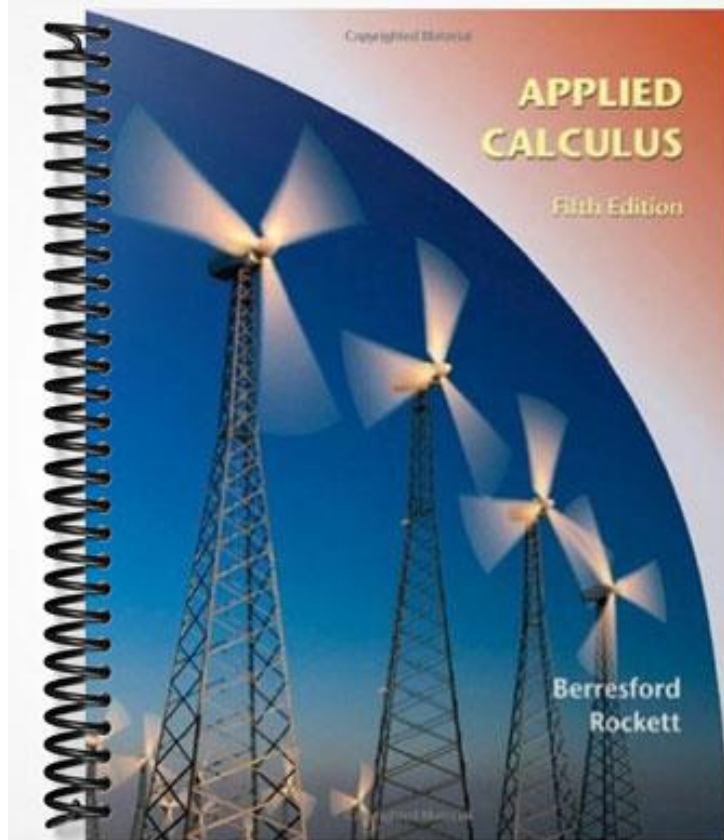


TEST BANK



Chapter 02: Derivatives and Their Uses

Student: _____

1. Complete the table and use it to predict the limit, if it exists.

- A. 56.0
- B. 28.0
- C. 28.0
- D.
- E. does not exist

2. Use properties of limits and algebraic methods to find the limit, if it exists.

- A.
- B.
- C.
- D.
- E. does not exist

3. Find without using a graphing calculator or making tables.

- A. 2
- B. 9
- C. 0
- D. 8
- E.

4. Use properties of limits and algebraic methods to find the limit, if it exists.

- A.
- B.
- C.
- D.
- E. does not exist

5. Use properties of limits and algebraic methods to find the limit, if it exists.
- A.
 - B.
 - C.
 - D.
 - E. does not exist
6. Use properties of limits and algebraic methods to find the limit, if it exists.
- A.
 - B.
 - C.
 - D.
 - E. does not exist
7. Use properties of limits and algebraic methods to find the limit, if it exists.
- A. 0
 - B.
 - C.
 - D.
 - E. does not exist
8. A graph of f is shown and a c -value is given. For this problem, use the graph to find $\lim_{x \rightarrow c} f(x)$.
- A. 0
 - B. 2
 - C. 6
 - D. 2
 - E. does not exist
9. Use properties of limits and algebraic methods to find the limit, if it exists.
- A. 7
 - B. 8
 - C. 8
 - D. 7
 - E. does not exist

10. Find for .

- A.
- B.
- C. 0
- D.
- E.

11. Find for the graph of given below.

- A. inf
- B. 0
- C. -3
- D.
- E. 3

12. Find .

- A. 5
- B. 0
- C.
- D. 5
- E. inf

13. Find .

- A. 6
- B.
- C. 0
- D. 6
- E. inf

14. For the given x -value, use the figure to determine whether the function is continuous or discontinuous at that x -value.

- A. discontinuous
- B. continuous

15. Determine whether the function is continuous or discontinuous at the given x -value.

- A. continuous
- B. discontinuous

16. Determine whether the given function is continuous. If it is not, identify where it is discontinuous.
- A. discontinuous at
 - B. discontinuous at
 - C. discontinuous at
 - D. discontinuous at
 - E. continuous everywhere
17. Determine whether the function is continuous or discontinuous at the given x -value.
- A. continuous
 - B. discontinuous
18. Determine whether the given function is continuous. If it is not, identify where it is discontinuous. You can verify your conclusions by graphing the function with a graphing utility, if one is available.
- A. discontinuous at
 - B. discontinuous at
 - C. discontinuous at
 - D. discontinuous at
 - E. continuous everywhere
19. By imagining tangent lines at points state whether the slopes are positive, zero, or negative at these points.
- A.
 - B.
 - C.
 - D.
 - E.

20. Which graph represents if the graph of is displayed below?

- A.
- B.
- C.
- D.
- E.

21. For the given function, find the average rate of change over the specified interval.
over

- A.
- B.
- C.
- D.
- E.

22. Find the average rate of change of between .

- A. 7
- B. 6
- C. 2
- D. 9
- E. 5

23. Find the instantaneous rate of change of the function .

- A. 45
- B. 38
- C. 61
- D. 63
- E. 43

24. For the function in this problem, find the instantaneous rate of change of the function at the given value.

- A. 0
- B. 27
- C. 21
- D. 45
- E. 51

25. For the function in this problem, find the slope of the tangent line at the given value.

- A. 61
- B. 35
- C. 29
- D. 0
- E. 67

26. Find the slope of the tangent at

- A. 18
- B. 3
- C. 10
- D. 3
- E. 0

27. For the function in this problem, find the derivative, by using the definition.

- A.
- B.
- C.
- D.
- E.

28. Find the slope of the tangent to the graph of $f(x)$ at any point.

- A.
- B.
- C.
- D.
- E.

29. Find of by using the definition of the derivative.

- A.
- B.
- C.
- D.
- E.

30. Write the equation of the line tangent to the graph of $f(x)$ at
- A. 22
 - B. 22
 - C. 2
 - D. 25
 - E. 25
31. The population of a town is people after x weeks (for). Find to find the instantaneous rate of change of the population after 8 weeks.
- A. 80
 - B. 96
 - C. 69
 - D. 27
 - E. 85
32. An automobile dealership finds that the number of cars that it sells on day x of an advertising campaign is (for). Find to find the instantaneous rate of change on day .
- A. 7
 - B. 11
 - C. 9
 - D. 15
 - E. 14
33. Differentiate the given function.
- A.
 - B.
 - C.
 - D.
 - E.
34. Find the derivative of .
- A.
 - B.
 - C.
 - D.
 - E.

35. Find the derivative of the function.

- A.
- B.
- C.
- D.
- E.

36. For the function given, find

- A.
- B.
- C.
- D.
- E.

37. Find the derivative of the function.

- A.
- B.
- C.
- D.
- E.

38. Find the derivative of .

- A.
- B.
- C.
- D.
- E.

39. Find the derivative of the function.

- A.
- B.
- C.
- D.
- E.

40. Find the derivative of the function.

- A.
- B.
- C.
- D.
- E.

41. Find the derivative of .

- A.
- B.
- C.
- D.
- E.

42. At the indicated point, find the instantaneous rate of change of the function.

- A. 40
- B. 207
- C. 23
- D. 32
- E. 13

43. If find .

- A.
- B.
- C.
- D.
- E.

44. Find the derivative at the given x -value with the appropriate rule.

- A. 18
- B. 70
- C. 18
- D. 9
- E. 0

45. If find .

- A.
- B.
- C.
- D.
- E.

46. If find .

- A.
- B.
- C.
- D.
- E.

47. Suppose the Marginal Cost Businesses can buy multiple licenses for *PowerZip* data compression software at a total cost of approximately dollars for x licenses. Find the derivative of this cost function at .

- A.
- B.
- C.
- D.
- E.

48. Suppose the number of people newly infected on day t of a flu epidemic is . Find the instantaneous rate of change of this number on day 10.

- A.
- B.
- C.
- D.
- E.

49. Find the derivative of by using the Product Rule. Simplify your answer.

- A.
- B.
- C.
- D.
- E.

50. Find if .

- A.
- B.
- C.
- D.
- E.

51. Find the derivative, but do not simplify your answer.

- A.
- B.
- C.
- D.
- E.

52. Find the derivative of by using the Product Rule. Simplify your answer.

- A.
- B.
- C.
- D.
- E.

53. Find the derivative of .

- A.
- B.
- C.
- D.
- E.

54. Find the indicated derivative and simplify.
for

- A.
- B.
- C.
- D.
- E.

55. Find the derivative of by using Quotient Rule. Simplify your answer.

- A.
- B.
- C.
- D.
- E.

56. Find the indicated derivative and simplify.
for

- A.
- B.
- C.
- D.
- E.

57. Find the derivative of .

- A.
- B.
- C.
- D.
- E.

58. Find the indicated derivative and simplify.
for

- A.
- B.
- C.
- D.
- E.

59. Find the derivative of .

- A. 1
- B.
- C.
- D.
- E.

60. If the cost C (in dollars) of removing p percent of the particulate pollution from the exhaust gases at an industrial site is given by

find the rate of change of C with respect to p .

- A.
- B.
- C.
- D.
- E.

61. The number of bottles of whiskey that a store will sell in a month at a price of p dollars per bottle is . Find the rate of change of this quantity when the price is \$3.
- A. 15.63
 - B. 187.50
 - C. 15.73
 - D. 15.54
 - E. 7.81
62. After x months, monthly sales of a compact disc are predicted to be thousand. Find the rate of change of the sales after 2 months in thousands per month.
- A. 48
 - B. 208
 - C. 176
 - D. 232
 - E. 224
63. Find
- A.
 - B.
 - C.
 - D.
 - E.
64. Find the third derivative.
- A.
 - B.
 - C.
 - D.
 - E. 0
65. Find the indicated derivative.
Find
- A.
 - B.
 - C.
 - D.
 - E.

66. Find for the function .

- A.
- B.
- C.
- D.
- E.

67. Find for the function .

- A.
- B.
- C.
- D.
- E.

68. Find for the function .

- A.
- B.
- C.
- D.
- E.

69. Find the second derivative.

- A.
- B.
- C.
- D.
- E.

70. Find for the function .

- A.
- B.
- C.
- D.
- E.

71. Find the third derivative.

- A.
- B.
- C.
- D.
- E.

72. Find the second derivative of the function .

- A.
- B.
- C.
- D.
- E.

73. Evaluate the expression .

- A. 5103
- B. 10,206
- C. 10,206
- D. 17,010
- E. 17,010

74. Find the second derivative of the function .

- A.
- B.
- C.
- D.
- E.

75. If the formula describing the distance s (in feet) an object travels as a function of time t (in seconds) is .
What is the acceleration of the object when

- A. 0 ft/sec^2
- B. ft/sec^2
- C. ft/sec^2
- D. ft/sec^2
- E. ft/sec^2

76. After t hours, a car is a distance miles from its starting point. Find the velocity after 3 hours.

- A. 54 miles/hour
- B. 64 miles/hour
- C. 56 miles/hour
- D. 58 miles/hour
- E. 62 miles/hour

77. If and , find .

- A.
- B.
- C.
- D.
- E.

78. If and , find .

- A.
- B.
- C.
- D.
- E.

79. If and , find .

- A.
- B.
- C.
- D.
- E.

80. Find for the given function.

- A.
- B.
- C.
- D.
- E.

81. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.

82. Find the derivative of the given function. Simplify and express the answer using positive exponents only.

- A.
- B.
- C.
- D.
- E.

83. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.

84. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.

85. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.

86. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.

87. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.

88. Find the derivative of the given function. Simplify and express the answer using positive exponents only.

- A.
- B.
- C.
- D.
- E.

89. Use the Generalized Power Rule to find the derivative of the function .

- A.
- B.
- C.
- D.
- E.

90. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.

91. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.

92. A company's cost function is dollars, where x is the number of units. Find the marginal cost function and evaluate it for . Round your answer to two decimal places.

- A. 1.34 dollars
- B. 4.02 dollars
- C. 44.72 dollars
- D. 8.94 dollars
- E. 66.33 dollars

93. If is deposited in a bank paying $r\%$ interest compounded annually, 7 years later its value will be dollars. Find . Round your answer to nearest cent.
- A. 121.95 dollars
 - B. 128.05 dollars
 - C. 17.42 dollars
 - D. 18.29 dollars
 - E. 134.45 dollars
94. For the function displayed in the graph below, find all x-values at which the derivative does not exist.
- A. 3
 - B. 3, 0, 3
 - C. 4
 - D. 1, 5
 - E. none
95. For the function displayed in the graph below, find all x-values at which the derivative does not exist.
- A. 3
 - B. 2, 2, 5
 - C. none
 - D. 4, 2, 1, 4
 - E. 3, 2, 3
96. For the function , find the x-value at which the derivative does not exist.
- A. - 5
 - B. 5
 - C. 0
 - D.
 - E. none
97. Use the numerical derivative function on a graphing calculator to calculate the derivative of the function at . Is the calculator correct?
- A. -4; No, the calculator is not correct.
 - B. 0; Yes, the calculator is correct.
 - C. ; No, the calculator is not correct.
 - D. 0; No, the calculator is not correct.
 - E. -4; Yes, the calculator is correct.
98. If a function is continuous at a point, then it is also not defined at that same point?
- A. True
 - B. False

Chapter 02: Derivatives and Their Uses **Key**

1. Complete the table and use it to predict the limit, if it exists.

A. 56.0
B. 28.0
C. 28.0
D.
E. does not exist
2. Use properties of limits and algebraic methods to find the limit, if it exists.

A.
B.
C.
D.
E. does not exist
3. Find without using a graphing calculator or making tables.

A. 2
B. 9
C. 0
D. 8
E.
4. Use properties of limits and algebraic methods to find the limit, if it exists.

A.
B.
C.
D.
E. does not exist

5. Use properties of limits and algebraic methods to find the limit, if it exists.

A.

B.

C.

D.

E. does not exist

6. Use properties of limits and algebraic methods to find the limit, if it exists.

A.

B.

C.

D.

E. does not exist

7. Use properties of limits and algebraic methods to find the limit, if it exists.

A. 0

B.

C.

D.

E. does not exist

8. A graph of f is shown and a c -value is given. For this problem, use the graph to find $\lim_{x \rightarrow c} f(x)$.

A. 0

B. 2

C. 6

D. 2

E. does not exist

9. Use properties of limits and algebraic methods to find the limit, if it exists.

A. 7

B. 8

C. 8

D. 7

E. does not exist

10. Find for .

- A.
- B.
- C. 0
- D.**
- E.

11. Find for the graph of given below.

- A.** inf
- B. 0
- C. -3
- D.
- E. 3

12. Find .

- A. 5
- B. 0
- C.**
- D. 5
- E. inf

13. Find .

- A. 6
- B.
- C. 0
- D. 6
- E.** inf

14. For the given x -value, use the figure to determine whether the function is continuous or discontinuous at that x -value.

- A.** discontinuous
- B. continuous

15. Determine whether the function is continuous or discontinuous at the given x -value.

- A. continuous
- B.** discontinuous

16. Determine whether the given function is continuous. If it is not, identify where it is discontinuous.
- A. discontinuous at
 - B. discontinuous at
 - C. discontinuous at
 - D. discontinuous at
 - E.** continuous everywhere
17. Determine whether the function is continuous or discontinuous at the given x -value.
- A.** continuous
 - B. discontinuous
18. Determine whether the given function is continuous. If it is not, identify where it is discontinuous. You can verify your conclusions by graphing the function with a graphing utility, if one is available.
- A. discontinuous at
 - B. discontinuous at
 - C. discontinuous at
 - D.** discontinuous at
 - E. continuous everywhere
19. By imagining tangent lines at points state whether the slopes are positive, zero, or negative at these points.
- A.
 - B.
 - C.**
 - D.
 - E.

20. Which graph represents if the graph of is displayed below?

A.

B.

C.

D.

E.

21. For the given function, find the average rate of change over the specified interval.
over

A.

B.

C.

D.

E.

22. Find the average rate of change of between .

A. 7

B. 6

C. 2

D. 9

E. 5

23. Find the instantaneous rate of change of the function .

A. 45

B. 38

C. 61

D. 63

E. 43

24. For the function in this problem, find the instantaneous rate of change of the function at the given value.
- A. 0
 - B. 27
 - C. 21
 - D. 45**
 - E. 51
25. For the function in this problem, find the slope of the tangent line at the given value.
- A. 61**
 - B. 35
 - C. 29
 - D. 0
 - E. 67
26. Find the slope of the tangent at
- A. 18
 - B. 3
 - C. 10**
 - D. 3
 - E. 0
27. For the function in this problem, find the derivative, by using the definition.
- A.
 - B.
 - C.
 - D.
 - E.**
28. Find the slope of the tangent to the graph of $f(x)$ at any point.
- A.**
 - B.
 - C.
 - D.
 - E.

29. Find $f'(x)$ by using the definition of the derivative.
- A.
 - B.**
 - C.
 - D.
 - E.
30. Write the equation of the line tangent to the graph of $f(x)$ at $x = 2$.
- A. 22
 - B. 22
 - C. 2
 - D.** 25
 - E. 25
31. The population of a town is $P(x)$ people after x weeks (for $x \geq 0$). Find to find the instantaneous rate of change of the population after 8 weeks.
- A. 80
 - B. 96
 - C.** 69
 - D. 27
 - E. 85
32. An automobile dealership finds that the number of cars that it sells on day x of an advertising campaign is $S(x)$ (for $x \geq 0$). Find to find the instantaneous rate of change on day 7.
- A.** 7
 - B. 11
 - C. 9
 - D. 15
 - E. 14
33. Differentiate the given function.
- A.
 - B.
 - C.
 - D.
 - E.**

34. Find the derivative of .

- A.
- B.
- C.
- D.
- E.

35. Find the derivative of the function.

- A.
- B.
- C.
- D.
- E.

36. For the function given, find

- A.
- B.
- C.
- D.
- E.

37. Find the derivative of the function.

- A.
- B.
- C.
- D.
- E.

38. Find the derivative of .

- A.
- B.
- C.
- D.
- E.

39. Find the derivative of the function.

A.

B.

C.

D.

E.

40. Find the derivative of the function.

A.

B.

C.

D.

E.

41. Find the derivative of .

A.

B.

C.

D.

E.

42. At the indicated point, find the instantaneous rate of change of the function.

A. 40

B. 207

C. 23

D. 32

E. 13

43. If find .

A.

B.

C.

D.

E.

44. Find the derivative at the given x -value with the appropriate rule.
- A. 18
 - B. 70
 - C. 18
 - D. 9**
 - E. 0
45. If find .
- A.
 - B.
 - C.
 - D.
 - E.**
46. If find .
- A.**
 - B.
 - C.
 - D.
 - E.
47. Suppose the Marginal Cost Businesses can buy multiple licenses for *PowerZip* data compression software at a total cost of approximately dollars for x licenses. Find the derivative of this cost function at .
- A.
 - B.**
 - C.
 - D.
 - E.
48. Suppose the number of people newly infected on day t of a flu epidemic is . Find the instantaneous rate of change of this number on day 10.
- A.
 - B.
 - C.**
 - D.
 - E.

49. Find the derivative of $y = (x^2 + 1)(x - 2)$ by using the Product Rule. Simplify your answer.

- A.
- B.
- C.
- D.**
- E.

50. Find $\frac{d}{dx} \ln(x^2 + 1)$ if $x = 1$.

- A.
- B.
- C.
- D.
- E.**

51. Find the derivative, but do not simplify your answer.

- A.**
- B.
- C.
- D.
- E.

52. Find the derivative of $y = (x^2 + 1)(x - 2)$ by using the Product Rule. Simplify your answer.

- A.
- B.
- C.
- D.
- E.**

53. Find the derivative of $y = \ln(x^2 + 1)$.

- A.
- B.**
- C.
- D.
- E.

54. Find the indicated derivative and simplify.
for $y = \ln(x^2 + 1)$

- A.
- B.
- C.
- D.**
- E.

55. Find the derivative of $y = \frac{x^2 + 1}{x - 1}$ by using Quotient Rule. Simplify your answer.

- A.
- B.
- C.
- D.**
- E.

56. Find the indicated derivative and simplify.
for $y = \frac{x^2 + 1}{x - 1}$

- A.
- B.
- C.**
- D.
- E.

57. Find the derivative of $y = \frac{x^2 + 1}{x - 1}$.

- A.
- B.
- C.**
- D.
- E.

58. Find the indicated derivative and simplify.
for $y = \frac{x^2 + 1}{x - 1}$

- A.
- B.
- C.**
- D.
- E.

59. Find the derivative of $y = \frac{x^2 + 1}{x - 1}$.

- A. 1
- B.
- C.
- D.
- E.**

60. If the cost C (in dollars) of removing p percent of the particulate pollution from the exhaust gases at an industrial site is given by
- find the rate of change of C with respect to p .
- A.
B.
C.
D.
E.
61. The number of bottles of whiskey that a store will sell in a month at a price of p dollars per bottle is . Find the rate of change of this quantity when the price is \$3.
- A.** 15.63
B. 187.50
C. 15.73
D. 15.54
E. 7.81
62. After x months, monthly sales of a compact disc are predicted to be thousand. Find the rate of change of the sales after 2 months in thousands per month.
- A. 48
B. 208
C. 176
D. 232
E. 224
63. Find
- A.**
B.
C.
D.
E.
64. Find the third derivative.
- A.**
B.
C.
D.
E. 0

65. Find the indicated derivative.

Find

A.

B.

C.

D.

E.

66. Find for the function .

A.

B.

C.

D.

E.

67. Find for the function .

A.

B.

C.

D.

E.

68. Find for the function .

A.

B.

C.

D.

E.

69. Find the second derivative.

A.

B.

C.

D.

E.

70. Find for the function .

A.

B.

C.

D.

E.

71. Find the third derivative.
- A.
 - B.
 - C.
 - D.
 - E.**
72. Find the second derivative of the function .
- A.
 - B.
 - C.
 - D.**
 - E.
73. Evaluate the expression .
- A. 5103
 - B. 10,206
 - C. 10,206
 - D. 17,010
 - E.** 17,010
74. Find the second derivative of the function .
- A.
 - B.
 - C.**
 - D.
 - E.
75. If the formula describing the distance s (in feet) an object travels as a function of time t (in seconds) is . What is the acceleration of the object when
- A. 0 ft/sec^2
 - B.** ft/sec_2
 - C. ft/sec_2
 - D. ft/sec_2
 - E. ft/sec^2
76. After t hours, a car is a distance miles from its starting point. Find the velocity after 3 hours.
- A. 54 miles/hour
 - B. 64 miles/hour
 - C. 56 miles/hour
 - D.** 58 miles/hour
 - E. 62 miles/hour

77. If $\sin \theta = \frac{1}{2}$ and $\cos \theta = \frac{\sqrt{3}}{2}$, find θ .

- A.
- B.
- C.
- D.**
- E.

78. If $\sin \theta = \frac{\sqrt{3}}{2}$ and $\cos \theta = \frac{1}{2}$, find θ .

- A.**
- B.
- C.
- D.
- E.

79. If $\sin \theta = \frac{1}{2}$ and $\cos \theta = \frac{1}{2}$, find θ .

- A.
- B.
- C.
- D.
- E.**

80. Find $\sin^{-1}(\frac{1}{2})$ for the given function.

- A.**
- B.
- C.
- D.
- E.

81. Differentiate the given function.

- A.
- B.
- C.**
- D.
- E.

82. Find the derivative of the given function. Simplify and express the answer using positive exponents only.
- A.
 - B.
 - C.**
 - D.
 - E.
83. Differentiate the given function.
- A.
 - B.**
 - C.
 - D.
 - E.
84. Differentiate the given function.
- A.
 - B.
 - C.
 - D.**
 - E.
85. Differentiate the given function.
- A.
 - B.
 - C.**
 - D.
 - E.
86. Differentiate the given function.
- A.**
 - B.
 - C.
 - D.
 - E.

87. Differentiate the given function.

- A.
- B.
- C.
- D.
- E.**

88. Find the derivative of the given function. Simplify and express the answer using positive exponents only.

- A.
- B.
- C.
- D.
- E.**

89. Use the Generalized Power Rule to find the derivative of the function .

- A.
- B.
- C.
- D.
- E.**

90. Differentiate the given function.

- A.
- B.
- C.**
- D.
- E.

91. Differentiate the given function.

- A.
- B.
- C.
- D.**
- E.

92. A company's cost function is dollars, where x is the number of units. Find the marginal cost function and evaluate it for . Round your answer to two decimal places.
- A. 1.34 dollars
 - B. 4.02 dollars
 - C. 44.72 dollars
 - D. 8.94 dollars
 - E. 66.33 dollars
93. If is deposited in a bank paying $r\%$ interest compounded annually, 7 years later its value will be dollars. Find . Round your answer to nearest cent.
- A. 121.95 dollars
 - B. 128.05 dollars
 - C. 17.42 dollars
 - D. 18.29 dollars
 - E. 134.45 dollars
94. For the function displayed in the graph below, find all x -values at which the derivative does not exist.
- A. 3
 - B.** 3, 0, 3
 - C. 4
 - D. 1, 5
 - E. none
95. For the function displayed in the graph below, find all x -values at which the derivative does not exist.
- A. 3
 - B. 2, 2, 5
 - C. none
 - D. 4, 2, 1, 4
 - E.** 3, 2, 3
96. For the function , find the x -value at which the derivative does not exist.
- A. - 5
 - B. 5
 - C. 0
 - D.
 - E. none

97. Use the numerical derivative function on a graphing calculator to calculate the derivative of the function at . Is the calculator correct?
- A. -4; No, the calculator is not correct.
 - B. 0; Yes, the calculator is correct.
 - C. ; No, the calculator is not correct.
 - D.** 0; No, the calculator is not correct.
 - E. -4; Yes, the calculator is correct.
98. If a function is continuous at a point, then it is also not defined at that same point?
- A. True
 - B.** False