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| 1. Suppose that  represents the height, in feet, of a person  years old. In real world terms, what does  represent? What is its unit? What does  represents and what is its unit?   |  |  | | --- | --- | | *ANSWER:* | represents the height of a 10-year old person. Its unit is feet.  represents the rate of change of the height when a person is t years old. Its unit is feet per year. | |

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| 2. The function  is both continuous and differentiable at  Write these facts as limit statements.   |  |  | | --- | --- | | *ANSWER:* | Since *f* is continuous at *x* = 0,  Since *f* is differentiable at *x* = 0,  exists. Note that there are alternate ways of writing the answer | |

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| 3. Suppose  and  Is  continuous and/or differentiable at   |  |  |  | | --- | --- | --- | |  | a. | *f* is not continuous but differentiable at *x* = 1 | |  | b. | *f* is neither continuous nor differentiable at *x* = 1 | |  | c. | *f* is continuous at but not differentiable at *x* = 1 | |  | d. | *f* is both continuous and differentiable at *x* = 1 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 4. Suppose  and  Is  continuous and/or differentiable at   |  |  |  | | --- | --- | --- | |  | a. | *f* is not continuous but differentiable at *x* = 1 | |  | b. | *f* is neither continuous nor differentiable at *x* = 1 | |  | c. | *f* is continuous but not differentiable at *x* = 1 | |  | d. | *f* is both continuous and differentiable at *x* = 1 |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 5. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* | - 2 | |

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| 6. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* | - | |

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| 7. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* | - 3 | |

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| 8. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* | - 2 | |

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| 9. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* | - | |

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| 10. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* | - 3 | |

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| 11. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 12. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 13. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 14. Use the definition of derivative:  to find   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 15. Given , is  continuous and/or differentiable at  Explain.   |  |  |  | | --- | --- | --- | |  | a. | *f* is not continuous but differentiable at *x* = 1 | |  | b. | *f* is neither continuous nor differentiable at *x* = 1 | |  | c. | *f* is continuous but not differentiable at *x* = 1 | |  | d. | *f* is both continuous and differentiable at *x* = 1 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 16. Given , is  continuous and/or differentiable at  Explain.   |  |  |  | | --- | --- | --- | |  | a. | *f* is continuous but not differentiable at *x* = 2 | |  | b. | *f* is differentiable but not continuous at *x* = 2 | |  | c. | *f* is neither continuous nor differentiable at *x* = 2 | |  | d. | *f* is both continuous and differentiable at *x* = 2 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 17. Use the Intermediate Value Theorem to show that  has at least one zero on [0, 2].   |  |  | | --- | --- | | *ANSWER:* | *f* is continuous on [0, 2], and | |

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| 18. Use the Intermediate Value Theorem to show that  has at least one zero on [- 2, 1].   |  |  | | --- | --- | | *ANSWER:* | *f* is continuous on [ - 2, 1], and | |

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| 19. Suppose  is a piecewise-defined function, equal to  where  are continuous and differentiable everywhere. If  is the function  differentiable at  Explain why or why not.   |  |  | | --- | --- | | *ANSWER:* | Yes. | |

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| 20. Suppose  are functions with values  Find   |  |  |  | | --- | --- | --- | |  | a. | 7 | |  | b. | 9 | |  | c. | – 9 | |  | d. | – 7 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 21. Suppose  are functions with values  Find   |  |  |  | | --- | --- | --- | |  | a. | 15 | |  | b. | – 12 | |  | c. | 12 | |  | d. | – 15 |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 22. Suppose  are functions with values  Find   |  |  |  | | --- | --- | --- | |  | a. | 3 | |  | b. |  | |  | c. | – 1 | |  | d. | 1 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 23. Find constants  so that , is continuous and differentiable everywhere?   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | x | g(x) | h(x) | g'(x) | h'(x) | | -3 | 0 | 3 | 1 | 0 | | -2 | 1 | 2 | 2 | -3 | | -1 | 3 | 0 | -1 | -2 | | 0 | 2 | 3 | -2 | 3 | | 1 | 0 | -1 | -2 | -2 | | 2 | -2 | -2 | -1 | 0 | | 3 | -3 | 0 | 0 | 1 | |

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| 24. Use the table above to find  if .   |  |  |  | | --- | --- | --- | |  | a. | 4 | |  | b. | – 1 | |  | c. | 1 | |  | d. | – 4 |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 25. Use the table above to find  if .   |  |  |  | | --- | --- | --- | |  | a. | 4 | |  | b. | – 1 | |  | c. | 1 | |  | d. | – 4 |  |  |  | | --- | --- | | *ANSWER:* | c | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 26. Use the table above to find  if   |  |  |  | | --- | --- | --- | |  | a. | 19/9 | |  | b. | – 19/9 | |  | c. | 17/9 | |  | d. | – 17/9 |  |  |  | | --- | --- | | *ANSWER:* | d | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 27. Use the table above to find  if .   |  |  |  | | --- | --- | --- | |  | a. | – 3 | |  | b. | 3 | |  | c. | – 1 | |  | d. | 1 |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 28. Use the table above to find  if .   |  |  |  | | --- | --- | --- | |  | a. | 4 | |  | b. | – 1 | |  | c. | 1 | |  | d. | – 4 |  |  |  | | --- | --- | | *ANSWER:* | d | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 29. Use the table above to find  if .   |  |  |  | | --- | --- | --- | |  | a. | 3 | |  | b. | – 3 | |  | c. | 6 | |  | d. | – 6 |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 30. Use the table above to find  if .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 31. Use the table above to find  if .   |  |  |  | | --- | --- | --- | |  | a. | 1 | |  | b. | – 1 | |  | c. | 7 | |  | d. | – 7 |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 32. Use the table above to find  if .   |  |  |  | | --- | --- | --- | |  | a. | 2 | |  | b. | – 2 | |  | c. | 8 | |  | d. | – 8 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 33. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 34. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 35. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 36. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 37. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 38. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 39. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 40. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 41. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 42. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 43. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 44. Differentiate  in three ways: (a) with the chain rule, (b) with the quotient rule but not chain rule, (c) without the chain or quotient rules.   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 45. Differentiate  in three ways: (a) with the chain rule, (b) with the quotient rule but not chain rule, (c) without the chain or quotient rules.   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 46. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 47. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 48. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 49. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 50. Find the derivative of   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 51. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 52. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 53. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 54. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 55. If , find   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 56. Use implicit differentiation to find  if   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 57. Use implicit differentiation to find  if   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 58. Use implicit differentiation to find  if .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 59. Find the equation of the tangent lines to the circle  at the points with x-coordinate   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 60. Find the equation of the tangent lines to the graph of  at the points with x-coordinate   |  |  | | --- | --- | | *ANSWER:* | and | |

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| 61. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 62. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 63. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 64. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 65. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 66. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 67. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 68. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 69. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 70. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 71. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 72. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 73. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 74. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 75. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 76. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 77. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 78. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 79. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 80. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 81. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 82. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 83. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 84. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 85. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 86. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 87. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 88. Find the derivative of   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 89. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 90. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 91. Find the derivative of .   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 92. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 93. Find the derivative of .   |  |  | | --- | --- | | *ANSWER:* |  | |

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| 94. Use implicit differentiation to find  if .   |  |  | | --- | --- | | *ANSWER:* |  | |