2.1.5

Find the average rate of change of the function over the given interval.

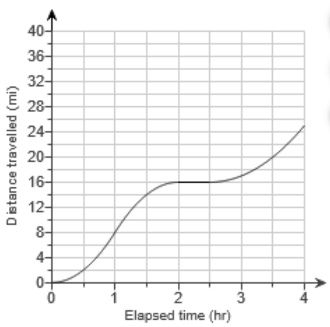
$R(\theta) = \sqrt{4\theta + 1}$;   [2,6]

$\frac{\Delta R}{\Delta \theta} = \frac{1}{2}$ (Simplify your answer.)

2.1.21

Question Help

The accompanying graph shows the total distance s traveled by a bicyclist after t hours.



Using the graph, answer parts **(a)** through **(c)**.

(a) Which of the following is the bicyclist's average speed, in mph, over the time interval [0, 1]?

- A. 58 mph
- B. 8 mph ✔
- C. −8 mph
- D. −58 mph

Which of the following is the bicyclist's average speed, in mph, over the time interval [1, 2.5]?

- A. −5.3 mph
- B. −30 mph
- C. 30 mph
- D. 5.3 mph ✔

Which of the following is the bicyclist's average speed, in mph, over the time interval [2.5, 3.5]?

- A. −4 mph
- B. 4 mph ✔
- C. −54 mph
- D. 54 mph

(b) Which of the following is the bicyclist's instantaneous speed, in mph, at $t = \frac{1}{2}$ hr?

- A. 8 mph ✔
- B. −8 mph
- C. 58 mph
- D. −58 mph

Which of the following is the bicyclist's instantaneous speed, in mph, at t = 2 hrs?

- A. 2 mph
- B. 1 mph
- C. 0 mph ✔
- D. −1 mph

Which of the following is the bicyclist's instantaneous speed, in mph, at t = 3 hrs?

- A. −21 mph
- B. 29 mph
- C. 4 mph ✔
- D. −29 mph

(c) Which of the following choices gives the maximum speed, in mph, and the time at which it occurs?

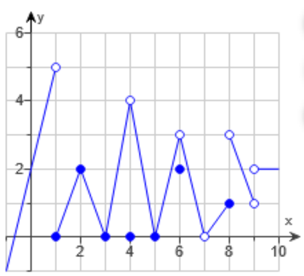
- A. The maximum speed of the bicyclist is 41 mph and it occurs when $t = 3.5$ hrs.
- B. The maximum speed of the bicyclist is 16 mph and it occurs when $t = 1$ hr.
- C. The maximum speed of the bicyclist is 16 mph and it occurs when $t = 3.5$ hrs.
- D. The maximum speed of the bicyclist is 41 mph and it occurs when $t = 1$ hr.

2.2.1

Question Help

For the graph g(x) graphed below, find the following limits, if they exist.

a) $\lim_{x\to 2} g(x)$ b) $\lim_{x\to 1} g(x)$ c) $\lim_{x\to 6} g(x)$



a) Find $\lim_{x\to 2} g(x)$. Select the correct choice below and fill in any answer boxes in your choice.

- A. $\lim_{x\to 2} g(x) = 2$
- B. The limit does not exist.

b) Find $\lim_{x\to 1} g(x)$. Select the correct choice below and fill in any answer boxes in your choice.

- A. $\lim_{x\to 1} g(x) =$
- B. The limit does not exist.

c) Find $\lim_{x\to 6} g(x)$. Select the correct choice below and fill in any answer boxes in your choice.

- A. $\lim_{x\to 6} g(x) = 3$
- B. The limit does not exist.

2.2.14

Evaluate the following limit.

$$\lim_{x\to -3} \left(3x^3 - 4x^2 + 5x + 3\right)$$

$\lim_{x\to -3} \left(3x^3 - 4x^2 + 5x + 3\right) = -129$ (Simplify your answer.)

Score: 10 of 10 pts

5 of 25

2.2.23

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

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

(Type an integer or a simplified fraction.)

Score: 10 of 10 pts

6 of 25

2.2.43

Find the limit.

$\lim_{x\to 0} (2 \sin x - 1)$

$\lim_{x\to 0} (2 \sin x - 1) = -1$ (Type an integer or a simplified fraction.)

Score: 10 of 10 pts

7 of 25

2.2.45

Find the limit.

$\lim_{x\to 0} \sec x$

$\lim_{x\to 0} \sec x = 1$ (Type an integer or a simplified fraction.)

2.2.51

Suppose $\lim_{x\to 0} f(x) = 1$ and $\lim_{x\to 0} g(x) = -7$. Name the rule or limit law that is used to accomplish each step of the following calculation.

$$\lim_{x\to 0}\frac{4f(x)-g(x)}{(f(x)+7)^{1/3}} = \frac{\lim_{x\to 0}(4f(x)-g(x))}{\lim_{x\to 0}(f(x)+7)^{1/3}}$$ Quotient rule

$$= \frac{\lim_{x\to 0}4f(x) - \lim_{x\to 0}g(x)}{\left(\lim_{x\to 0}(f(x)+7)\right)^{1/3}}$$ Difference rule and power rule

$$= \frac{4\lim_{x\to 0}f(x) - \lim_{x\to 0}g(x)}{\left(\lim_{x\to 0}f(x) + \lim_{x\to 0}7\right)^{1/3}}$$ Constant multiple rule and sum rule

$$= \frac{4(1)-(-7)}{(1+7)^{1/3}}$$

$$= \frac{11}{2}$$

2.2.57

Limits of the form $\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ occur frequently in calculus. Evaluate this limit for the given value of x and function f.

$f(x) = x^2$, $x = 3$

The value of the limit is 6. (Simplify your answer.)

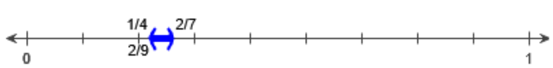
2.3.5

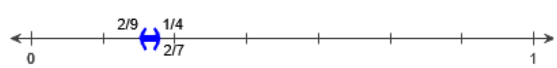
Question Help

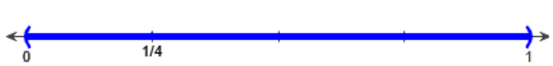
Sketch the interval (a,b) on the x-axis with the point c inside. Then find the largest value of $\delta > 0$ such that for all x, $0 < |x-c| < \delta$ implies $a < x < b$.

$a = \frac{2}{9}$, $b = \frac{2}{7}$, $c = \frac{1}{4}$

Choose the correct sketch below.

A. 

B. 

C. 

D. 

The largest possible value for δ is $\frac{1}{36}$.

(Type a simplified fraction.)

2.3.37

Give an ε-δ proof of the limit fact.

$$\lim_{x \to 0} (7x - 6) = -6$$

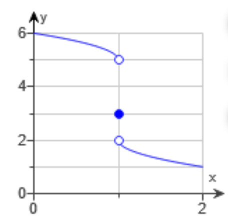
Let $\varepsilon > 0$ be given.

- A. Choose $\delta = \frac{\varepsilon}{6}$. Then $0 < |x - 0| < \delta \Rightarrow |(7x - 6) - 7x| = |-6x| = 6|x| < 6\delta = \varepsilon$.
- B. Choose $\delta = \varepsilon$. Then $0 < |x - 0| < \delta \Rightarrow |(7x - 6) - (-6)| = |7x| < \delta = \varepsilon$.
- C. Choose $\delta = \frac{\varepsilon}{7}$. Then $0 < |x - 0| < \delta \Rightarrow |(7x - 6) - (-6)| = |7x| = 7|x| < 7\delta = \varepsilon$.
- D. Choose $\delta = 7\varepsilon$. Then $0 < |x - 0| < \delta \Rightarrow |(7x - 6) - (-6)| = |7x| = 7|x| < \frac{\delta}{7} = \varepsilon$.
- E. None of the above proofs is correct.

2.3.59

Question Help

For the function graphed to the right, explain why $\lim_{x \to 1} f(x) \neq 2$.



Choose the correct reason below.

- A. The limit of f(x) as x approaches 1 is 3.
- B. The limit of f(x) as x approaches 1 is $\frac{7}{2}$.
- C. The limit of f(x) as x approaches 1 does not exist.
- D. The limit of f(x) as x approaches 1 is 5.

Score: 10 of 10 pts

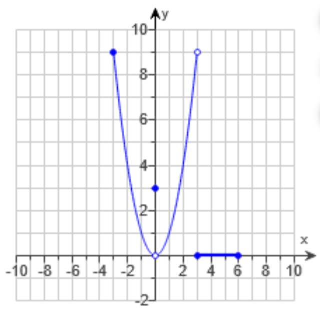
13 of 25

Test Score: 95.56%, 238.89 of 250

2.4.1

Question Help

Use the graph below to determine whether the statements about the function $y = f(x)$ are true or false.



True or false: $\lim_{x \to -3^+} f(x) = 9$.

- False
- True

True or false: $\lim_{x \to 0^-} f(x) = 3$.

- False
- True

True or false: $\lim_{x \to 0^-} f(x) = \lim_{x \to 0^+} f(x)$.

- True
- False

True or false: $\lim_{x \to 0} f(x)$ exists.

- True
- False

True or false: $\lim_{x \to 0} f(x) = 0$.

- False
- True

True or false: $\lim_{x \to 3} f(x) = 9$.

- True
- False

True or false: $\lim_{x \to 6^-} f(x) = 6$.

- False
- True

Score: 10 of 10 pts

14 of 25

2.4.11

Find the following limit.

$$\lim_{x \to -0.25^-} \sqrt{\frac{x+9}{x+2}}$$

$$\lim_{x \to -0.25^-} \sqrt{\frac{x+9}{x+2}} = \sqrt{5}$$

Score: 10 of 10 pts   15 of 25

2.4.21

Use the relation $\lim_{\theta\to 0}\frac{\sin\theta}{\theta} = 1$ to determine the limit of the given function.

$$f(\theta) = \frac{2\sin\sqrt{11\theta}}{\sqrt{11\theta}}$$

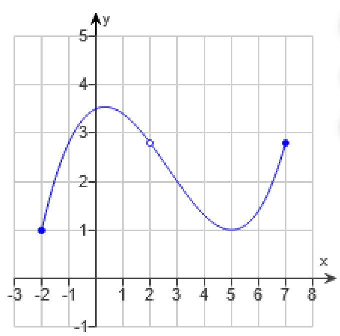
$$\lim_{\theta\to 0}\frac{2\sin\sqrt{11\theta}}{\sqrt{11\theta}} = 2$$

(Type an integer or a simplified fraction.)

Score: 10 of 10 pts   16 of 25   **Test Score:** 95.56%, 238.8

2.5.1   Question

Say whether the function graph below is continuous on $[-2,7]$. If not, where does it fail to be continuous?



Select the correct answer below and, if necessary, fill in the an: complete your choice.

A. The graph is not continuous on the interval .
(Type your answer in interval notation.)

B. The graph is not continuous at x = 2.
(Use a comma to separate answers as needed.)

C. The graph is continuous on $[-2,7]$.

Score: 0 of 10 pts   17 of 25

2.5.15

At what points is the function $y = \frac{x+3}{x^2 - 7x + 12}$ continuous?

Describe the set of x-values where the function is continuous, using interval notation.

$(-\infty,3)\cup(3,4)\cup(4,\infty)$

(Simplify your answer. Type your answer in interval notation.)

You answered: $(-\infty,2)\cup(2,5)\cup(5,\infty)$

Get answer feedback

Score: 10 of 10 pts

18 of 25

2.5.25

Determine the point(s) at which the given function f(x) is continuous.

$f(x) = \sqrt{4x + 28}$

Describe the set of x-values where the function is continuous, using interval notation.

$[-7, \infty)$

(Use interval notation.)

Score: 8.89 of 10 pts

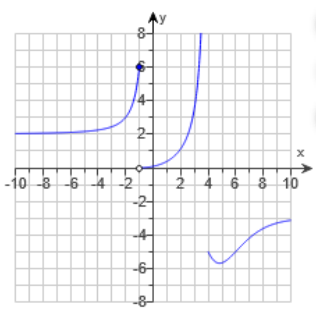
19 of 25

Test Score: 95.56%, 238.89 of 250

2.6.1

Question Help

Using the following graph of the function f, evaluate the limits **(a)** through **(i)**.



(a) Select the correct choice below and fill in the answer box within the choice.

A. $\lim_{x \to 6} f(x) = -5$

B. $\lim_{x \to 6} f(x)$ does not exist.

(b) $\lim_{x \to -1^+} f(x) = 0$

(c) $\lim_{x \to -1^-} f(x) = 6$

(d) Select the correct choice below and fill in the answer box within the choice.

A. $\lim_{x \to -1} f(x) =$

B. $\lim_{x \to -1} f(x)$ does not exist.

(e) $\lim_{x \to 4^+} f(x) = -5$

(f) $\lim_{x \to 4^-} f(x) = \infty$

(g) Select the correct choice below and fill in the answer box within the choice.

A. $\lim_{x \to 4} f(x) =$

B. $\lim_{x \to 4} f(x)$ does not exist.

(h) $\lim_{x \to \infty} f(x) = -3$

(i) $\lim_{x \to -\infty} f(x) = 2$

Score: 10 of 10 pts

2.6.13

Find the limit of $f(x) = \frac{4x+2}{5x+3}$ as x approaches ∞ and as x approaches $-\infty$.

$\lim_{x \to \infty} f(x) = \frac{4}{5}$
(Type a simplified fraction.)

$\lim_{x \to -\infty} f(x) = \frac{4}{5}$
(Type a simplified fraction.)

Score: 10 of 10 pts

2.6.19

Find the limit of $f(x) = \frac{7x^8 + 4x^7 + 6}{6x^9}$ as x approaches ∞ and as x approaches $-\infty$.

$\lim_{x \to \infty} f(x) = 0$
(Type a simplified fraction.)

$\lim_{x \to -\infty} f(x) = 0$
(Type a simplified fraction.)

Score: 10 of 10 pts

2.6.37

Find the limit.

$$\lim_{x \to 0^+} \frac{-1}{14x}$$

$$\lim_{x \to 0^+} \frac{-1}{14x} = -\infty$$

(Simplify your answer.)

Score: 10 of 10 pts ◀ 23 of 25 ▼ ▶

2.6.49

Find the limit.

$$\lim_{x \to (15\pi/2)^+} -8\tan x$$

$$\lim_{x \to (15\pi/2)^+} -8\tan x = \infty$$

(Simplify your answer.)

Score: 10 of 10 pts ◀ 24 of 25 ▼ ▶ **Test Score:** 95.56%, 238.89 of

2.6.67

Question Help

Find the horizontal and vertical asymptotes of f(x). Then graph f(x).

$$f(x) = \frac{x+7}{x+5}$$

If there is a horizontal asymptote, what is it? Select the correct choice below and fill in any answer boxes within your choice.

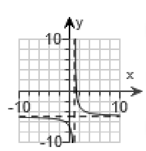
- A. The horizontal asymptote is $y = 1$. (Type an equation.)
- B. There is no horizontal asymptote.

If there is a vertical asymptote, what is it? Select the correct choice below and fill in any answer boxes within your choice.

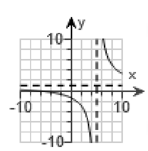
- A. The vertical asymptote is $x = -5$. (Type an equation.)
- B. There is no vertical asymptote.

Choose the correct graph of f(x).

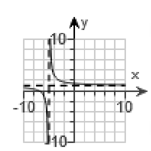
A.



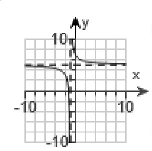
B.



C.



D.



Score: 10 of 10 pts | 25 of 25 | Test Score: 95.56%, 238.89 of 250

2.6.73

Question Help

Find a function that satisfies the given conditions and sketch its graph.

$$\lim_{x \to \pm\infty} f(x) = 2, \quad \lim_{x \to 3^-} f(x) = \infty, \text{ and } \lim_{x \to 3^+} f(x) = \infty$$

Which of the following functions satisfies the given conditions?

A. $\ln(x-6)$

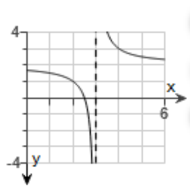
B. $\frac{1}{x-3} + 2$

C. $-\frac{1}{(x-3)^2} + 2$

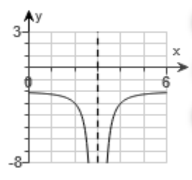
D. $\frac{1}{(x-3)^2} + 2$ ✔

Graph this function. Choose the correct graph below.

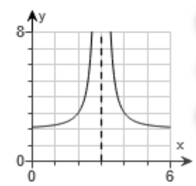
A.



B.



C. ✔



D.