Section 1.1

1. Decide whether the following problem can be solved using precalculus, or whether calculus is required. If the problem can be solved using precalculus, solve it. If the problem seems to require calculus, use a graphical or numerical approach to estimate the solution.

Find the distance traveled in 16 seconds by an object traveling at a constant velocity of 20 feet per second.

a. calculus, 320 ft
b. calculus, 340 ft
c. precalculus, 320 ft
d. calculus, 640 ft
e. precalculus, 640 ft

ANSWER:	c
POINTS:	1
DIFFICULTY:	Easy
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus. PCAL.COH.LO.01.01.08 - Evaluate functions for given values of the independent variable. PCAL.COH.LO.01.01.11 - Express a function algebraically, given its verbal or numerical representation.
OTHER:	Skill
DATE CREATED:	11/25/2013 2:52 PM
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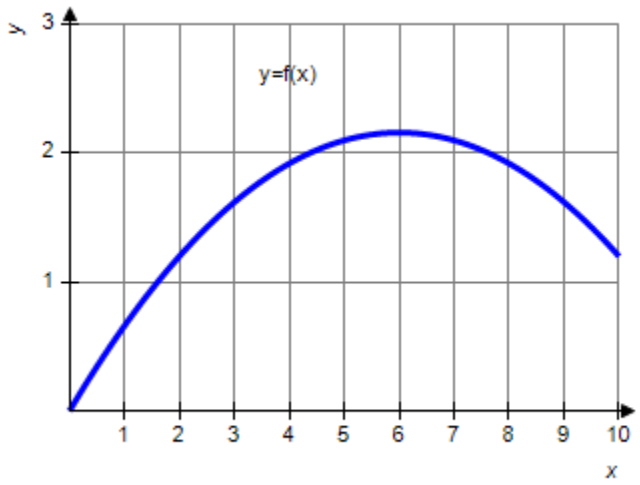
2. Decide whether the following problem can be solved using precalculus, or whether calculus is required. If the problem can be solved using precalculus, solve it. If the problem seems to require calculus, use a graphical or numerical approach to estimate the solution.

A cyclist is riding on a path whose elevation is modeled by the function $f(x) = 0.06(12x - x^2)$ where x and $f(x)$ are measured in miles. Find the rate of change of elevation when $x = 3$.

Section 1.1



a. precalculus, 0.06
b. calculus, 0.18
c. calculus, 0.36
d. calculus, 0.06
e. precalculus, 0.18

ANSWER: c
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.1
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.02.02.06 - Solve applied and mathematical problems using derivatives of polynomial and constant functions.
LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus.
OTHER: Skill
DATE CREATED: 11/25/2013 2:52 PM
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3. Decide whether the following problem can be solved using precalculus, or whether calculus is required. If the problem can be solved using precalculus, solve it. If the problem seems to require calculus, use a graphical or numerical approach to estimate the solution.

Find the distance traveled in 18 seconds by an object moving with a velocity of $v(t) = 12 + 5\cos t$ feet per second. Round your answer to four decimal places.

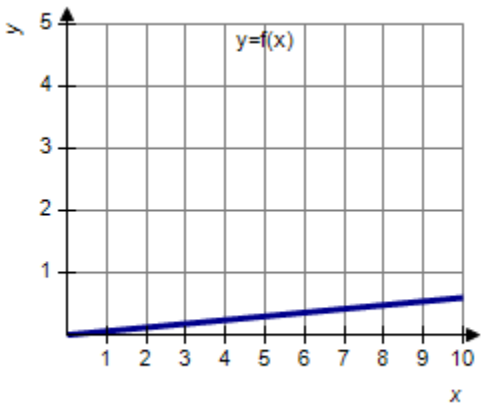
a. calculus, 219.3016 ft
b. precalculus, 220.6516 ft
c. calculus, 212.2451 ft
d. precalculus, 212.2451 ft
e. precalculus, 219.3016 ft

Section 1.1

ANSWER:	c
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.04.03.10 - Solve applied and mathematical problems using definite integrals. LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus.
OTHER:	Skill
DATE CREATED:	11/25/2013 2:52 PM
DATE MODIFIED:	5/20/2022 1:31 AM

4. Decide whether the following problem can be solved using precalculus, or whether calculus is required. If the problem can be solved using precalculus, solve it. If the problem seems to require calculus, use a graphical or numerical approach to estimate the solution.

A cyclist is riding on a path whose elevation is modeled by the function $f(x) = 0.06x$ where *x* and *f(x)* are measured in miles. Find the rate of change of elevation when x = 1.5. Round your answer to two decimal places, if necessary.



a. calculus, 0.18
b. precalculus, 0.06
c. calculus, 0.06
d. precalculus, 0.18
e. precalculus, 0.31

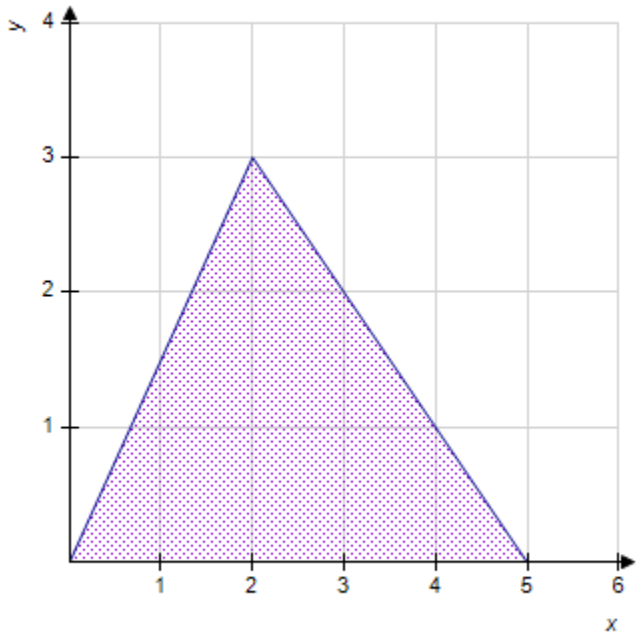
ANSWER:	b
POINTS:	1
DIFFICULTY:	Easy
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic

Section 1.1

LEARNING OBJECTIVES: LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus.
PCAL.COH.LO..01.2.11 - Solve applied problems involving rates of change.
OTHER: Skill
DATE CREATED: 11/25/2013 2:52 PM
DATE MODIFIED: 5/20/2022 1:35 AM

5. Decide whether the following problem can be solved using precalculus, or whether calculus is required. If the problem can be solved using precalculus, solve it. If the problem seems to require calculus, use a graphical or numerical approach to estimate the solution.

Find the area of the shaded region bounded by the triangle with vertices $(0, 0)$, $(2, 3)$, $(5, 0)$.



a. precalculus, 15
b. calculus, 22.5
c. precalculus, 7.5
d. precalculus, 22.5
e. calculus, 15

ANSWER: c
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.1
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus.
PCAL.COH.LO.01.01.08 - Evaluate functions for given values of the independent variable.

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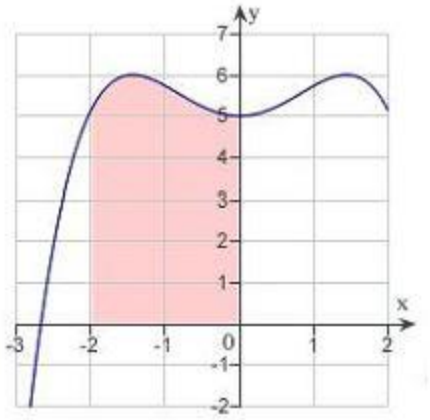
	PCAL.COH.LO.01.02.03 - Graph functions using a graphing tool.
OTHER:	Skill
DATE CREATED:	11/25/2013 2:52 PM
DATE MODIFIED:	5/20/2022 1:53 AM

6. Decide whether the following problem can be solved using precalculus, or whether calculus is required. If the problem can be solved using precalculus, solve it. If the problem seems to require calculus, use a graphical or numerical approach to estimate the solution.

Find the area of the shaded region. Round your answer to the whole number.



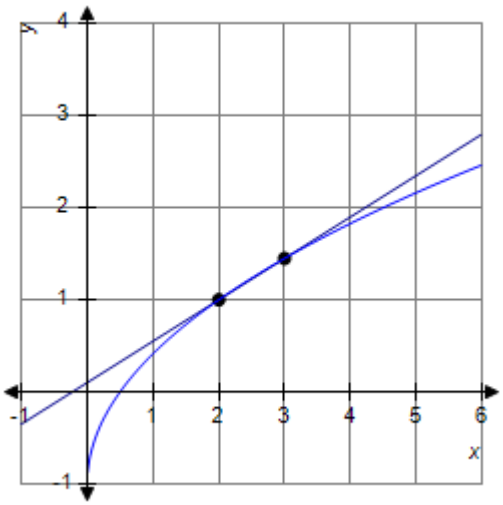
a. calculus , 11
b. precalculus , 11
c. precalculus , 13
d. calculus , 16
e. precalculus , 16

ANSWER:	a
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.04.03.02 - Approximate definite integrals using the Midpoint Rule. LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus.
OTHER:	Skill
DATE CREATED:	11/25/2013 2:52 PM
DATE MODIFIED:	5/20/2022 1:56 AM

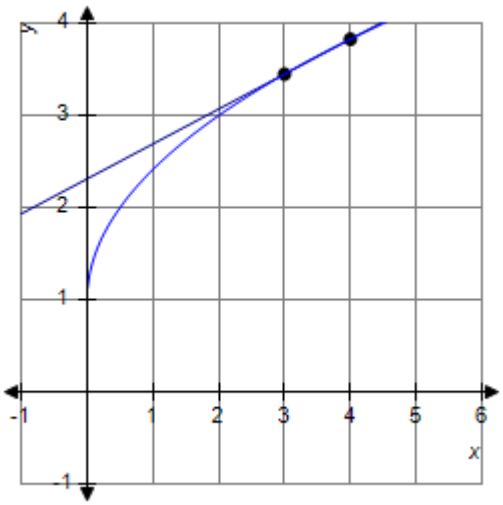
7. Consider the function $f(x) = \sqrt{2x}$ and the point $P(2, 2)$ on the graph of f. Graph f and the secant line passing through $P(2, 2)$ and $Q(x, f(x))$ for $x = 3$.

a. b.

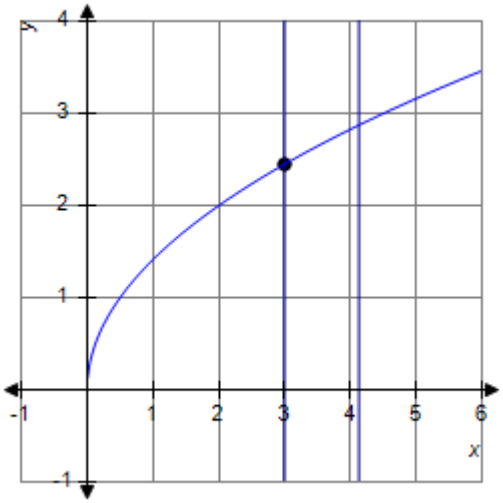
Section 1.1



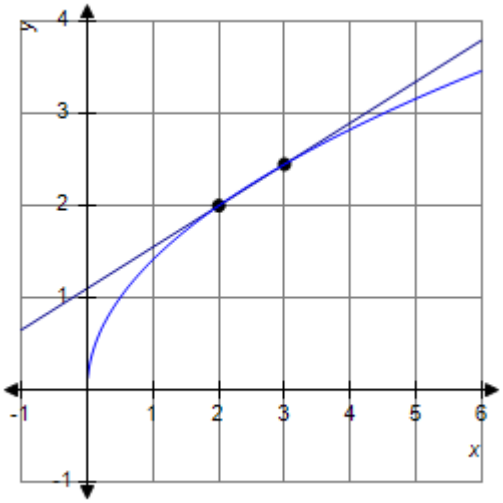
c.

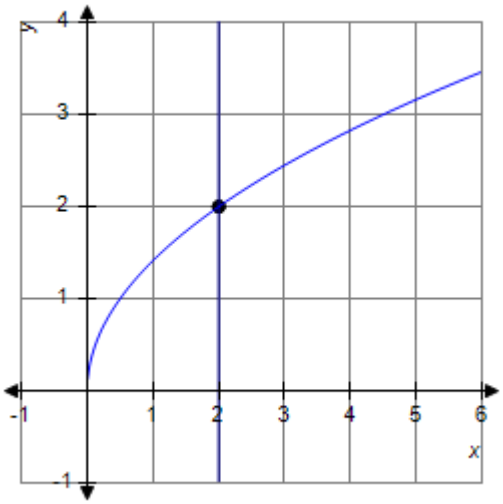


d.



e.





Section 1.1

ANSWER:	d
POINTS:	1
DIFFICULTY:	Easy
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.06.02 - Find the equation of a secant line of a curve. LCalc11.1.1.0 - A Preview of Calculus PCAL.COH.LO.01.02.01 - Sketch graphs of functions by point plotting.
OTHER:	Skill
DATE CREATED:	11/25/2013 2:52 PM
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8. Consider the function $f(x) = \sqrt{x}$ and the point $P(25, 5)$ on the graph of *f*. Find the slope of the secant line passing through $P(25, 5)$ and $Q(x, f(x))$ for $x = 2$. Round your answer to four decimal places.

a. $m = 0.1559$
b. $m = 0.0379$
c. $m = 0.0370$
d. $m = 0.3692$
e. $m = 0.1429$

ANSWER:	a
POINTS:	1
DIFFICULTY:	Easy
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.06.01 - Find the slope of a secant line of a curve. LCalc11.1.1.0 - A Preview of Calculus
OTHER:	Skill
DATE CREATED:	11/25/2013 2:52 PM
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9. Consider the function $f(x) = \sqrt{x}$ and the point $P(25, 5)$ on the graph of *f*.

Consider the secant lines passing through $P(25, 5)$ and $Q(x, f(x))$ for *x* values of 22, 24, and 26. Find the slope of each secant line to four decimal places. Round your answers to four decimal places, if necessary.

(Think about how you could use your results to estimate the slope of the tangent line of *f* at $P(25, 5)$, and how to improve your approximation of the slope.)

a. 0.1032 , 0.101 , 0.0495
b. 0.1032 , –0.101 , 0.099

Section 1.1

c. 0.0516 , 0.0505 , 0.0495
d. 0.1032 , 0.101 , 0.099
e. –0.0516 , –0.0505 , –0.0495

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.1
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.06.05 - Find the slope of a tangent line to a curve at a given point.
LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus.
OTHER: Skill
DATE CREATED: 11/25/2013 2:52 PM
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10. Consider the function $f(x) = \sqrt{x}$ and the point $P(4, 2)$ on the graph of *f*. Estimate the slope *m* of the tangent line of *f* at $P(4, 2)$. Round your answer to four decimal places.

a. $m = 0.2500$
b. $m = 0.1663$
c. $m = 0.4633$
d. $m = 0.1250$
e. $m = 0.1667$

ANSWER: a
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.1
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.06.05 - Find the slope of a tangent line to a curve at a given point.
LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus.
OTHER: Skill
DATE CREATED: 11/25/2013 2:52 PM
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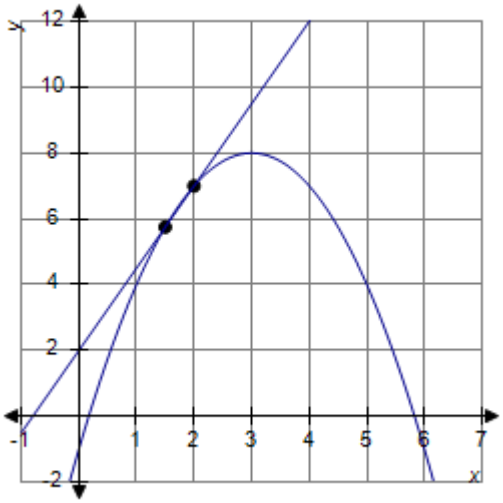
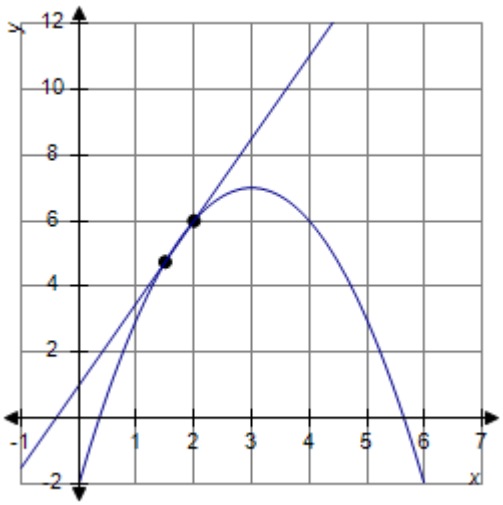
11. Consider the function $f(x) = 6x - x^2$ and the point $P(2, 8)$ on the graph of *f*. Graph *f* and the secant line passing through $P(2, 8)$ and $Q(x, f(x))$ for x = 1.5.

a. b.

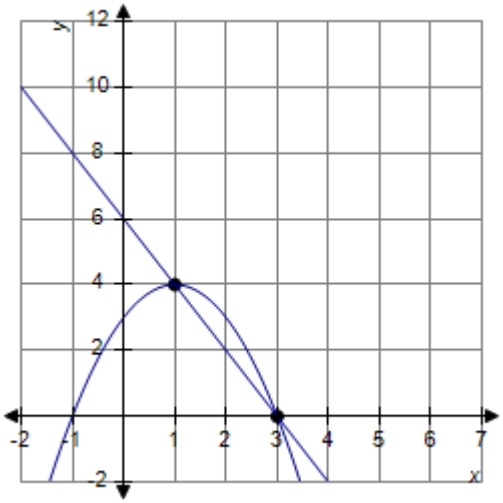
Section 1.1

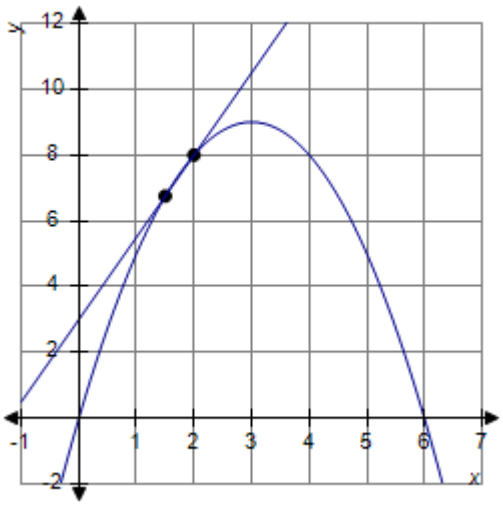


c.

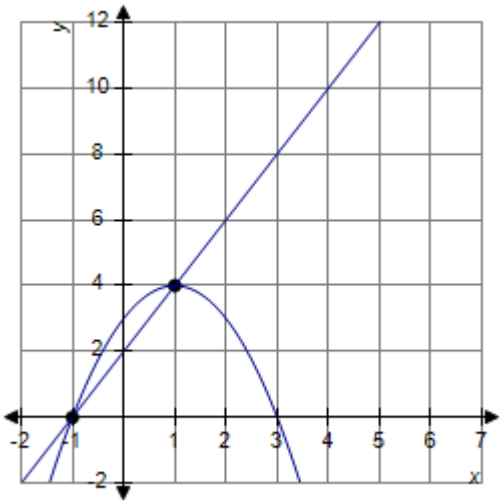


d.





e.



Section 1.1

ANSWER: d
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.1
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.06.02 - Find the equation of a secant line of a curve.
LCalc11.1.1.0 - A Preview of Calculus
PCAL.COH.LO.01.02.01 - Sketch graphs of functions by point plotting.
OTHER: Skill
DATE CREATED: 11/25/2013 2:52 PM
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12. Consider the function $f(x) = 10x - x^2$ and the point $P(4, 24)$ on the graph of *f*. Find the slope of the secant line passing through $P(4, 24)$ and $Q(x, f(x))$ for $x = 3$. Round your answer to one decimal place.

a. 4.5
b. 3.0
c. 2.0
d. 3.5
e. 7.0

ANSWER: b
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.1
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.06.01 - Find the slope of a secant line of a curve.
LCalc11.1.1.0 - A Preview of Calculus
OTHER: Skill
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13. Consider the function $f(x) = 7x - x^2$ and the point $P(1, 6)$ on the graph of *f*. Estimate the slope of the tangent line of *f* at $P(1, 6)$. Round your answer to the whole number.

a. 9
b. 6
c. 7
d. 5
e. 8

ANSWER: d

Section 1.1

POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.06.05 - Find the slope of a tangent line to a curve at a given point. LCalc11.1.1.2 - Understand that the tangent line problem is basic to calculus.
OTHER:	Skill
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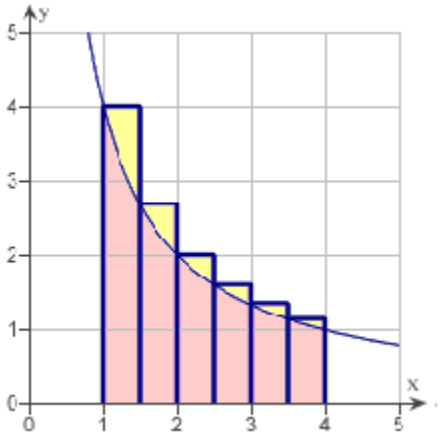
14. Use the rectangles in the graph given below to approximate the area of the region bounded by $y = \frac{4}{x}$, $y = 0$, $x = 1$, and $x = 4$. Round your answer to three decimal places.



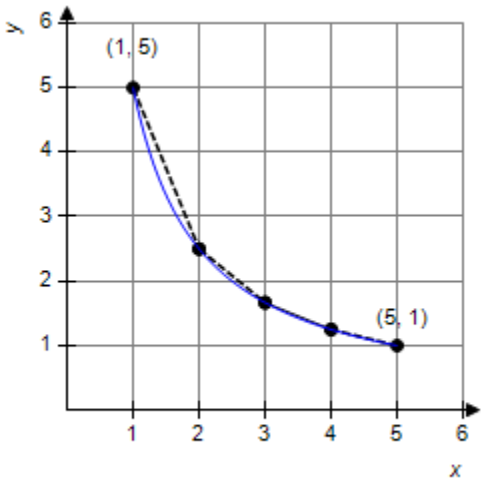
a. 2.476 units^2
b. 6.371 units^2
c. 3.573 units^2
d. 6.375 units^2
e. 6.895 units^2

ANSWER:	b
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.04.02.01 - Approximate the area under a curve using rectangles and the Midpoint Rule.

Section 1.1

	LCalc11.1.1.3 - Understand that the area problem is also basic to calculus.
OTHER:	Skill
DATE CREATED:	11/25/2013 2:52 PM
DATE MODIFIED:	5/20/2022 4:27 AM

15. Consider the length of the graph of $f(x) = \frac{5}{x}$ from $(1, 5)$ to $(5, 1)$. Approximate the length of the curve by finding the sum of the lengths of four line segments, as shown in following figure. Round your answer to two decimal places.



a. 6.11
b. 8.12
c. 5.66
d. 8.49
e. 7.11

ANSWER:	a
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.1
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.06.05.03 - Approximate definite integrals using the Trapezoidal Rule. LCalc11.1.1.0 - A Preview of Calculus
OTHER:	Skill
DATE CREATED:	11/25/2013 2:52 PM
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Section 1.2

1. Complete the table and use the result to estimate the limit. Round your answer to six decimal places.

$$\lim_{x \to -8} \frac{x + 8}{x^2 + 11x + 24}$$

x	–8.1	–8.01	–8.001	–7.999	–7.99	–7.9
$f(x)$						

a. 0.425000
b. 0.175000
c. –0.200000
d. 0.300000
e. –0.575000

ANSWER: c
POINTS: 1
DIFFICULTY: Medium
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.01.02 - Find a limit of a function numerically.
LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
DATE CREATED: 4/27/2016 6:34 AM
DATE MODIFIED: 5/20/2022 4:36 AM

2. Complete the table and use the result to estimate the limit. Round your answer to six decimal places.

$$\lim_{x \to 6} \frac{\frac{1}{x-4} - \frac{1}{2}}{x-6}$$

x	5.9	5.99	5.999	6.001	6.01	6.1
$f(x)$						

a. –0.250000
b. –0.120000
c. –0.380000
d. –0.140000
e. –0.360000

ANSWER: a
POINTS: 1
DIFFICULTY: Medium
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.01.02 - Find a limit of a function numerically.
LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
DATE CREATED: 4/27/2016 1:30 PM

Section 1.2

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3. Complete the table and use the result to estimate the limit.

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

x	–0.1	–0.01	–0.001	0.001	0.01	0.1
$f(x)$						

a. –1
b. –0.5
c. 0
d. 0.5
e. 1

ANSWER: c
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.2
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.02 - Find a limit of a function numerically.
LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
OTHER: Skill
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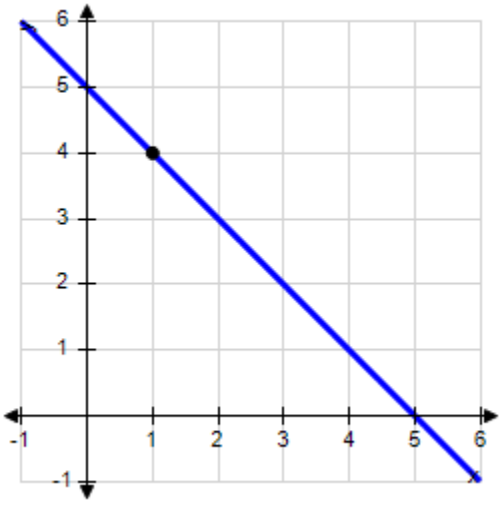
4. Determine the following limit. (Hint: Use the graph to calculate the limit.)

$$\lim_{x \to 1} (5 - x)$$

Section 1.2



a. 6
b. 1
c. 5
d. 4
e. does not exist

ANSWER: d
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.2
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.03 - Find a limit of a function graphically.
LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
OTHER: Skill
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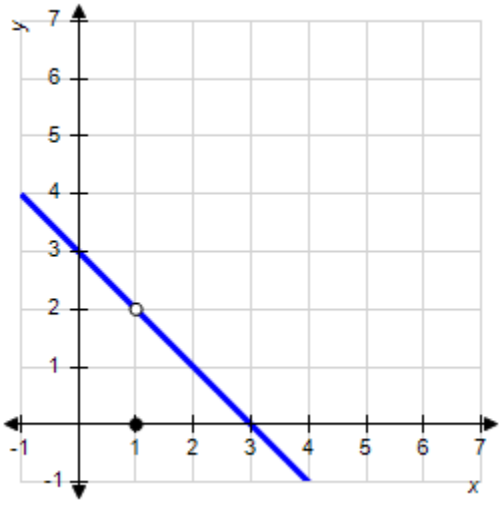
DATE MODIFIED: 5/20/2022 4:46 AM

5. Let $f(x) = \begin{cases} 3 - x, & x \neq 1 \\ 0, & x = 1 \end{cases}$.

Determine the following limit. (Hint: Use the graph to calculate the limit.)

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

Section 1.2



a. 4
b. 3
c. 2
d. 0
e. does not exist

ANSWER: c
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.2
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.03 - Find a limit of a function graphically.
LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
OTHER: Skill
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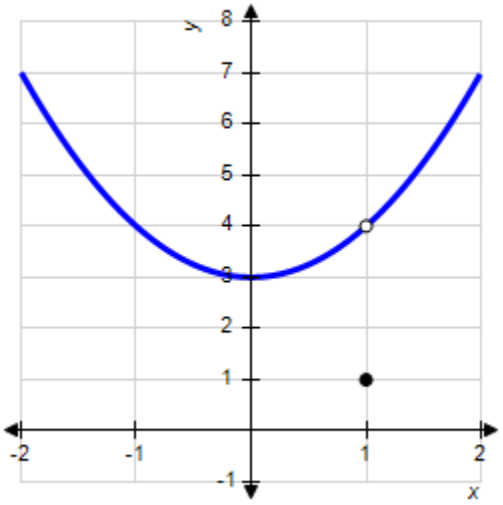
6. Let $f(x) = \begin{cases} x^2 + 3, & x \neq 1 \\ 1, & x = 1 \end{cases}$.

Determine the following limit. (Hint: Use the graph to calculate the limit.)

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

Section 1.2



a. 4
b. 9
c. 1
d. 3
e. does not exist.

ANSWER:	a
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.2
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.01.03 - Find a limit of a function graphically. LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
OTHER:	Skill
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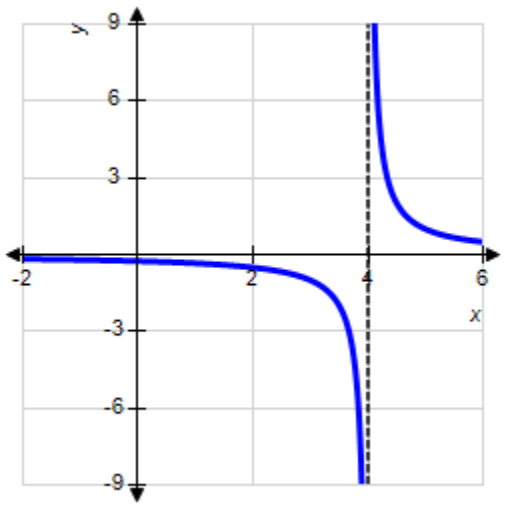
7. Determine the following limit. (Hint: Use the graph to calculate the limit.)

$$\lim_{x \to 4} \frac{1}{x - 4}$$

Section 1.2



a. –4
b. 0
c. –8
d. 4
e. does not exist

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.2
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.03 - Find a limit of a function graphically.
LCalc11.1.2.2 - Learn different ways that a limit can fail to exist.
OTHER: Skill
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8. A ring has an inner circumference of 11 centimeters. What is the radius of the ring? Round your answer to four decimal places.

a. 0.8754 centimeter
b. 3.5014 centimeters
c. 1.7507 centimeters
d. 1.8712 centimeters
e. 12.2599 centimeters

ANSWER: c
POINTS: 1
DIFFICULTY: Easy

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REFERENCES:	Section 1.2
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	LCalc11.1.2.0 - Finding Limits Graphically and Numerically PCAL.COH.LO.01.01.08 - Evaluate functions for given values of the independent variable. PCAL.COH.LO.01.01.11 - Express a function algebraically, given its verbal or numerical representation.
OTHER:	Application
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9. A ring has an inner circumference of 11 centimeters. If the ring's inner circumference can vary between 10.5 centimeters and 12 centimeters, how can the radius vary? Round your answer to five decimal places.

a. Radius can vary between 11.17066 centimeters and 14.59025 centimeters.
b. Radius can vary between 1.82818 centimeters and 1.95441 centimeters.
c. Radius can vary between 1.67113 centimeters and 1.90986 centimeters.
d. Radius can vary between 3.34225 centimeters and 3.81972 centimeters.
e. Radius can vary between 1.25070 centimeters and 2.75070 centimeters.

ANSWER:	c
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.2
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	LCalc11.1.2.0 - Finding Limits Graphically and Numerically PCAL.COH.LO.01.01.08 - Evaluate functions for given values of the independent variable. PCAL.COH.LO.01.01.11 - Express a function algebraically, given its verbal or numerical representation.
OTHER:	Application
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10. A sphere has a volume of 3.68 cubic inches. What is the radius of the sphere? Round your answer to four decimal places.

a. 0.9578 inch
b. 1.5203 inches
c. 0.9373 inch
d. 1.8746 inches
e. 1.7001 inches

ANSWER: a

Section 1.2

POINTS:	1
DIFFICULTY:	Easy
REFERENCES:	Section 1.2
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	LCalc11.1.2.0 - Finding Limits Graphically and Numerically PCAL.COH.LO.01.01.08 - Evaluate functions for given values of the independent variable. PCAL.COH.LO.01.01.11 - Express a function algebraically, given its verbal or numerical representation.
OTHER:	Application
DATE CREATED:	11/25/2013 2:52 PM
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11. A sphere has a volume of 4.68 cubic inches. If the sphere's volume can vary between 3.88 cubic inches and 5.88 cubic inches, how can the radius vary? Round your answer to five decimal places.

a. Radius can vary between 0.96244 inch and 1.18480 inches.
b. Radius can vary between 0.23765 inch and 2.23765 inches.
c. Radius can vary between 1.74566 inches and 2.14899 inches.
d. Radius can vary between 1.54739 inches and 1.77739 inches.
e. Radius can vary between 0.97480 inch and 1.11969 inches.

ANSWER:	e
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.2
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	LCalc11.1.2.0 - Finding Limits Graphically and Numerically PCAL.COH.LO.01.01.08 - Evaluate functions for given values of the independent variable. PCAL.COH.LO.01.01.11 - Express a function algebraically, given its verbal or numerical representation.
OTHER:	Application
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12. Find the limit L.

$$\lim_{x \to 8} (x + 2)$$

a. $L = 10$
b. $L = 2$
c. $L = 8$

d. $L = 18$

e. none of the above

ANSWER: a
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.2
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.02 - Find a limit of a function numerically.
LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
OTHER: Skill
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13. Find the limit L.

$$\lim_{x \to -7} \left(x^2 + 4x\right)$$

a. $L = 77$

b. $L = 56$

c. $L = 42$

d. $L = 21$

e. none of the above

ANSWER: d
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.2
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.02 - Find a limit of a function numerically.
LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
OTHER: Skill
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14. What is the limit of $f(x) = 7$ as x approaches π?

a. $\lim_{x \to \pi} (7) = \pi$

b. $\lim_{x \to \pi} (7) = 7$

c. $\lim_{x \to \pi} (7) = \frac{\pi}{7}$

Section 1.2

d. $\lim_{x \to \pi} (7) = 7\pi$

e. none of the above

ANSWER: b
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.2
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.02 - Find a limit of a function numerically.
LCalc11.1.2.1 - Estimate a limit using a numerical or graphical approach.
OTHER: Skill
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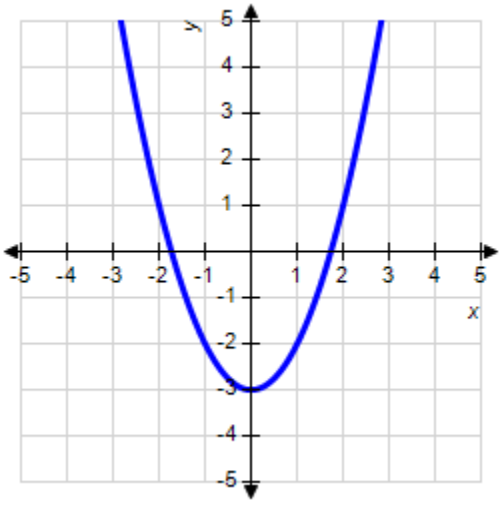
15. The graph of $f(x) = x^2 - 3$ is shown in the figure. Find δ such that if $0 < |x - 4| < \delta$, then $|f(x) - 13| < 0.2$.



a. $\delta = \sqrt{16.2} - 4$

b. $\delta = \sqrt{16.2} + 4$

c. $\delta = \sqrt{13} - 4$

d. $\delta = \sqrt{13} - 3$

e. None of the above

ANSWER: a
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.2

Section 1.2

QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.02.08 - Given a value of epsilon, find the value of delta using the epsilon-delta definition of a limit. LCalc11.1.2.3 - Study and use a formal definition of limit
OTHER:	Skill
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Section 1.3

1. Find the limit.

$$\lim_{x \to -2} 4x^2 + 8x$$

a. 24
b. –8
c. 32
d. –32
e. 0

ANSWER: e
POINTS: 1
DIFFICULTY: Easy
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.02.02 - Evaluate limits using direct substitution.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
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2. Find the limit.

$$\lim_{x \to 4} \frac{x}{x^2 + 1}$$

a. $\frac{1}{5}$
b. $\frac{1}{3}$
c. $\frac{4}{17}$
d. $\frac{4}{5}$
e. $\frac{4}{9}$

ANSWER: c
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.02 - Evaluate limits using direct substitution.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill

Section 1.3

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3. Find the limit. Round your answer to the whole number, if necessary.

$$\lim_{x \to 2} \frac{\sqrt{x+23}}{x-1}$$

a. 3
b. –5
c. –3
d. 5
e. 2

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.02 - Evaluate limits using direct substitution.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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4. Let $f(x) = -5x - 2$ and $g(x) = x^4$. Find the limit.

$$\lim_{x \to 4} g(f(x))$$

a. –1,264
b. 256
c. –1,282
d. 234,256
e. 16

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.02.04 - Evaluate limits of composite functions.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
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Section 1.3

5. Let $f(x) = 6 + 5x^2$ and $g(x) = \sqrt{x+2}$. Find the limit.

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

a. $2\sqrt{2}$
b. $2\sqrt{7}$
c. $\sqrt{26}$
d. $3\sqrt{2}$
e. $\sqrt{2}$

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.02.04 - Evaluate limits of composite functions.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
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6. Let $f(x) = -2x^2 + 3x - 1$ and $g(x) = \sqrt[3]{x+15}$. Find the limits.

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

a. $\sqrt[3]{36}$
b. $-\sqrt[3]{6}$
c. $\sqrt[3]{21}$
d. $-\sqrt[3]{21}$
e. $-\sqrt[3]{36}$

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.02.04 - Evaluate limits of composite functions.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
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7. Find the limit.

$$\lim_{x \to \pi} \tan\left(\frac{2x}{3}\right)$$

Section 1.3

a. $\frac{1}{\sqrt{3}}$

b. $-\sqrt{3}$

c. $\sqrt{3}$

d. $-\frac{1}{\sqrt{3}}$

e. does not exist

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.05 - Evaluate limits of transcendental functions.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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8. Find the limit.

$\lim_{x \to 2} \cos\frac{\pi x}{3}$

a. $\frac{1}{2}$

b. $-\frac{1}{2}$

c. $-\frac{\sqrt{3}}{2}$

d. $\frac{\sqrt{3}}{2}$

e. 0

ANSWER: b
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic

Section 1.3

LEARNING OBJECTIVES: CALC.COH.LO.01.02.05 - Evaluate limits of transcendental functions.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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9. Find the limit.

$$\lim_{x \to 1} \cos\left(\frac{\pi x}{6}\right)$$

a. $\frac{1}{2}$

b. 0

c. $-\frac{1}{2}$

d. $\frac{\sqrt{3}}{2}$

e. $-\frac{\sqrt{3}}{2}$

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.05 - Evaluate limits of transcendental functions.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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10. Find the limit.

$$\lim_{x \to \frac{\pi}{4}} \sin(x)$$

a. $\frac{\sqrt{3}}{2}$

b. $-\frac{\sqrt{2}}{2}$

Section 1.3

c. $-\frac{1}{2}$

d. $\frac{\sqrt{2}}{2}$

e. does not exist

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.05 - Evaluate limits of transcendental functions.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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11. Suppose that $\lim_{x \to c} f(x) = 5$ and $\lim_{x \to c} g(x) = 6$. Find the following limit.

$\lim_{x \to c} [f(x) + g(x)]$

a. 0
b. 6
c. –1
d. 11
e. 30

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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12. Suppose that $\lim_{x \to c} f(x) = 11$ and $\lim_{x \to c} g(x) = -6$. Find the following limit.

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$\lim_{x \to c} [f(x) - g(x)]$

a. 11
b. 17
c. –66
d. 5
e. 0

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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13. Suppose that $\lim_{x \to c} f(x) = -5$ and $\lim_{x \to c} g(x) = -11$. Find the following limit.

$\lim_{x \to c} [f(x)g(x)]$

a. 11
b. 6
c. –16
d. –5
e. 55

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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14. Suppose that $\lim_{x \to c} f(x) = 3$ and $\lim_{x \to c} g(x) = -10$. Find the following limit.

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$\lim_{x \to c} \frac{f(x)}{g(x)}$

a. –30
b. $-\frac{10}{3}$
c. 30
d. $-\frac{3}{10}$
e. does not exist

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
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15. Suppose that $\lim_{x \to c} f(x) = 3$. Find the following limit.

$\lim_{x \to c} \left[f(x)^4 \right]$

a. –1
b. 81
c. 7
d. 0
e. 12

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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Section 1.3

16. Suppose that $\lim_{x \to c} f(x) = 4$. Find the following limit.

$\lim_{x \to c} (-11 f(x))$

a. 4
b. 44
c. –44
d. -11c
e. –11

ANSWER: c
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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17. Find the following limit (if it exists). Write a simpler function that agrees with the given function at all but one point.

$$\lim_{x \to -1} \frac{-11x^2 - 20x - 9}{x + 1}$$

a. –20
b. 2
c. –2
d. 20
e. does not exist

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.3 - Evaluate a limit using the dividing out technique.
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18. Find the limit (if it exists).

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$$\lim_{x \to -15} \frac{x+15}{x^2-225}$$

a. $-\frac{1}{30}$

b. $\frac{1}{60}$

c. –60

d. –15

e. $\frac{1}{30}$

ANSWER:	a
POINTS:	1
DIFFICULTY:	Medium
QUESTION TYPE:	Multiple Choice
HAS VARIABLES:	True
LEARNING OBJECTIVES:	CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws. LCalc11.1.3.3 - Evaluate a limit using the dividing out technique.
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19. Find the limit (if it exists).

$$\lim_{x \to 4} \frac{\sqrt{x+12}-4}{x-4}$$

a. 8

b. 1

c. 0

d. $\frac{1}{8}$

e. Limit does not exist

ANSWER:	d
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.3
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws. LCalc11.1.3.4 - Evaluate a limit using the rationalizing technique.
OTHER:	Skill
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20. Find the limit (if it exists).

$$\lim_{\Delta x \to 0} \frac{(x+\Delta x)^2+15(x+\Delta x)-12-\left(x^2+15x-12\right)}{\Delta x}$$

a. $\frac{1}{3}x^3+\frac{15}{2}x^2-12$

b. $2x+15$

c. x^3+15x^2-12x

d. $x^2+15x-12$

e. does not exist

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
QUESTION TYPE: Multiple Choice
HAS VARIABLES: True
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.2 - Develop and use a strategy for finding limits.
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21. Determine the limit (if it exists).

$$\lim_{x \to 0} \frac{4(1-\cos(x))}{x^2}$$

a. 2

b. 16

c. 6

d. 8

e. does not exist

ANSWER: a
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.05 - Evaluate limits of transcendental functions.
LCalc11.1.3.5 - Evaluate a limit using the Squeeze Theorem.
OTHER: Skill
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Section 1.3

22. Determine the limit (if it exists).

$$\lim_{x \to 0} \frac{\sin(x)(1-\cos(x))}{-2x^8}$$

a. 8
b. 1
c. 0
d. –2
e. does not exist

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.05 - Evaluate limits of transcendental functions.
LCalc11.1.3.5 - Evaluate a limit using the Squeeze Theorem.
OTHER: Skill
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23. Determine the limit (if it exists).

$$\lim_{x \to 0} \frac{\sin^3 x}{x^2}$$

a. 1
b. 0
c. 2
d. ∞
e. does not exist

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.05 - Evaluate limits of transcendental functions.
LCalc11.1.3.5 - Evaluate a limit using the Squeeze Theorem.
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24. Find $\lim_{\Delta x \to 0} \frac{f(x+\Delta x)-f(x)}{\Delta x}$ where $f(x)=3x-5$.

a. 0
b. 3
c. –5
d. 1
e. Limit does not exist

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.3
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.03 - Evaluate limits of functions using limit laws.
LCalc11.1.3.1 - Evaluate a limit using properties of limits.
OTHER: Skill
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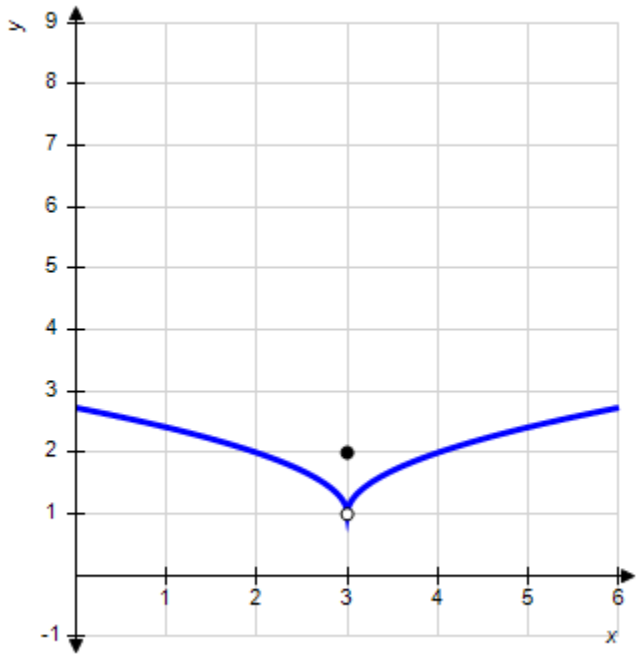
Section 1.4

1. Use the graph as shown to determine the following limits, and discuss the continuity of the function at x = 3.

(i) $\lim_{x \to 3^+} f(x)$ (ii) $\lim_{x \to 3^-} f(x)$ (iii) $\lim_{x \to 3} f(x)$



a. 1, 1, 2, not continuous
b. 2, 2, 2, continuous
c. 4, 4, 4, not continuous
d. 2, 2, 2, not continuous
e. 1, 1, 2, continuous

ANSWER:	a
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.4
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.01.03 - Find a limit of a function graphically. CALC.COH.LO.01.03.01 - Explain what it means for a function to be continuous at a point. LCalc11.1.4.2 - Determine one-sided limits and continuity on a closed interval.
OTHER:	Skill
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2. Use the graph as shown to determine the following limits, and discuss the continuity of the function at $x = -3$.

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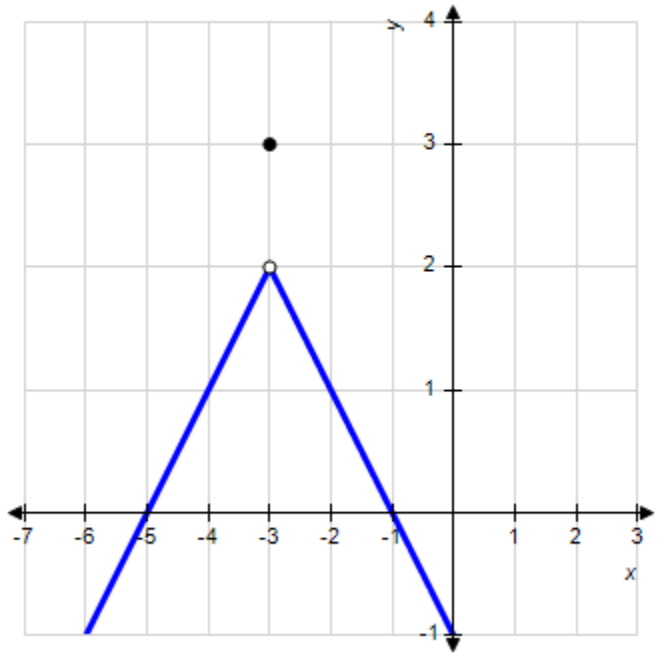
(i) $\lim_{x \to -3^+} f(x)$ (ii) $\lim_{x \to -3^-} f(x)$ (iii) $\lim_{x \to -3} f(x)$



a. 3, 3, 3, continuous
b. 2, 2, 3, not continuous
c. 3, 3, 3, not continuous
d. –3, –3, –3, continuous
e. 2, 2, 3, continuous

ANSWER:	b
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.4
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.01.03 - Find a limit of a function graphically. CALC.COH.LO.01.03.01 - Explain what it means for a function to be continuous at a point. LCalc11.1.4.2 - Determine one-sided limits and continuity on a closed interval.
OTHER:	Skill
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3. Use the graph to determine the following limits, and discuss the continuity of the function at $x = -3$.

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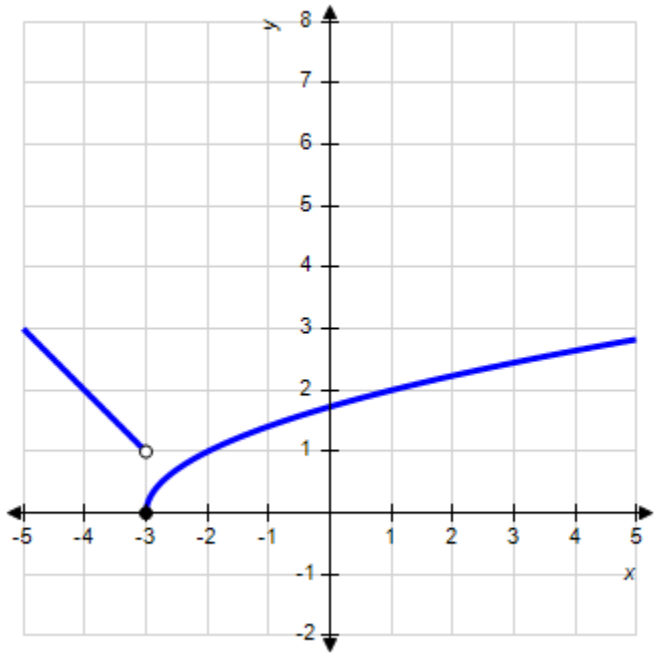
(i) $\lim_{x \to -3^+} f(x)$ (ii) $\lim_{x \to -3^-} f(x)$ (iii) $\lim_{x \to -3} f(x)$



a. 1, –1, does not exist, not continuous
b. 1, 0, does not exist, not continuous
c. 0, 1, 0, not continuous
d. –3, 0, does not exist, not continuous
e. 0, 1, 0, continuous

ANSWER:	c
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.4
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.01.03 - Find a limit of a function graphically. CALC.COH.LO.01.03.01 - Explain what it means for a function to be continuous at a point. LCalc11.1.4.2 - Determine one-sided limits and continuity on a closed interval.
OTHER:	Skill
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4. Find the limit (if it exists).

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$$\lim_{x \to 11^+} \frac{11 - x}{x^2 - 121}$$

a. $\frac{1}{22}$

b. 0

c. Limit does not exist.

d. $-\frac{1}{22}$

e. $\frac{1}{242}$

ANSWER:	d
POINTS:	1
DIFFICULTY:	Easy
REFERENCES:	Section 1.4
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.01.04 - Find one-sided limits of functions numerically. LCalc11.1.4.2 - Determine one-sided limits and continuity on a closed interval.
OTHER:	Skill
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5. Find the limit (if it exists).

$$\lim_{x \to 4^-} \frac{\sqrt{x} - 2}{x - 4}$$

a. 0

b. $-\frac{1}{4}$

c. $\frac{1}{8}$

d. $\frac{1}{4}$

e. Limit does not exist.

ANSWER:	d
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.4
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True

Section 1.4

STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.04 - Find one-sided limits of functions numerically.
LCalc11.1.4.2 - Determine one-sided limits and continuity on a closed interval.
OTHER: Skill
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6. Find the limit (if it exists).

$\lim_{x \to 1^-} f(x)$, where $f(x) = \begin{cases} x^3 + 4, & x < 1 \\ x + 4, & x \geq 1 \end{cases}$

a. Limit does not exist.
b. 0
c. 4
d. 5
e. 12

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.01.04 - Find one-sided limits of functions numerically.
LCalc11.1.4.2 - Determine one-sided limits and continuity on a closed interval.
OTHER: Skill
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7. Find the limit (if it exists). Note that $f(x) = \lfloor x \rfloor$ represents the greatest integer function.

$\lim_{x \to 7^-} (-7\lfloor x \rfloor - 9)$

a. –58
b. 51
c. –51
d. 58
e. does not exist

ANSWER: c
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)

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HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.01.04 - Find one-sided limits of functions numerically. LCalc11.1.4.2 - Determine one-sided limits and continuity on a closed interval.
OTHER:	Skill
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8. Find the limit (if it exists). Note that $f(x) = \lfloor x \rfloor$ represents the greatest integer function.

$$\lim_{x \to 5^+} (3x - \lfloor x \rfloor)$$

a. 11
b. Limit does not exist.
c. 10
d. 0
e. 9

ANSWER:	c
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.4
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.01.04 - Find one-sided limits of functions numerically. LCalc11.1.4.2 - Determine one-sided limits and continuity on a closed interval.
OTHER:	Skill
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9. Discuss the continuity of the function $f(x) = \dfrac{x^2 - 1}{x - 1}$.

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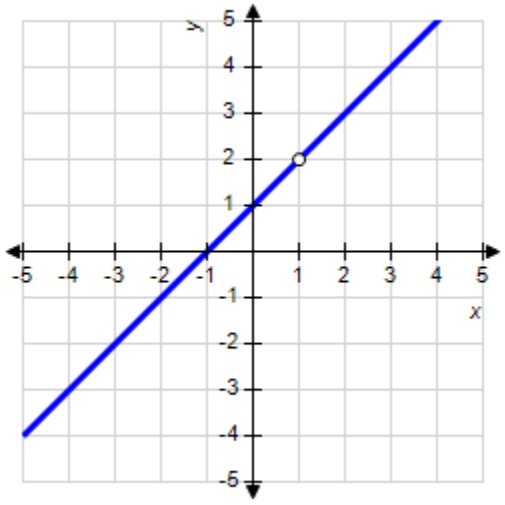

a. *f(x)* is discontinuous at $x = -1$.
b. *f(x)* is discontinuous at $x = -1, 1$.
c. *f(x)* is discontinuous at $x = 1$.
d. *f(x)* is continuous for all real x.
e. *f(x)* is continuous at $x = 2$.

ANSWER:	c
POINTS:	1
DIFFICULTY:	Easy
REFERENCES:	Section 1.4
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.03.03 - Given its graph, identify numbers at which a function is not continuous. LCalc11.1.4.1 - Determine continuity at a point and continuity on an open interval.
OTHER:	Skill
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10. Find the x-values (if any) at which the function $f(x) = -6x^2 - 3x - 3$ is not continuous. Which of the discontinuities are removable?

a. $x = 3$, removable
b. $x = 0$, removable
c. $x = -\frac{1}{4}$, not removable
d. continuous everywhere
e. $x = -\frac{1}{4}$, not removable

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ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.04 - Identify intervals on which a function is continuous.
CALC.COH.LO.01.03.06 - Determine if a discontinuity is removable or nonremovable.
LCalc11.1.4.1 - Determine continuity at a point and continuity on an open interval.
OTHER: Skill
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11. Find the *x*-values (if any) at which $f(x) = \frac{x}{x^2 - x}$ is not continuous.

a. *f(x)* is not continuous at $x = 0$ and *f(x)* has a removable discontinuity at $x = 0$.
b. *f(x)* is not continuous at $x = 0, 1$ and both the discontinuities are nonremovable.
c. *f(x)* is not continuous at $x = 1$ and *f(x)* has a removable discontinuity at $x = 1$.
d. *f(x)* is not continuous at $x = 0, 1$ and *f(x)* has a removable discontinuity at $x = 0$.
e. *f(x)* is continuous for all real *x*.

ANSWER: d
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.04 - Identify intervals on which a function is continuous.
CALC.COH.LO.01.03.06 - Determine if a discontinuity is removable or nonremovable.
LCalc11.1.4.1 - Determine continuity at a point and continuity on an open interval.
OTHER: Skill
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12. Find the *x*-values (if any) at which the function $f(x) = \frac{x}{x^2 - 100}$ is not continuous. Which of the discontinuities are removable?

a. 10 and -10, removable
b. discontinuous everywhere
c. continuous everywhere
d. 10 and -10, not removable

e. 0, removable

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.04 - Identify intervals on which a function is continuous.
CALC.COH.LO.01.03.06 - Determine if a discontinuity is removable or nonremovable.
LCalc11.1.4.1 - Determine continuity at a point and continuity on an open interval.
OTHER: Skill
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13. Find the *x*-values (if any) at which the function $f(x) = \dfrac{x - 3}{x^2 - 9x + 18}$ is not continuous. Which of the discontinuities are removable?

a. no points of discontinuity
b. $x = 3$ (not removable), $x = 6$ (removable)
c. $x = 3$ (removable), $x = 6$ (not removable)
d. no points of continuity
e. $x = 3$ (not removable), $x = 6$ (not removable)

ANSWER: c
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.04 - Identify intervals on which a function is continuous.
CALC.COH.LO.01.03.06 - Determine if a discontinuity is removable or nonremovable.
LCalc11.1.4.1 - Determine continuity at a point and continuity on an open interval.
OTHER: Skill
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14. Find the *x*-values (if any) at which $f(x) = \dfrac{|x + 1|}{x + 1}$ is not continuous.

a. *f(x)*is not continuous at $x = -1$ and the discontinuity is nonremovable.
b. *f(x)* is not continuous at $x = 0$ and the discontinuity is removable.

Section 1.4

c. *f(x)* is continuous for all real *x*.
d. *f(x)* is not continuous at $x = -1$ and the discontinuity is removable.
e. *f(x)* is not continuous at $x = 0, 1$ and $x = 0$ is a removable discontinuity.

ANSWER: a
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.04 - Identify intervals on which a function is continuous.
CALC.COH.LO.01.03.06 - Determine if a discontinuity is removable or nonremovable.
LCalc11.1.4.1 - Determine continuity at a point and continuity on an open interval.
OTHER: Skill
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15. Find the constant *a* such that the function

$$f(x) = \begin{cases} 4 \cdot \dfrac{\sin x}{x}, & x < 0 \\ a + 12x, & x \geq 0 \end{cases}$$

is continuous on the entire real line.

a. 1
b. –12
c. 12
d. –4
e. 4

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.05 - Identify functions that are continuous on their entire domain.
LCalc11.1.4.3 - Use properties of continuity.
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16. Find the constants a and b such that the function

$$f(x) = \begin{cases} 12, & x \le -7 \\ ax + b, & -7 < x < 5 \\ -12, & x \ge 5 \end{cases}$$

is continuous on the entire real line.

a. $a = 2, b = 0$
b. $a = 2, b = -2$
c. $a = -2, b = -2$
d. $a = -2, b = 2$
e. $a = 2, b = 2$

ANSWER: c
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.05 - Identify functions that are continuous on their entire domain.
LCalc11.1.4.3 - Use properties of continuity.
OTHER: Skill
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17. Find the value of c guaranteed by the Intermediate Value Theorem.

$f(x) = x^2 - 4x + 3, [4, 8], f(c) = 8$

a. 0
b. 5
c. 7
d. 1
e. 6

ANSWER: b
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.09 - Solve problems using the Intermediate Value Theorem.
LCalc11.1.4.4 - Understand and use the Intermediate Value Theorem.

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18. Find the value of c guaranteed by the Intermediate Value Theorem.

$$f(x)=\frac{x^2-x}{x-3}, \left[\frac{9}{2}, 18\right], f(c)=12$$

a. 11
b. 4
c. 3
d. 9
e. 10

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.09 - Solve problems using the Intermediate Value Theorem.
LCalc11.1.4.4 - Understand and use the Intermediate Value Theorem.
OTHER: Skill
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19. A long distance phone service charges \$0.35 for the first 8 minutes and \$0.1 for each additional minute or fraction thereof. Use the greatest integer function to write the cost C of a call in terms of time t (in minutes).

a. $$C=\begin{cases} 0.35, & 0<t\le 8 \\ 0.35+0.1\lfloor t-8\rfloor, & t>8,\ t \text{ is not an integer} \\ 0.35+0.1(t-7), & t>8,\ t \text{ is an integer} \end{cases}$$

b. $$C=\begin{cases} 0.35, & 0<t\le 8 \\ 0.35+0.1(t-8), & t>8 \end{cases}$$

c. $$C=\begin{cases} 0.35, & 0<t\le 8 \\ 0.35+0.1\lfloor t-7\rfloor, & t>8 \end{cases}$$

d. $$C=\begin{cases} 0.35, & 0<t\le 8 \\ 0.35+0.1\lfloor t-8\rfloor, & t>8 \end{cases}$$

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e. $C = \begin{cases} 0.35, & 0 < t \le 8 \\ 0.35 + 0.1\lfloor t - 7 \rfloor, & t > 8,\ t \text{ is not an integer} \\ 0.35 + 0.1(t - 8), & t > 8,\ t \text{ is an integer} \end{cases}$

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.02.10 - Solve applied problems using limits.
LCalc11.1.4.3 - Use properties of continuity.
OTHER: Application
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20. Find all values of *c* such that *f* is continuous on $(-\infty, \infty)$.

$f(x) = \begin{cases} 4 - x^2, & x \le c \\ 5x, & x > c \end{cases}$

a. $c = -1$
b. $c = 0$
c. $\frac{-5 + \sqrt{41}}{2}$
d. $\frac{5 + \sqrt{41}}{2}, \frac{5 - \sqrt{41}}{2}$
e. $\frac{-5 + \sqrt{41}}{2}, \frac{-5 - \sqrt{41}}{2}$

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.4
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.03.05 - Identify functions that are continuous on their entire domain.
LCalc11.1.4.3 - Use properties of continuity.
OTHER: Skill
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Section 1.4

Section 1.5

1. Determine whether $f(x) = \dfrac{x^2}{x^2 - 49}$ approaches ∞ or $-\infty$ as x approaches -7 from the left and from the right by completing the tables below.

x	–7.5	–7.1	–7.01	–7.001
$f(x)$				

x	–6.999	–6.99	–6.9	–6.5
$f(x)$				

a. $\lim\limits_{x \to -7^-} f(x) = -\infty$, $\lim\limits_{x \to -7^+} f(x) = \infty$

b. $\lim\limits_{x \to -7^-} f(x) = \infty$, $\lim\limits_{x \to -7^+} f(x) = -\infty$

c. $\lim\limits_{x \to -7^-} f(x) = \infty$, $\lim\limits_{x \to -7^+} f(x) = \infty$

d. $\lim\limits_{x \to -7^-} f(x) = -\infty$, $\lim\limits_{x \to -7^+} f(x) = -\infty$

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.02 - Find infinite limits of functions numerically.
LCalc11.1.5.1 - Determine infinite limits from the left and from the right.
OTHER: Skill
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2. Find all the vertical asymptotes (if any) of the graph of the function $f(x) = \dfrac{1}{(x-2)^2}$.

a. $x = -2$
b. $x = 1$
c. $x = 2, -2$
d. $x = 2$
e. no vertical asymptotes

ANSWER: d
POINTS: 1
DIFFICULTY: Easy
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True

Section 1.5

STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.04 - Find vertical asymptotes of the graphs of functions using infinite limits.
LCalc11.1.5.2 - Find and sketch the vertical asymptotes of the graph of a function.
OTHER: Skill
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3. Find the vertical asymptotes (if any) of the function $f(x) = \dfrac{x^2 - 4}{x^2 - 4x - 12}$.

a. $x = 2$
b. $x = 6$
c. $x = -6$
d. $x = 12$
e. $x = -2$

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.04 - Find vertical asymptotes of the graphs of functions using infinite limits.
LCalc11.1.5.2 - Find and sketch the vertical asymptotes of the graph of a function.
OTHER: Skill
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4. Find all the vertical asymptotes (if any) of the graph of the function $f(x) = \dfrac{5 + x}{x^2(2 - x)}$.

a. $x = -5$
b. $x = 2$
c. $x = 0$
d. $x = 2, x = 0$
e. no vertical asymptotes

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True

Section 1.5

STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.04 - Find vertical asymptotes of the graphs of functions using infinite limits.
LCalc11.1.5.2 - Find and sketch the vertical asymptotes of the graph of a function.
OTHER: Skill
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5. Find all the vertical asymptotes (if any) of the graph of the function $f(x) = \dfrac{x^3 - 64}{x - 4}$.

a. $x = 4$
b. $x = -64$
c. $x = -4$
d. $x = -4, 4$
e. no vertical asymptotes

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.04 - Find vertical asymptotes of the graphs of functions using infinite limits.
LCalc11.1.5.2 - Find and sketch the vertical asymptotes of the graph of a function.
OTHER: Skill
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6. Find all vertical asymptotes (if any) of the function $f(x) = \dfrac{x^2 + 8x + 12}{x^3 - 2x^2 - 36x + 72}$.

a. $x = 2, 6$
b. $x = 2, 6, -6$
c. $x = -2, -6$
d. $x = 6$
e. $x = -6$

ANSWER: a
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True

Section 1.5

STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.04 - Find vertical asymptotes of the graphs of functions using infinite limits.
LCalc11.1.5.2 - Find and sketch the vertical asymptotes of the graph of a function.
OTHER: Skill
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7. Find the vertical asymptotes (if any) of the function $f(x) = \tan(9x)$.

a. $x = \frac{k}{9}\pi \ (k = 0, \pm 1, \pm 2, \ldots)$

b. $x = \frac{2k+1}{18}\pi \ (k = 0, \pm 1, \pm 2, \ldots)$

c. $x = \frac{2k}{9}\pi \ (k = 0, \pm 1, \pm 2, \ldots)$

d. $x = \frac{2k+1}{9}\pi \ (k = 0, \pm 1, \pm 2, \ldots)$

e. no vertical asymptotes

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.04 - Find vertical asymptotes of the graphs of functions using infinite limits.
LCalc11.1.5.2 - Find and sketch the vertical asymptotes of the graph of a function.
OTHER: Skill
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8. Find the limit.

$$\lim_{x \to 2^+} \frac{x+3}{x-2}$$

a. 1
b. $-\infty$
c. 0
d. ∞
e. –1

ANSWER: d

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POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.5
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.04.02 - Find infinite limits of functions numerically. LCalc11.1.5.1 - Determine infinite limits from the left and from the right.
OTHER:	Skill
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9. Find the limit.

$$\lim_{x \to -9} \frac{x^2 + 9x}{(x^2 + 81)(x + 9)}$$

a. $\frac{1}{18}$

b. $-\frac{1}{18}$

c. 18

d. –9

e. –18

ANSWER:	b
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.5
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.04.06 - Find infinite limits algebraically. LCalc11.1.5.0 - Infinite Limits
OTHER:	Skill
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10. Find the limit.

$$\lim_{x \to 0^-} \left(x^6 + \frac{1}{x} \right)$$

a. 1

b. 0

c. -1

d. ∞
e. $-\infty$

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.06 - Find infinite limits algebraically.
LCalc11.1.5.1 - Determine infinite limits from the left and from the right.
OTHER: Skill
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11. Find the limit (if it exists).

$$\lim_{x \to \frac{1}{2}} x\tan(\pi x)$$

a. ∞
b. $-\infty$
c. 0
d. $\frac{1}{2}$
e. Limit does not exist

ANSWER: e
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.06 - Find infinite limits algebraically.
LCalc11.1.5.0 - Infinite Limits
OTHER: Skill
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12. Use a graphing utility to graph the function $f(x) = \dfrac{x^2 - 3x + 9}{x^3 + 27}$ and determine the one-sided limit $\lim_{x \to -3^-} f(x)$.

a. ∞
b. $-\infty$

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c. 0
d. 27
e. 18

ANSWER: b
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.03 - Find infinite limits of functions graphically.
LCalc11.1.5.1 - Determine infinite limits from the left and from the right.
OTHER: Skill
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13. Use a graphing utility to graph the function $f(x) = \sec\left(\frac{\pi x}{8}\right)$ and determine the following one-sided limit.

$$\lim_{x \to 4^+} f(x)$$

a. ∞
b. 4
c. –4
d. $-\infty$
e. 0

ANSWER: d
POINTS: 1
DIFFICULTY: Medium
REFERENCES: Section 1.5
QUESTION TYPE: Multi-Mode (Multiple choice)
HAS VARIABLES: True
STUDENT ENTRY MODE: Basic
LEARNING OBJECTIVES: CALC.COH.LO.01.04.03 - Find infinite limits of functions graphically.
LCalc11.1.5.1 - Determine infinite limits from the left and from the right.
OTHER: Skill
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14. A 30-foot ladder is leaning against a house (see figure). If the base of the ladder is pulled away from the house at a rate of 2 feet per second, the top will move down the wall at a rate of $r = \frac{2x}{\sqrt{900 - x^2}}$ ft/sec, where x is the distance between the base of the ladder and the house. Find the rate r when x is 18 feet.

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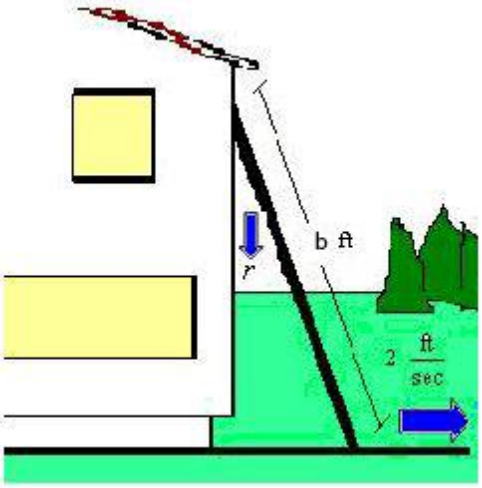

a. $r = \frac{3}{2}$ ft/sec

b. $r = \frac{4}{3}$ ft/sec

c. $r = \frac{48}{5}$ ft/sec

d. $r = \frac{2}{3}$ ft/sec

e. $r = \frac{3}{4}$ ft/sec

ANSWER:	a
POINTS:	1
DIFFICULTY:	Easy
REFERENCES:	Section 1.5
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.02.10 - Solve applied problems using limits. LCalc11.1.5.0 - Infinite Limits
OTHER:	Application
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15. A 35-foot ladder is leaning against a house (see figure). If the base of the ladder is pulled away from the house at a rate of 2 feet per second, the top will move down the wall at a rate of $r = \frac{2x}{\sqrt{1225 - x^2}}$ ft/sec, where x is the distance between the base of the ladder and the house. Find the limit of r as $x \to 35^-$.

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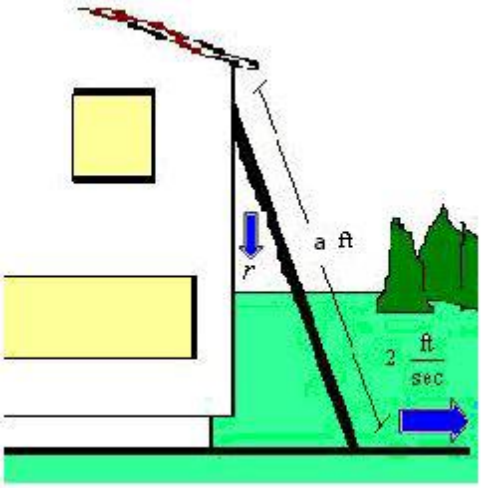

a. $-\infty$

b. 70

c. 0

d. ∞

e. 35

ANSWER:	d
POINTS:	1
DIFFICULTY:	Medium
REFERENCES:	Section 1.5
QUESTION TYPE:	Multi-Mode (Multiple choice)
HAS VARIABLES:	True
STUDENT ENTRY MODE:	Basic
LEARNING OBJECTIVES:	CALC.COH.LO.01.02.10 - Solve applied problems using limits. LCalc11.1.5.1 - Determine infinite limits from the left and from the right.
OTHER:	Application
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