(e) $\lim_{x \rightarrow 2^+} g(x)$

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

(g) $g(2)$

(h) $\lim_{x \rightarrow 4} g(x)$

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7. [-/1 Points]

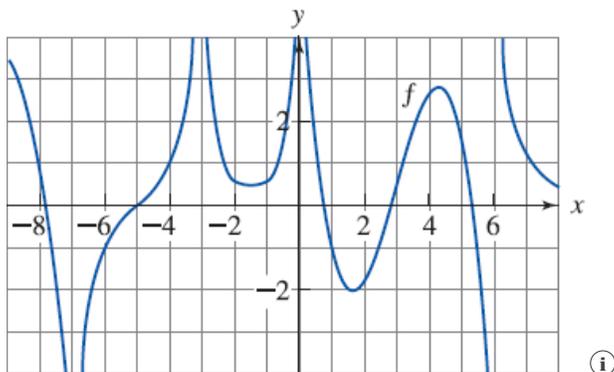
DETAILS

SCALCET9 2.2.009.

For the function f whose graph is shown, state the following. (If the limit is infinite, enter ' ∞ ' or ' $-\infty$ ', as appropriate. If the limit does not otherwise exist, enter DNE.)

Figure

Description



i

(a) $\lim_{x \rightarrow -7} f(x)$

(b) $\lim_{x \rightarrow -3} f(x)$

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

(d) $\lim_{x \rightarrow 6^-} f(x)$

(e) $\lim_{x \rightarrow 6^+} f(x)$

(f) the equations of the vertical asymptotes (Enter your answers as a comma-separated list. If an answer does not exist, enter

DNE.)

$x =$

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8. [-/1 Points]

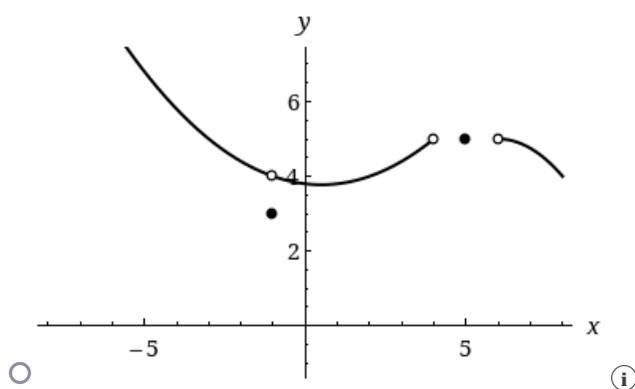
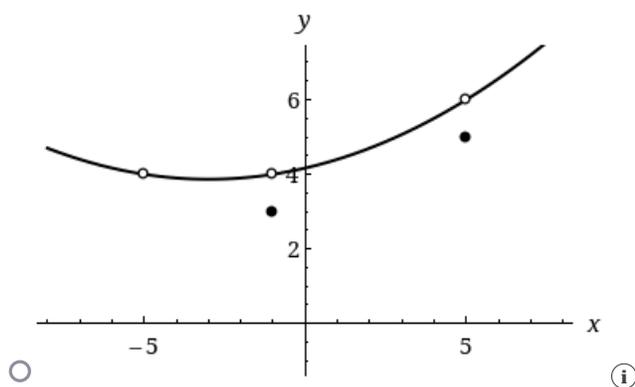
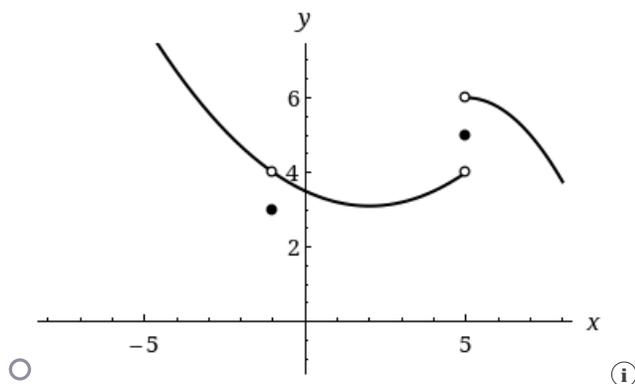
DETAILS

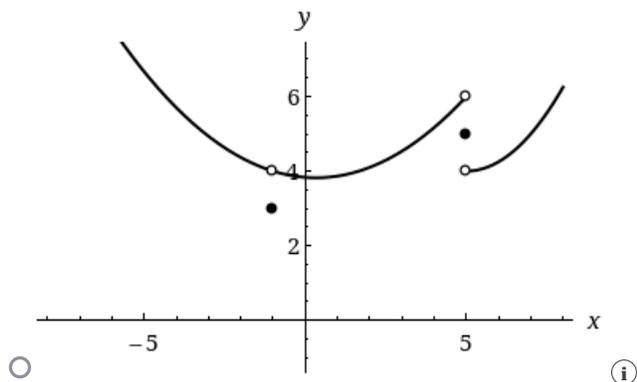
SCALCET9 2.XP.2.006.

PRACTICE ANOTHER

Sketch the graph of a function f that satisfies all of the given conditions.

$$\lim_{x \rightarrow 5^+} f(x) = 6, \quad \lim_{x \rightarrow 5^-} f(x) = 4, \quad \lim_{x \rightarrow -1} f(x) = 4, \quad f(5) = 5, \quad f(-1) = 3$$





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9. [-/1 Points]

DETAILS

SCALCET9 2.2.019.

PRACTICE ANOTHER

Guess the value of the limit (if it exists) by evaluating the function at the given numbers.

$$\lim_{x \rightarrow 5} \frac{x^2 - 5x}{x^2 - 25}, \quad x = 5.1, 5.05, 5.01, 5.001, 5.0001, 4.9, 4.95, 4.99, 4.999, 4.9999$$

Complete the table (correct to six decimal places).

x	$f(x)$	x	$f(x)$
5.1	<input type="text"/>	4.9	<input type="text"/>
5.05	<input type="text"/>	4.95	<input type="text"/>
5.01	<input type="text"/>	4.99	<input type="text"/>
5.001	<input type="text"/>	4.999	<input type="text"/>
5.0001	<input type="text"/>	4.9999	<input type="text"/>

Guess the value of the limit (correct to six decimal places). (If an answer does not exist, enter DNE.)

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10. [-/1 Points]

DETAILS

SCALCET9 2.2.035.MI.

PRACTICE ANOTHER

Determine the infinite limit.

$$\lim_{x \rightarrow (\pi/2)^+} \frac{7}{x} \sec(x)$$

 ∞ $-\infty$

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Master It

11. [-/1 Points]

DETAILS

SCALCET9 2.2.040.

PRACTICE ANOTHER

Determine the infinite limit.

$$\lim_{x \rightarrow 0^+} \left(\frac{3}{x} - \ln(x) \right)$$

 ∞ $-\infty$

Need Help?

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12. [-/1 Points]

DETAILS

SCALCET9 2.2.043.

PRACTICE ANOTHER

Let $f(x) = \frac{4}{x^3 - 1}$ and consider the limits $\lim_{x \rightarrow 1^-} f(x)$ and $\lim_{x \rightarrow 1^+} f(x)$.

- (a) Use a table of values to evaluate $f(x) = \frac{4}{x^3 - 1}$ for values of x that approach 1 from the left and from the right. (Round your answers to one decimal place.)

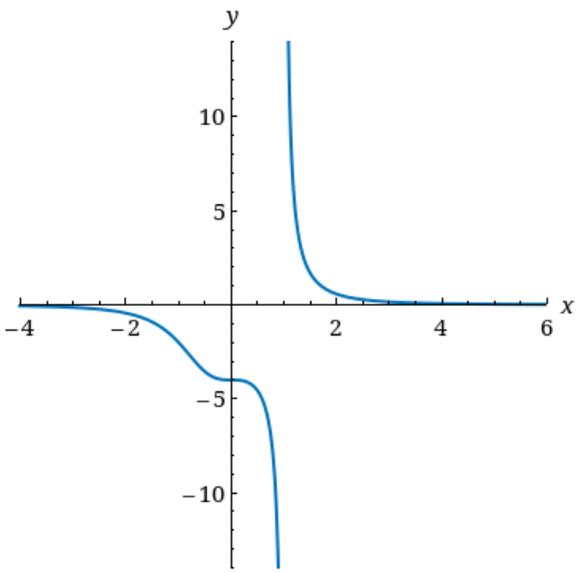
x	$f(x)$	x	$f(x)$
0.5	<input type="text"/>	1.5	<input type="text"/>
0.9	<input type="text"/>	1.1	<input type="text"/>
0.99	<input type="text"/>	1.01	<input type="text"/>
0.999	<input type="text"/>	1.001	<input type="text"/>
0.9999	<input type="text"/>	1.0001	<input type="text"/>
0.99999	<input type="text"/>	1.00001	<input type="text"/>

- (b) Use an analytical argument to find each limit. (If the limit is infinite, enter ' ∞ ' or ' $-\infty$ ', as appropriate. If the limit does not otherwise exist, enter DNE.)

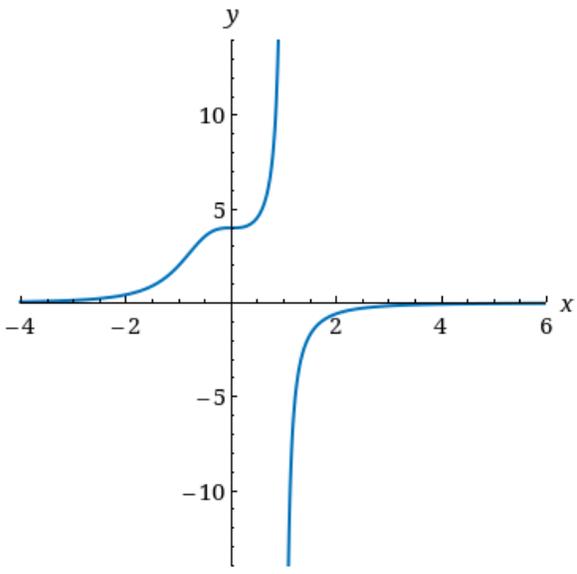
$$\lim_{x \rightarrow 1^-} f(x) =$$

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

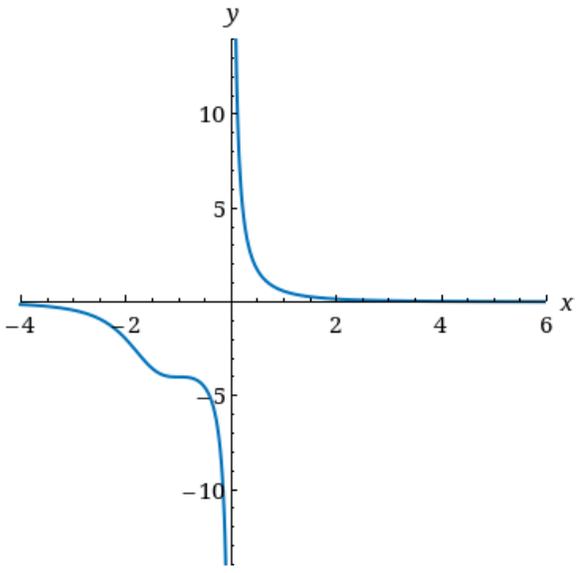
- (c) Sketch a graph of f to confirm your results. (A graphing calculator is recommended.)



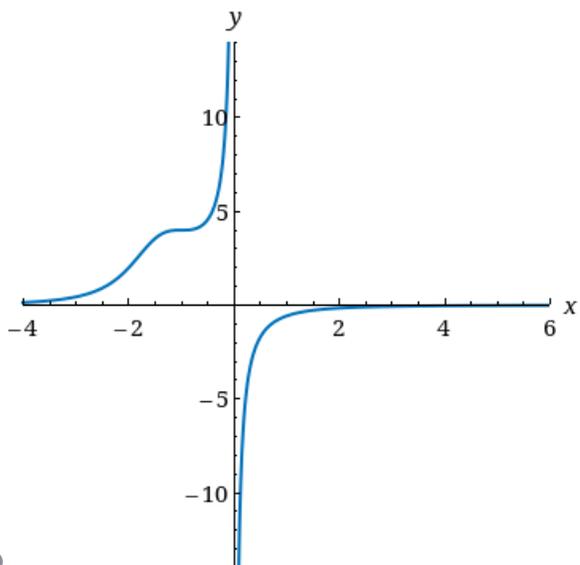
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i



i

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13. [-/1 Points]

DETAILS

SCALCET9 2.XP.2.011.MI.SA.

PRACTICE ANOTHER

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Use a table of values to estimate the value of the limit. If you have a graphing device, use it to confirm your result graphically.

$$\lim_{x \rightarrow 0} \frac{\tan(2x)}{\tan(5x)}$$

[Click here to begin!](#)**Need Help?**[Read It](#)

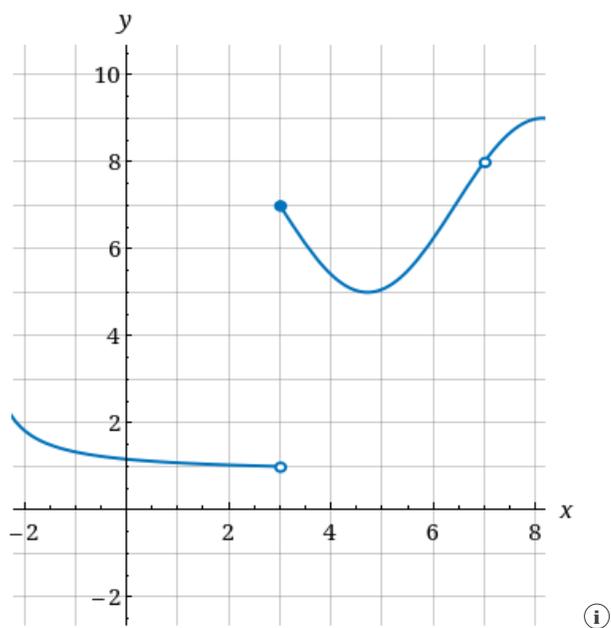
14. [-/1 Points]

DETAILS

SCALCET9 2.XP.2.001.MI.

PRACTICE ANOTHER

Use the given graph of f to state the value of each quantity, if it exists. (If an answer does not exist, enter DNE.)



i

(a) $\lim_{x \rightarrow 3^-} f(x)$

(b) $\lim_{x \rightarrow 3^+} f(x)$

(c) $\lim_{x \rightarrow 3} f(x)$

(d) $\lim_{x \rightarrow 7} f(x)$

(e) $f(7)$

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Master It

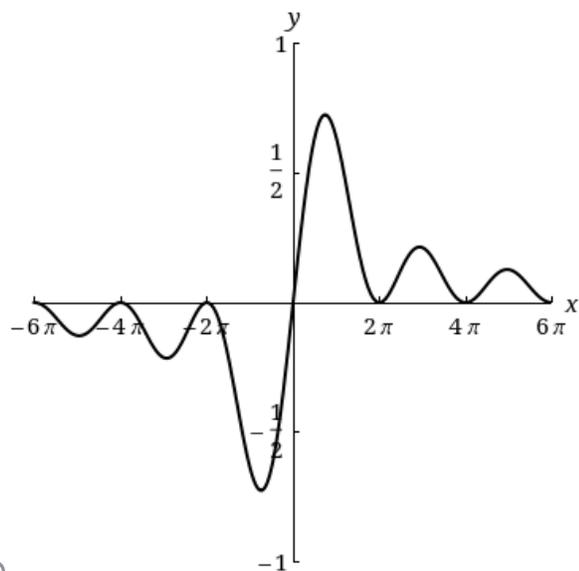
15. [-/1 Points]

DETAILS

SCALCET9 2.JIT.2.008.

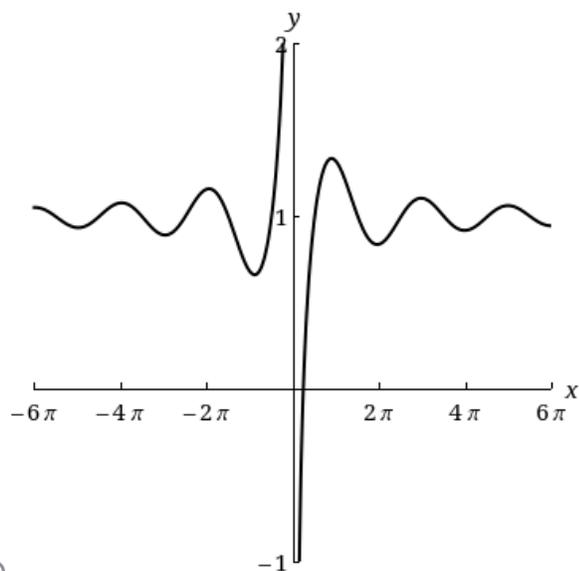
Use a graphing utility to graph the function.

$$f(x) = \frac{1 - \cos(x)}{x}$$



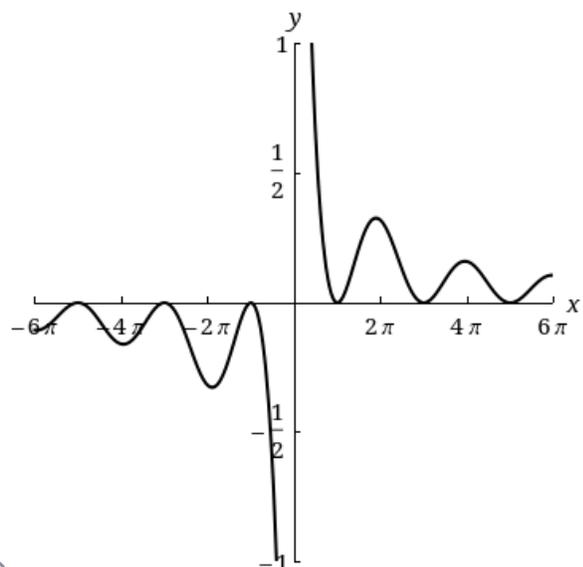
○

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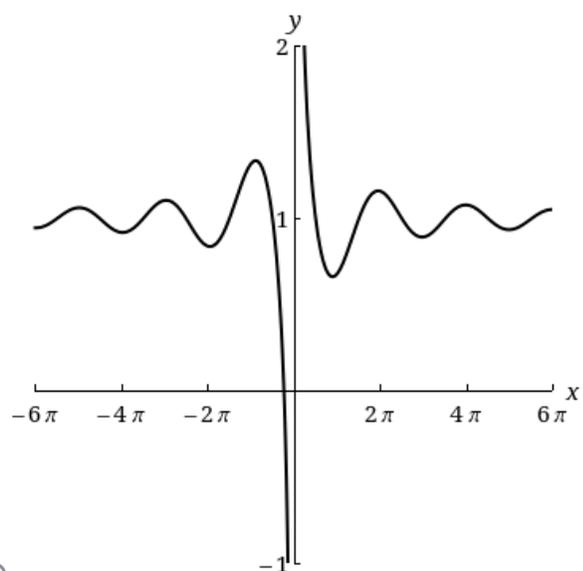
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Describe the behavior of the function as x approaches zero.

- As $x \rightarrow 0$, $f(x) \rightarrow \infty$.
- As $x \rightarrow 0$, $f(x)$ oscillates between -1 and 1 .
- As $x \rightarrow 0$, $f(x) \rightarrow 0$.
- As $x \rightarrow 0$, $f(x) \rightarrow -\infty$.
- As $x \rightarrow 0$, $f(x) \rightarrow 1$.

Need Help? [Read It](#)

16. [-/1 Points]

DETAILS

SCALCET9 2.XP.3.002.

PRACTICE ANOTHER

Evaluate the limit using the appropriate Limit Law(s). (If an answer does not exist, enter DNE.)

$$\lim_{x \rightarrow 3} (2x^3 - 3x^2 + x - 2)$$

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17. [-/1 Points]

DETAILS

SCALCET9 2.XP.3.015.MI.SA.

PRACTICE ANOTHER

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Find the limit.

$$\lim_{h \rightarrow 0} \frac{(2 + h)^3 - 8}{h}$$

[Click here to begin!](#)

Need Help?

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18. [-/1 Points]

DETAILS

SCALCET8 2.3.020.

PRACTICE ANOTHER

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{h \rightarrow 0} \frac{\sqrt{9 + h} - 3}{h}$$

Need Help?

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19. [-/1 Points]

DETAILS

SCALCET9 2.3.020.

PRACTICE ANOTHER

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{u \rightarrow -5} \frac{u + 5}{u^3 + 125}$$

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20. [-/1 Points]

DETAILS

SCALCET9 2.3.028.

PRACTICE ANOTHER

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{t \rightarrow 0} \left(\frac{5}{t} - \frac{5}{t^2 + t} \right)$$

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21. [-/1 Points]

DETAILS

SCALCET9 2.3.029.

PRACTICE ANOTHER

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \rightarrow 25} \frac{5 - \sqrt{x}}{25x - x^2}$$

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22. [-/1 Points]

DETAILS

SCALCET9 2.3.014.MI.SA.

PRACTICE ANOTHER

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Evaluate the limit, if it exists.

$$\lim_{x \rightarrow 6} \frac{x^2 - 6x}{x^2 - 5x - 6}$$

[Click here to begin!](#)

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23. [-/1 Points]

DETAILS

SCALCET9 2.3.025.

PRACTICE ANOTHER

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \rightarrow 2} \frac{\frac{1}{x} - \frac{1}{2}}{x - 2}$$

Need Help?

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24. [-/1 Points]

DETAILS

SCALCET8 2.3.511.XP.

PRACTICE ANOTHER

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{t \rightarrow 25} \frac{25 - t}{5 - \sqrt{t}}$$

Need Help?

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25. [-/1 Points]

DETAILS

SCALCET9 2.3.AE.008.

PRACTICE ANOTHER

EXAMPLE 8[Video Example](#) 

Prove that the limit does not exist.

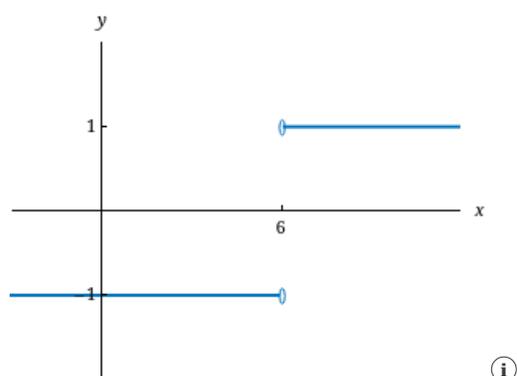
$$\lim_{x \rightarrow 6} \frac{|x - 6|}{x - 6}$$

SOLUTION

$$\lim_{x \rightarrow 6^+} \frac{|x - 6|}{x - 6} = \lim_{x \rightarrow 6^+} \frac{x - 6}{x - 6} = \boxed{}$$

$$\lim_{x \rightarrow 6^-} \frac{|x - 6|}{x - 6} = \lim_{x \rightarrow 6^-} \frac{-(x - 6)}{x - 6} = \boxed{}$$

Since the right- and left-hand limits are different, it follows from [this theorem](#) that the limit does not exist. The graph of the function $f(x) = |x - 6|/(x - 6)$ is shown below and supports the one-sided limits that we found.



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