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| 1. Copy the points (–2, 5), (3, –5), (–4, –1), (4, 0), (2, –3) in the Cartesian plane.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 7/13/2017 3:56 AM | |

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| 2. Find the distance between the points (–2, –5) and (–7, –10). Round your answer to the nearest hundredth if necessary.  ​   |  |  |  | | --- | --- | --- | |  | a. | 17.49 | |  | b. | 0 | |  | c. | 7.07 | |  | d. | 3.16 | |  | e. | 50 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 7/13/2017 4:08 AM | |

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| 3. Find the midpoint of the line segment joining between the points (7, –1) and (2, –6). Round your answer to the nearest hundredth if necessary.  ​   |  |  |  | | --- | --- | --- | |  | a. | (4, 2.5) | |  | b. | (4.5, –3.5) | |  | c. | (14, 6) | |  | d. | (3, –2) | |  | e. | none of these choices |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 7/13/2017 4:20 AM | |

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| 4. Find the length of each side of the right triangle from the following figure.    ​   |  |  |  | | --- | --- | --- | |  | a. | , , | |  | b. | , , | |  | c. | , , | |  | d. | , , | |  | e. | , , |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 7/13/2017 4:45 AM | |

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| 5. Find *x* such that the distance between the points  and   is 5.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 4/5/2017 6:17 AM | |

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| 6. Assume that the number (in millions) of cellular telephone subscribers in the United States from 1996 through 2005 is given in the following table. Use a graphing utility to graph a line plot of the given data. Describe any trends that appear within the last four years.  ​   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Year | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | | Subscribers | 56 | 62.3 | 71.5 | 79.7 | 97.4 | 117.9 | 136.5 | 158.4 | 195 | 214.1 |      |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​  The number of subscribers appears to be increasing. | b. | ​  The number of subscribers appears to be decreasing. | |  | c. | ​  The number of subscribers appears to be constant. | d. | ​  The number of subscribers appears to be decreasing | |  | e. | ​  The number of subscribers appears to be increasing. |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 3/31/2017 8:48 AM | |

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| 7. Assume that the number (in millions) of basic cable television subscribers in the United States from 1996 through 2005 is given in the following table. Use a graphing utility to graph a scatter plot of the given data. Describe any trends that appear within the last four years.  ​   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Year | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | | Subscribers | 73.2 | 73.5 | 74 | 74.3 | 74.8 | 75 | 75.3 | 74.9 | 74.5 | 74.1 |    ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​  ​The number of subscribers appears to be increasing. | b. | ​  The number of subscribers appears to be decreasing. | |  | c. | ​  The number of subscribers appears to be linearly decreasing. | d. | ​  The number of subscribers appears to be decreasing | |  | e. | ​  ​  The number of subscribers appears to be  linearly increasing. |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 8. ​Assume that the median sales prices of existing one family homes sold (in thousands of dollars) in the United States from 1990 through 2005 are as given in the following figure. Use the following figure to estimate the percent increase in the value of existing one-family homes from1999 to 2000. Round your answer to the nearest hundredth if necessary.  ​  ​ ​   |  |  |  | | --- | --- | --- | |  | a. | ​1.2% | |  | b. | ​201.21% | |  | c. | ​101.21% | |  | d. | ​98.8% | |  | e. | ​1.21% |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 9. Use the Midpoint Formula repeatedly to find the three points that divide the segment joining  and  into four equal parts.  ​   |  |  |  | | --- | --- | --- | |  | a. | , , | |  | b. | , , | |  | c. | , , | |  | d. | , , | |  | e. | , , |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 7/19/2017 10:06 AM | |

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| 10. ​The red figure is translated to a new position in the plane to form the blue figure. Find the vertices of the transformed figure from the following graph.  (In case your exam is printed in black and white - the red figure has one vertex at (0,0)).  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​, , | |  | b. | ​, , | |  | c. | ​, , | |  | d. | ​, , | |  | e. | ​, , |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 11. ​Which of the following is the correct graph of ?   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 12. ​Which of the following is the correct graph of ?   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 13. ​Which of the following is the correct graph of ?   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 14. Sketch the graph of the equation. ?   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 15. ​Which of the following is the correct graph of ?   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 16. ​Find the *x*- and *y*- intercepts of the graph of the equation ?   ​   |  |  |  | | --- | --- | --- | |  | a. | ​*x*- intercepts: , ; ​*y*- intercepts: | |  | b. | ​​*x*- intercepts: , ; ​*y*- intercepts: | |  | c. | ​​*x*- intercepts: , ; ​*y*- intercepts: , | |  | d. | ​​​*x*- intercepts: , ; ​*y*- intercepts: , | |  | e. | ​​​*x*- intercepts: ; ​*y*- intercepts: |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 17. ​Find the *x*- and *y*- intercepts of the graph of the equation ?   ​   |  |  |  | | --- | --- | --- | |  | a. | ​*x*- intercepts: ; ​*y*- intercepts: | |  | b. | ​​*x*- intercepts: , ; ​*y*- intercepts: , | |  | c. | ​​​*x*- intercepts: ; ​*y*- intercepts: | |  | d. | ​​​*x*- intercepts: , ; ​*y*- intercepts: , | |  | e. | ​​​*x*- intercepts: ; ​*y*- intercepts: |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 18. Sketch the graph of the function ?   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 19. Sketch the graph of the equation: .   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 20. Write the general form of the equation of the circle with center  and solution point .     |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 3/29/2017 11:26 AM | |

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| 21. Write the general form of the equation of the circle with endpoints of a diameter at   .​   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 22. Find the points of intersection (if any) of the graphs of the equations   .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 23. ​A manufacturer of DVD players has monthly fixed costs of $9000 and variable costs of $45 per unit for one particular model. For this model DVD player, find the function  for monthly total costs where *​x* denotes the number of units produced and sold.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 24. ​A small business recaps and sells tires. The business has a revenue function  and a cost function , where *x* represents the number of sets of four tires recapped and sold. Find the number of sets of recaps that must be sold to break even.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​100 | |  | b. | ​300 | |  | c. | ​6 | |  | d. | ​200 | |  | e. | ​65 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 25. ​Find the market equilibrium point for the following demand and supply functions below, where *p* is price per unit and *q* is the number of units produced and sold. Demand:  Supply:     |  |  |  | | --- | --- | --- | |  | a. | ​, | |  | b. | ​​, | |  | c. | ​, | |  | d. | ​, | |  | e. | ​, |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 26. ​Find the market equilibrium point for the following demand and supply functions below, where *p* is price per unit and *q* is the number of units produced and sold. Demand:  Supply:     |  |  |  | | --- | --- | --- | |  | a. | ​, | |  | b. | ​​, | |  | c. | ​, | |  | d. | ​, | |  | e. | ​, |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 27. ​Estimate the slope of the line from the graph.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 28. ​Estimate the slope of the line from the graph.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 29. Find the slope of the line passing through the pair of points.  ​   and  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. | None of the above |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 7/19/2017 1:03 PM | |

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| 30. ​Find the slope of the line passing through the given pair of points.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​11 | |  | b. | ​ | |  | c. | ​8 | |  | d. | ​0 | |  | e. | ​The slope is undefined. |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 31. ​Find the slope of the line passing through the given pair of points.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–12 | |  | b. | ​ | |  | c. | ​2 | |  | d. | ​ | |  | e. | ​The slope is undefined. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 32. ​Find the slope of the line passing through the given pair of points.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​1 | |  | c. | ​–11 | |  | d. | ​5 | |  | e. | ​The slope is undefined. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 33. Use the point  on a line having slope   to find two additional points through which the line passes.  ​   |  |  |  | | --- | --- | --- | |  | a. | , | |  | b. | , | |  | c. | , | |  | d. | , | |  | e. | , |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 7/19/2017 2:26 PM | |

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| 34. ​Find the slope *m* and *y*-intercept *b* of the line whose equation is given below.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​, | |  | b. | ​​, | |  | c. | ​​​, | |  | d. | ​, | |  | e. | ​, |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 35. ​Find the slope *m* and *y*-intercept *b* of the line whose equation is given below.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​, | |  | b. | ​​, | |  | c. | , | |  | d. | ​, | |  | e. | , |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 36. ​Find the slope *m* and *y*-intercept *b* of the line whose equation is given below.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​, | |  | b. | ​​, | |  | c. | , | |  | d. | ​, | |  | e. | Both *m* and *b* are undefined. |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 37. Find the slope *m* and *y*-intercept *b* of the line whose equation is given below.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | , | |  | b. | , | |  | c. | , | |  | d. | , | |  | e. | Both *m* and *b* are undefined. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 4/5/2017 6:19 AM | |

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| 38. ​Write the equation of the line passing through the given pair of points.   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 39. ​Write the equation of the line passing through the given pair of points.   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 40. ​Find an equation of the line that passes through the points   and .   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 41. ​Find an equation of the line that passes through the point  and has the slope *m* that is undefined.   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 42. ​Write the equation and graph the line that passes through the given point and has the slope indicated.   with 0 slope   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 43. ​Write the equation of the line that passes through the given point and has the slope indicated.   with slope  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 44. ​True or False: These three points are collinear.  ​  , ,   ​   |  |  |  | | --- | --- | --- | |  | a. | ​true | |  | b. | ​false |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 45. ​Write the equation of the line through  that is parallel to .   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 46. ​Write the equation of the line through  that is perpendicular to .   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. |  | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 47. Write an equation of the line that passes through the point (i) parallel to the given line, and (ii) perpendicular to the given line.  ​  Point: ​.  Line:  ​   |  |  |  | | --- | --- | --- | |  | a. | ​(i) parallel:  (ii) perpendicular: | |  | b. | ​(i) parallel:  (ii) perpendicular: | |  | c. | ​​(i) parallel:  (ii) perpendicular: | |  | d. | ​​(i) parallel:  (ii) perpendicular: | |  | e. | ​​(i) parallel:  (ii) perpendicular: |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 48. Write an equation of the line that passes through the point (i) parallel to the given line, and (ii) perpendicular to the given line.  ​  Point: .  Line: .  ​       |  |  |  | | --- | --- | --- | |  | a. | (i) parallel:  (ii) perpendicular: | |  | b. | (i) parallel:  (ii) perpendicular: | |  | c. | (i) parallel:  (ii) perpendicular: | |  | d. | (i) parallel:  (ii) perpendicular: | |  | e. | (i) parallel:  (ii) perpendicular: |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 3/29/2017 11:28 AM | |

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| 49. ​Find a linear equation that expresses the relationship between the temperature in degrees Celsius and degrees Fahrenheit. Use the fact that water freezes at  0° C (32° F) and boils at  100° C (212° F ). Use the equation to convert  82° F  to Celsius. Round to the nearest degree.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​28°C | |  | b. | ​14°C | |  | c. | 63​°C | |  | d. | ​90°C | |  | e. | ​116°C |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 50. ​Suppose the resident population of South Carolina (in thousands) was 4,030 in 2000 and 4,256 in 2006. Assume that the relationship between the population *y* and the year *t* is linear. Let  represent 2000. Estimate the population in 2004 by using linear model for the given data. Round your answer to the nearest thousand residents.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​4,482 thousand residents | |  | b. | ​3,879 thousand residents | |  | c. | ​4,105 thousand residents | |  | d. | ​4,181 thousand residents | |  | e. | ​4,407 thousand residents |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 51. ​In 2004, a product has a value of $2,175. Over the next five years, its value will increase by $100 per year. Write a linear equation that gives the dollar value *V* in terms of the year *t*. (Let *t* = 0 represent 2000.)  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 52. A small business purchases a piece of equipment for $1,740. After 5 years, the equipment will be outdated, having no value. Write a linear equation giving the value *V* of the equipment in terms of time *t* in years, .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 53. ​If , is *y* a function of *x*?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​Yes | |  | b. | ​No |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 54. ​If , is *y* a function of *x*?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​Yes | |  | b. | ​No |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 55. Determine whether *y* is a function of *x*.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​Yes | |  | b. | ​No |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 56. Determine whether *y* is a function of *x*.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​Yes | |  | b. | ​No |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 57. Determine the range of the function .     |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 4/5/2017 6:33 AM | |

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| 58. ​Determine the range of the function .  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 59. Evaluate (if possible) the function at the given value of the independent variable. Simplify the results.  ​  ,  ​   |  |  |  | | --- | --- | --- | |  | a. | 101 | |  | b. | 109 | |  | c. | –11 | |  | d. | –3 | |  | e. | undefined |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 4/14/2017 7:44 AM | |

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| 60. ​If  find .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 61. ​Simplify the expression using the given function definition.  ​  ​,  ​   |  |  |  | | --- | --- | --- | |  | a. | ​10 | |  | b. | ​6 | |  | c. | ​5 | |  | d. | ​2 | |  | e. | ​undefined |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 62. ​Use the Vertical Line Test to determine which of the following graphs shows *y* as a function of *x*.   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 63. ​Given  and , find .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 64. ​Given  and , find .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​3 | |  | b. | ​17 | |  | c. | ​6 | |  | d. | ​–40 | |  | e. | ​14 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 65. Use the Horizontal Line Test to determine whether the functions are one-to-one.  ​    ​ ​   |  |  |  | | --- | --- | --- | |  | a. | *​f(x)* and *g(x)* both are one-to-one. | |  | b. | *​f(x)* is not one-to-one and *g(x)* is one-to-one. | |  | c. | *​f(x)* and *g(x)* both are not one-to-one. | |  | d. | ​*f(x)* is one-to-one and *g(x)* is not one-to-one. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 66. Use the graph of  to sketch .  ​ ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 67. Use the graph of    below to sketch .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 3/31/2017 8:55 AM | |

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| 68. ​The inventor of a new game believes that the variable cost for producing the game is $0.98 per unit. The fixed cost is $7000. Find a formula for the average cost per unit .   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 69. A manufacturer charges $80 per unit for units that cost $30 to produce. To encourage large orders from distributors, the manufacturer will reduce the price by $0.01 per unit for each unit in excess of 100 units. (For example, an order of 101 units would have a price of $79.99 per unit, and an order of 102 units would have a price of $79.98 per unit.) This price reduction is discontinued when the price per unit drops to $61. Express the price per unit as a function of the order size.   ​​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Difficult | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 70. ​Complete the table and use the result to estimate the limit. Round your answer to six decimal places.  ​  ​  ​   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | 9.9 | 9.99 | 9.999 | 10.001 | 10.01 | 10.1 | | *f*(*x*) |  |  |  |  |  |  |                   ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0.047619 | |  | b. | ​0.547619 | |  | c. | ​0.422619 | |  | d. | ​0.672619 | |  | e. | ​–0.327381 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 71. Complete the table and use the result to estimate the limit. Round your answer to six decimal places.  ​  ​   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | 3.9 | 3.99 | 3.999 | 4.001 | 4.01 | 4.1 | | *f*(*x*) |  |  |  |  |  |  |                   ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 2.474874 | |  | b. | –2.349874 | |  | c. | –2.474874 | |  | d. | 2.308207 | |  | e. | 2.224874 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 4/5/2017 6:39 AM | |

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| 72. ​Complete the table and use the result to estimate the limit. Round your answer to six decimal places.  ​  ​  ​   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | –8.1 | –8.01 | –8.001 | –7.999 | –7.99 | –7.9 | | *f*(*x*) |  |  |  |  |  |  |                   ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–0.140000 | |  | b. | ​–0.120000 | |  | c. | ​–0.380000 | |  | d. | ​–0.250000 | |  | e. | ​–0.360000 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 73. ​Suppose that  and . Find the following limit:  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​7 | |  | b. | ​6 | |  | c. | ​0 | |  | d. | ​8 | |  | e. | ​1 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 74. ​Suppose that  and . Find the following limit:  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​13 | |  | b. | ​24 | |  | c. | ​2 | |  | d. | ​–143 | |  | e. | ​11 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 75. Let . Determine the following limit. (Hint: Use the graph of the function.)  ​    ​   .  ​ ​   |  |  |  | | --- | --- | --- | |  | a. | ​3 | |  | b. | ​1 | |  | c. | ​2 | |  | d. | ​4 | |  | e. | ​does not exist. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 76. A graph of  is shown and a *c*-value is given. For this problem, use the graph to find .    ​  ​ .  ​ ​   |  |  |  | | --- | --- | --- | |  | a. | ​0 | |  | b. | ​–4 | |  | c. | ​4 | |  | d. | ​–2 | |  | e. | ​does not exist. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 77. A graph of  is shown and a *c*-value is given. For this problem, use the graph to find .    ​  .  ​   |  |  |  | | --- | --- | --- | |  | a. | 6 | |  | b. | 1.5 | |  | c. | –3 | |  | d. | 12 | |  | e. | does not exist. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 4/5/2017 6:54 AM | |

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| 78. ​Find the limit (if it exists):  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​0 | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 79. ​Find .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–3 | |  | b. | ​0 | |  | c. | ​-∞ | |  | d. | ​3 | |  | e. | ​∞ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 80. ​Find  the limit: .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​-∞ | |  | b. | ​∞ | |  | c. | ​0 | |  | d. | ​-1 | |  | e. | ​1 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 81. ​Find .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​1 | |  | b. | ​∞ | |  | c. | ​0 | |  | d. | ​–1 | |  | e. | ​-∞ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 82. Determine the following limit. (Hint: Use the graph of the function.)  ​  .  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–2 | |  | b. | ​does not exist | |  | c. | ​0 | |  | d. | ​2 | |  | e. | ​–4 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 83. Graph the function with a graphing utility and use it to predict the limit. Check your work either by using the table feature of the graphing utility or by finding the limit algebraically.  ​   .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​27 | |  | c. | ​ | |  | d. | ​0 | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 84. The cost (in dollars) of removing *p*% of the pollutants from the water in a small lake is given by , . Evaluate .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​∞ | |  | b. | ​23,000 | |  | c. | ​0 | |  | d. | ​–23000 | |  | e. | ​-∞ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 85. Consider a certificate of deposit that pays 14% (annual percentage rate) on an initial deposit of $3,000. The balance after 14 years is . Estimate , where *x* is the length of the compounding period (in years). Round your answer to the nearest hundredth.  ​​   |  |  |  | | --- | --- | --- | |  | a. | ​21,297.98 | |  | b. | ​1,103.64 | |  | c. | ​42,000 | |  | d. | ​3,420 | |  | e. | ​3,000 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 86. ​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 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 87. Find the x-values (if any) at which the function  is not continuous. Which of the discontinuities are removable?     |  |  |  | | --- | --- | --- | |  | a. | continuous everywhere | |  | b. | , removable | |  | c. | , removable | |  | d. | , removable | |  | e. | both *B* and *C* |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 3/29/2017 11:33 AM | |

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| 88. ​Describe the interval(s) on which the function  is continuous.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​,  & | |  | b. | ​,  & | |  | c. | ​,  & | |  | d. | ​,  & | |  | e. | ​,  & |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 89. Determine whether the given function is continuous. If it is not, identify where it is discontinuous and which condition fails to hold. 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 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 90. Find the *x*-values (if any) at which *f*(*x*)  is not continuous and identify whether they are removable or nonremovable.  ​    ​​       |  |  |  | | --- | --- | --- | |  | a. | is a removable discontinuity | |  | b. | is a nonremovable discontinuity | |  | c. | is a removable discontinuity | |  | d. | is a nonremovable discontinuity | |  | e. | *f*(*x*) has no discontinuities |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Easy | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 91. Find the *x*-values (if any) at which the function  is not continuous. Are the discontinuities removable?  ​   |  |  |  | | --- | --- | --- | |  | a. | continuous everywhere | |  | b. | not removable | |  | c. | discontinuous everywhere | |  | d. | removable | |  | e. | none of the above |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 4/5/2017 6:58 AM | |

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| 92. ​Find the *x*-values (if any) at which the function  is not continuous. Which of the discontinuities are removable?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​no points of discontinuity | |  | b. | ​ (not removable),  (removable) | |  | c. | ​ (removable),  (not removable) | |  | d. | no points of continuity | |  | e. | ​​ (not removable),  (not removable) |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 93. ​Sketch the graph of the function  and describe the interval(s) on which the function is continuous.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​​ and | b. | ​ and | |  | c. | ​ and | d. | ​ and  ​ | |  | e. | ​none of these choices |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 94. Describe the interval(s) on which the function  is continuous.  ​       |  |  |  | | --- | --- | --- | |  | a. | and | |  | b. | and | |  | c. | and | |  | d. |  | |  | e. | none of these choices |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 95. Find constants a and b such that the function  is continuous on the entire real line.  ​       |  |  |  | | --- | --- | --- | |  | a. | , | |  | b. | , | |  | c. | , | |  | d. | , ​ | |  | e. | , |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 96. ​A deposit of $8,500 is made in an account that pays 6% compounded every 7 months. The amount *A* in the account after *t* years is , . What are the points of discontinuity of graph of  ?  (Here, the brackets indicate the greatest integer function.)  ​   |  |  |  | | --- | --- | --- | |  | a. | ​1 ,   ,   ,   ,... | |  | b. | ​0 ,  1 ,  2 ,... | |  | c. | ​7 ,  14 ,  21 ,.... | |  | d. | ​1 ,  2 ,  3 ,... | |  | e. | ​ ,   ,   ,... |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *DIFFICULTY:* | Medium | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:01 AM | | *DATE MODIFIED:* | 1/21/2016 10:01 AM | |

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| 97. Find the slope of the tangent line to the graph of the function below at the given point.  ​  ,  ​   |  |  |  | | --- | --- | --- | |  | a. | ​4 | |  | b. | ​–4 | |  | c. | ​–2 | |  | d. | ​6 | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 98. Find the slope of the tangent line to the graph of the function below at the given point.  ​  ,  ​   |  |  |  | | --- | --- | --- | |  | a. | ​12 | |  | b. | ​–3 | |  | c. | ​–8 | |  | d. | ​–12 | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 99. Find the slope of the tangent line to the graph of the function below at the given point.  ​  ,  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–12 | |  | b. | ​–2 | |  | c. | ​10 | |  | d. | ​–18 | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 100. ​Use the limit definition to find the slope of the tangent line to the graph of  at the point .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 101. Find the derivative of the following function using the limiting process.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​2 | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 102. ​Find the derivative of the following function using the limiting process.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​either B or D |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 103. ​Find the derivative of the following function using the limiting process.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 104. ​Find an equation of the line that is tangent to the graph of *f* and parallel to the given line.  ​  ​,  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 105. ​Find an equation of the line that is tangent to the graph of *f* and parallel to the given line.  ​  ​,  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​both B and D |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 106. ​Identify a function *f*(*x*) that has the given characteristics and then sketch the function.  ​  ​; ;  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​  ​ | b. | ​  ​ | |  | c. | ​  ​ | d. | ​  ​ | |  | e. | ​  ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 107. ​Find the derivative of the function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 108. ​Find the derivative of the function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 109. ​For the function given, find .  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 110. Find the derivative of the function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 111. ​Find the derivative of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 112. ​Find the derivative of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 113. ​Find the derivative of the function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​  ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 114. ​Differentiate the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 115. Differentiate the given function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 3/31/2017 9:15 AM | |

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| 116. ​Determine the point(s), (if any), at which the graph of the function has a horizontal tangent.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0 | |  | b. | ​0 and 3 | |  | c. | ​0 and –3 | |  | d. | ​3 | |  | e. | ​There are no points at which the graph has a horizontal tangent. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 117. The graph shows the number of visitors *V* to a national park in hundreds of thousands during a one-year period, where  represents January. Estimate the rate of change of *V* over the interval . Round your answer to the nearest hundred thousand visitors per year.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 187.5 hundred thousand visitors per year | |  | b. | 281.25 hundred thousand visitors per year | |  | c. | 225 hundred thousand visitors per year | |  | d. | 562.5 hundred thousand visitors per year | |  | e. | 1125 hundred thousand visitors per year |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 7/14/2017 10:14 AM | |

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| 118. ​Find the marginal cost for producing *x* units. (The cost is measured in dollars.)  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​$9,800 | |  | b. | ​​$9,850 | |  | c. | ​​$8,800 | |  | d. | ​​$8,850 | |  | e. | ​​​$9,750 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 119. ​Find the marginal revenue for producing *x* units. (The revenue is measured in dollars.)  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ dollars | |  | b. | ​​ dollars | |  | c. | ​​50 dollars | |  | d. | ​​ dollars | |  | e. | ​​​ dollars |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 120. ​Find the marginal profit for producing *x* units. (The profit is measured in dollars.)  ​  ​       |  |  |  | | --- | --- | --- | |  | a. | ​ dollars | |  | b. | dollars | |  | c. | ​ dollars | |  | d. | ​ dollars | |  | e. | ​ dollars |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 121. The cost *C* (in dollars) of producing *x* units of a product is given by . Find the additional cost when the production increases from 9 to 10. Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | $0.58 | |  | b. | $0.36 | |  | c. | $0.62 | |  | d. | $0.12 | |  | e. | $0.64 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 4/5/2017 9:41 AM | |

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| 122. ​The profit (in dollars) from selling *x* units of calculus textbooks is given by . Find the additional profit when the sales increase from 146 to 147 units. Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​$15.35 | |  | b. | ​$30.00 | |  | c. | ​$15.45 | |  | d. | ​$30.80 | |  | e. | ​$30.60 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 123. ​The profit (in dollars) from selling *x* units of calculus textbooks is given by . Find the marginal profit when . Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​$35.00 | |  | b. | ​$20.00 | |  | c. | ​$5.00 | |  | d. | ​$–125.00 | |  | e. | ​$–130.05 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 124. ​The population *P* ( in thousands) of Japan from 1980 through 2010 can be modeled by  where *t* is the year, with  corresponding to 1980. Determine the population growth rate, .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 125. ​When the price of a glass of lemonade at a lemonade stand was $1.75, 400 glasses were sold. When the price was lowered to $1.50, 500 glasses were sold. Assume that the demand function is linear and that the marginal and fixed costs are $0.10 and $25, respectively. Find the profit *P* as a function of *x*, the number of glasses of lemonade sold.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 126. When the price of a glass of lemonade at a lemonade stand was $1.75, 400 glasses were sold. When the price was lowered to $1.50, 500 glasses were sold. Assume that the demand function is linear and that the marginal and fixed costs are $0.10 and $ 25, respectively. Find the marginal profit when 300 glasses of lemonade are sold and when 700 glasses of lemonade are sold.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​, | |  | b. | ​, | |  | c. | ​, | |  | d. | ​, | |  | e. | ​​, |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 127. ​Use the product Rule to find the derivative of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 128. ​Find the derivative of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 129. ​Find the derivative of the function . State which differentiation rule(s) you used to find the derivative.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​1, Product Rule. | |  | b. | ​1, Quotient Rule. | |  | c. | ​5, Product Rule. | |  | d. | ​5, Quotient Rule. | |  | e. | ​, Product Rule. |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 130. ​Find the point(s), if any, at which the graph of f has a horizontal tangent line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​, | |  | b. | ​, | |  | c. | ​, | |  | d. | ​, | |  | e. | ​, |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 131. ​A population of bacteria is introduced into a culture. The number of bacteria *P* can be modeled by  where *t* is the time (in hours). Find the rate of change of the population when .  ​   |  |  |  | | --- | --- | --- | |  | a. | 36.98 bacteria/hr | |  | b. | ​29.15 bacteria/hr | |  | c. | ​33.65 bacteria/hr | |  | d. | ​32.75 bacteria/hr | |  | e. | ​30.25 bacteria/hr |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 132. ​Use the given information to find  of the function .  ​  , ,  and  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 133. ​Find an equation of the tangent line to the graph of *f* at the given point.  ​  , at  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 134. ​Find an equation of the tangent line to the graph of *f* at the given point.  ​  , at  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 135. ​Use the demand function  to find the rate of change in the demand *x* for the given price . Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​1.44 units per dollar | |  | b. | ​–0.72 units per dollar | |  | c. | ​0.72 units per dollar | |  | d. | ​0.96 units per dollar | |  | e. | ​–1.44 units per dollar |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 136. ​A population of bacteria is introduced into a culture. The number of bacteria *P* can be modeled by  where *t* is the time (in hours). Find the rate of change of the population when .  ​   |  |  |  | | --- | --- | --- | |  | a. | 21.95 bacteria/hr | |  | b. | ​3.53 bacteria/hr | |  | c. | ​10.6 bacteria/hr | |  | d. | ​2.07 bacteria/hr | |  | e. | ​7.32 bacteria/hr |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 137. ​Find , , and  of the functions , .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​, , and | |  | b. | ​​, , and | |  | c. | ​​, , and | |  | d. | ​​, , and | |  | e. | ​​, , and |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 1/21/2016 10:02 AM | |

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| 138. Find  of , .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. | none of these choices |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 3/30/2017 7:51 AM | |

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| 139. Find the derivative of the function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 3/30/2017 7:58 AM | |

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| 140. Differentiate the given function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:02 AM | | *DATE MODIFIED:* | 3/30/2017 8:00 AM | |

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| 141. ​Find the derivative of the function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 142. Find the derivative of the given function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 4/5/2017 9:42 AM | |

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| 143. ​Find the derivative of the function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 144. ​Find the derivative of the function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 145. You deposit $1,000 in an account with an annual interest rate of change *r* (in decimal form) compounded monthly. At the end of 4 years, the balance is . Find the rate of change of *A* with respect to *r* when . Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | $1,375.67 | |  | b. | $65,594.67 | |  | c. | $114.64 | |  | d. | $5,466.22 | |  | e. | $5,430.02 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 4/5/2017 9:42 AM | |

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| 146. ​The value *V* of a machine *t* years after it is purchased is inversely proportional to the square root of . The initial value of the machine is $10,000. Find the rate of depreciation when . Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | –381.80 per year | |  | b. | ​–1,889.82 per year | |  | c. | ​447.21 per year | |  | d. | ​1,767.77 per year | |  | e. | –763.60​ per year |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 147. ​Find the second derivative of the function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​None of the above |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 148. ​Find the third derivative of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 149. ​Find the  of .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 150. ​Determine whether the statement is true or false. If it is false, explain why or give an example that shows it is false.  ​  If , then .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​True | |  | b. | ​False. The product rule is |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 151. Find the third derivative.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. | 0 | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 3/30/2017 8:18 AM | |

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| 152. ​Find the value  for the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​1,776 | |  | b. | ​800 | |  | c. | ​311 | |  | d. | ​807 | |  | e. | ​4,576 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 153. ​Find the indicated derivative.  ​  Find  if .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 154. ​Find the second derivative for the function  and solve the equation .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–2 | |  | b. | ​1 | |  | c. | ​0 | |  | d. | ​26 | |  | e. | ​33 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 155. ​Find the second derivative for the function  and solve the equation .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0 | |  | b. | ​4 | |  | c. | ​–4 | |  | d. | ​ | |  | e. | ​no solution |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 156. ​A brick becomes dislodged from the Empire State Building (at a height of 1,000 feet) and falls to the sidewalk below. Write the position *s*(*t*), velocity *v*(*t*), and acceleration *a*(*t*) as functions of time.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​; ; | |  | b. | ​; ; | |  | c. | ​; ; | |  | d. | ​; ; | |  | e. | ​; ; |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 157. ​Find  implicitly for .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 158. ​Find  for the equation .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 159. ​Find the slope of the graph at the given point.  ​    ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0 | |  | b. | ​3 | |  | c. | ​5 | |  | d. | ​4 | |  | e. | ​7 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 160. ​Find the slope of the graph at the given point.  ​    ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​2 | |  | b. | ​0 | |  | c. | ​1 | |  | d. | ​3 | |  | e. | ​5 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 161. ​Find the rate of change of *x* with respect to *p*.  ​  ,  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 162. ​Find the rate of change of *x* with respect to *p*.  ​  ,  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 163. ​Find  implicitly and explicitly(the explicit functions are shown on the graph) and show that the results are equivalent. Use the graph to estimate the slope of the tangent line at the labeled point. Then verify your result analytically by evaluating  at the point.  ​    ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 164. ​Let *x* represent the units of labor and y the capital invested in a manufacturing process. When 135,540 units are produced, the relationship between labor and capital can be modeled by . Find the rate of change of *y* with respect to *x* when  and .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​-2 | |  | b. | ​0 | |  | c. | ​3 | |  | d. | ​-7 | |  | e. | ​5 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 165. ​Find  for the following equation:  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 166. Find  for the equation  by implicit differentiation and evaluate the derivative at the point .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. | 0 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 4/5/2017 10:01 AM | |

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| 167. ​Assume that *x* and *y* are differentiable functions of *t*. Find  using the given values.  ​   for , .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​216 | |  | b. | ​82 | |  | c. | ​164 | |  | d. | ​214 | |  | e. | ​107 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 168. ​Assume that *x* and *y* are differentiable functions of *t*. Given , find  when  and .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 169. ​Assume that *x* and *y* are differentiable functions of *t*. Find  given that , , and .  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–1.33 | |  | b. | ​1.5 | |  | c. | ​6 | |  | d. | ​–8 | |  | e. | ​2.67 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 170. ***​Area***. The radius, *r*, of a circle is decreasing at a rate of 4 centimeters per minute.  Find the rate of change of area, *A*, when the radius is 6.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 171. ***​Volume and radius***. Suppose that air is being pumped into a spherical balloon at a rate of 8 in.3/min. At what rate is the radius of the balloon increasing when the radius is 7 in.?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 172. The radius *r* of a sphere is increasing at a rate of 5 inches per minute. Find the rate of change of volume when  inches. Round your answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | 1,809.6 cubic inches per minute | |  | b. | 7,238.2 cubic inches per minute | |  | c. | 36,191.1 cubic inches per minute | |  | d. | 9,047.8 cubic inches per minute | |  | e. | 27,143.4 cubic inches per minute |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 3/30/2017 8:28 AM | |

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| 173. ***​Profit***. Suppose that the monthly revenue and cost (in dollars) for *x* units of a product are  and . At what rate per month is the profit changing if the number of units produced and sold is 100 and is increasing at a rate of 10 units per month?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​11,960 per month | |  | b. | ​1,160 per month | |  | c. | ​1,960 per month | |  | d. | 760​ per month | |  | e. | 19,960​ per month |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 174. ​The lengths of the edges of a cube are increasing at a rate of 4 ft/min. At what rate is the surface area changing when the edges are 21 ft long?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​96 ft2/min | |  | b. | 1,008 ​ft2/min | |  | c. | 504 ​ft2/min | |  | d. | ​2,016 ft2/min | |  | e. | ​84 ft2/min |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 175. ​A point is moving along the graph of the function  such that  centimeters per second.  Find  for the given values of *x*.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 176. A point is moving along the graph of the function  such that  centimeters per second.   Find  when .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 177. ***​Boat docking***. Suppose that a boat is being pulled toward a dock by a winch that is 24 ft above the level of the boat deck. If the winch is pulling the cable at a rate of 13 , at what rate is the boat approaching the dock when it is 32 ft from the dock? Use the figure below.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 16.25​ | |  | b. | 13​ | |  | c. | ​21.67 | |  | d. | ​9.75 | |  | e. | ​7.8 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 178. ​An airplane flying at an altitude of 4 miles passes directly over a radar antenna. When the airplane is 25 miles away , the radar detects that the distance *s* is changing at a rate of 220 miles per hour. What is the speed of the airplane? Round your answer to the nearest integer.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​223 mi/hr | |  | b. | ​​206 mi/hr | |  | c. | ​446​ mi/hr | |  | d. | ​​111 mi/hr | |  | e. | ​​103 mi/hr |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 179. A baseball diamond has the shape of a square with sides 90 feet long. A player running from second base to third base at a speed of 27 feet per second is 60 feet from third base. At what rate is the player’s distance *s* from home plate changing? Round your answer to one decimal place.  ​   |  |  |  | | --- | --- | --- | |  | a. | –24.1 feet/second | |  | b. | –0.2 feet/second | |  | c. | –0.6 feet/second | |  | d. | –15 feet/second | |  | e. | –0.9 feet/second |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 3/30/2017 8:28 AM | |

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| 180. ​A retail sporting goods store estimates that weekly sales and weekly advertising costs are related by the equation . The current weekly advertising costs are $1,500, and these costs are increasing at a rate of $135 per week. Find the current rate of change of weekly sales.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​156,600 dollars per week | |  | b. | ​158,880 dollars per week | |  | c. | ​85,980 dollars per week | |  | d. | ​83,700 dollars per week | |  | e. | ​823,080 dollars per week |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:03 AM | | *DATE MODIFIED:* | 1/21/2016 10:03 AM | |

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| 181. ​Use the graph of  to identify at which of the indicated points the derivative  changes from positive to negative.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​(5, 6) | |  | b. | ​(-1, 2), (2, 4) | |  | c. | ​(2, 4), (5, 6) | |  | d. | ​(2, 4) | |  | e. | ​(-1, 2) |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 182. Use the graph of  to identify at which of the indicated points the derivative  changes from negative to positive.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | (2,4), (5,6) | |  | b. | (-1,2) | |  | c. | (-1,2), (2,4) | |  | d. | (2,4) | |  | e. | (-1,2), (5,6) |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/27/2017 5:03 AM | |

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| 183. Identify the open intervals where the function  is increasing or decreasing.  ​   |  |  |  | | --- | --- | --- | |  | a. | decreasing: ; increasing: | |  | b. | increasing: ; decreasing: | |  | c. | increasing on | |  | d. | decreasing on | |  | e. | none of the above |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/28/2017 12:13 PM | |

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| 184. ​Both a function and its derivative are given. Use them to find all critical numbers.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 185. Identify the open intervals where the function  is increasing or decreasing.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​decreasing: ; increasing: | |  | b. | ​​increasing: ; decreasing: | |  | c. | ​increasing on | |  | d. | ​​decreasing on | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 186. ​For the given function, find all critical numbers.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 187. ​Find any critical numbers of the function ​.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0 | |  | b. | ​ | |  | c. | ​ | |  | d. | ​both A and B | |  | e. | ​both A and C |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 188. ​Identify the open intervals where the function  is increasing or decreasing.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​decreasing: ; increasing: | |  | b. | ​increasing: ; decreasing: | |  | c. | ​increasing: ; decreasing: | |  | d. | ​increasing: ; decreasing: | |  | e. | ​decreasing for all *x* |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 189. ​For the given function, find the critical numbers.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 190. ​Find the open intervals on which the function  is increasing or decreasing.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The function is increasing on the interval , and decreasing on the intervals  and . | |  | b. | ​The function is increasing on the interval , and decreasing on the intervals  and . | |  | c. | ​​The function is increasing on the interval , and decreasing on the intervals  and . | |  | d. | ​The function is decreasing on the interval , and increasing on the intervals  and . | |  | e. | ​The function is decreasing on the interval , and increasing on the intervals  and . |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 191. ​Find the open intervals on which the function is increasing or decreasing.    ​   |  |  |  | | --- | --- | --- | |  | a. | ​The function is increasing on the interval  and decreasing on the interval . | |  | b. | ​The function is increasing on the interval  and decreasing on the interval . | |  | c. | ​The function is increasing on the interval  and decreasing on the interval . | |  | d. | ​The function is increasing on the interval  and decreasing on the interval . | |  | e. | ​The function is increasing on the interval  and decreasing on the interval . |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 192. Suppose the number *y* of medical degrees conferred in the United States can be modeled by , for , where *t* is the time in years, with  corresponding to 1972. Use the test for increasing and decreasing functions to estimate the years during which the number of medical degrees is increasing and the years during which it is decreasing.  ​   |  |  |  | | --- | --- | --- | |  | a. | The number of medical degrees is increasing from 1972 to 1989 and 1997 to 2005, and decreasing during 1989 to 1997. | |  | b. | The number of medical degrees is increasing from 1972 to 1988 and 1996 to 2005, and decreasing during 1988 to 1996. | |  | c. | The number of medical degrees is increasing from 1972 to 1989 and 2001 to 2005, and decreasing during 1989 to 2001. | |  | d. | The number of medical degrees is increasing from 1972 to 1990 and 1996 to 2005, and decreasing during 1990 to 2001. | |  | e. | The number of medical degrees is increasing from 1972 to 1989 and 1995 to 2005, and decreasing during 1989 to 1995. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/30/2017 4:12 AM | |

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| 193. ​A fast-food restaurant determines the cost model,  and revenue model,  for   where *x* is the number of hamburgers sold. Determine the intervals on which the profit function is increasing and on which it is decreasing.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The profit function is increasing on the interval  and decreasing on the interval . | |  | b. | ​The profit function is increasing on the interval  and decreasing on the interval . | |  | c. | ​​The profit function is increasing on the interval  and decreasing on the interval . | |  | d. | ​The profit function is increasing on the interval  and decreasing on the interval . | |  | e. | ​​The profit function is increasing on the interval  and decreasing on the interval . |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 194. ​For the given function, find the relative minima.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no relative minima |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 195. ​Find the *x*-values of all relative maxima of the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no relative maxima |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 196. For the function  ​  (a)  Find the critical numbers of *f* (if any);  (b)  Find the open intervals where the function is increasing or decreasing; and  (c)  Apply the First Derivative Test to identify all relative extrema.    ​   |  |  |  | | --- | --- | --- | |  | a. | (a)  (b)  increasing: ; decreasing:  (c)  relative max: ;  relative min:  ​ | |  | b. | (a)  (b) decreasing: ; increasing:  (c) relative min: ;  relative max:  ​ | |  | c. | (a)  (b) increasing: ; decreasing:  (c) relative max: ;  relative min:  ​ | |  | d. | (a)  (b) decreasing: ; increasing:  (c) relative min: ;  relative max:  ​ | |  | e. | (a)  (b) increasing: ; decreasing:  (c) relative max: ;  relative min: no relative min.  ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 7/4/2017 5:43 AM | |

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| 197. ​Find all relative maxima of the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no relative maxima |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 198. ​Find all relative minima of the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no relative maxima |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 199. ​Locate the absolute extrema of the function  on the closed interval .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​no absolute max; absolute min: | |  | b. | ​absolute max:  ; absolute min: | |  | c. | ​absolute max:  ; no absolute min | |  | d. | ​absolute max:  ; | |  | e. | ​no absolute max or min |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 200. ​Locate the absolute extrema of the function  on the closed interval  ​   |  |  |  | | --- | --- | --- | |  | a. | ​absolute max:  ; absolute min: | |  | b. | ​absolute max:  ; absolute min: | |  | c. | ​​absolute max:  ; absolute min: no absolute min | |  | d. | ​no absolute max; absolute min: | |  | e. | ​no absolute max or min |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 201. Find the *x*-value at which the absolute minimum of *f*(*x*) occurs on the interval [*a*,*b*].  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 202. ​Locate the absolute extrema of the given function on the closed interval [–4, 4].  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​absolute max: | |  | b. | ​absolute min: | |  | c. | ​no absolute max | |  | d. | ​no absolute min | |  | e. | ​both A and D | |  | f. | ​both A and B |  |  |  | | --- | --- | | *ANSWER:* | f | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 203. ​Find the absolute extrema of the function  on the closed interval . Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The maximum of the function is 1 and the minimum of the function is 0. | |  | b. | ​The maximum of the function is 2.92 and the minimum of the function is 1. | |  | c. | ​The maximum of the function is 2.92 and the minimum of the function is 0. | |  | d. | ​The maximum of the function is1 and the minimum of the function is 2.52. | |  | e. | ​The maximum of the function is 0 and the minimum of the function is 2.52. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 204. ​Approximate the critical numbers of the function shown in the graph and determine whether the function has a relative maximum, a relative minimum, an absolute maximum, an absolute minimum, or none of these at each critical number on the interval shown.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The critical number *​*​ yields an absolute minimum and the critical number  yields an absolute maximum. | |  | b. | ​The critical number  yields an absolute maximum and the critical number  yields an absolute minimum. | |  | c. | ​Both the critical numbers  &  yield an absolute minimum. | |  | d. | ​Both the critical numbers  and  yield an absolute maximum. | |  | e. | ​Both the critical numbers  &  yield a relative minimum. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 205. ​Find the absolute extrema of the function  on the interval .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The maximum of the function is 1 and the minimum of the function is 0. | |  | b. | ​The maximum of the function is 0 and the minimum of the function is –1. | |  | c. | ​The maximum of the function is –1 and the minimum of the function is 0. | |  | d. | ​The maximum of the function is 1 and the minimum of the function is 0. | |  | e. | ​The maximum of the function is 0 and the minimum of the function is 1. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 206. Graph a function on the interval  having the following characteristics.    Absolute maximum at  Absolute minimum at  Relative minimum at  Relative maximum at  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/31/2017 5:10 AM | |

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| 207. ***​Medication***. The number of milligrams *x* of a medication in the bloodstream *t* hours after a dose is taken can be modeled by   . Find the *t*-value at which *x* is maximum. Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0 hours | |  | b. | ​2.83 hours | |  | c. | ​707.11 hours | |  | d. | ​4.83 hours | |  | e. | ​6.91 hours |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 208. ***​Medication***. The number of milligrams *x* of a medication in the bloodstream *t* hours after a dose is taken can be modeled by   . Find the maximum value of *x*. Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | 1.73 hours | |  | b. | ​​1443.37 hours | |  | c. | ​3.73 hours | |  | d. | ​4.22 hours | |  | e. | 1.73 hours |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 209. ​Suppose the resident population *P*(in millions) of the United States can be modeled by , , where  corresponds to 1800. Analytically find the minimum and maximum populations in the U.S. for .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The population is minimum at   and maximum at . | |  | b. | ​​The population is minimum at   and maximum at . | |  | c. | ​​​The population is minimum at   and maximum at . | |  | d. | ​​The population is minimum at  and maximum at . | |  | e. | ​The population is minimum at  and maximum at . |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 210. ​Determine the open intervals on which the graph of  is concave downward or concave upward.     |  |  |  | | --- | --- | --- | |  | a. | ​concave upward on ; concave downward on | |  | b. | ​concave downward on | |  | c. | ​concave upward on | |  | d. | ​concave downward on ; ​concave upward | |  | e. | ​​concave upward on ; concave downward on |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 211. ​Determine the open intervals on which the graph of  is concave downward or concave upward.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​concave downward on | |  | b. | ​concave downward on  ; concave upward on | |  | c. | ​concave upward on ; concave downward on | |  | d. | ​​concave downward on  ; ​concave upward on | |  | e. | ​concave upward on ; concave downward on |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 212. ​Find all relative extrema of the function . Use the Second Derivative Test where applicable.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​relative max: ; no relative min | |  | b. | ​relative max: ; no relative min | |  | c. | ​no relative max or min | |  | d. | ​relative min: ; no relative max | |  | e. | ​​relative min: ; no relative max |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 213. ​Find all relative extrema of the function . Use the Second Derivative Test where applicable.     |  |  |  | | --- | --- | --- | |  | a. | ​relative max: | |  | b. | ​relative min: | |  | c. | ​no relative min | |  | d. | ​​no relative max | |  | e. | ​both A and C | |  | f. | ​both B and D |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 214. ​Find all relative extrema of the function . Use the Second Derivative Test where applicable.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​relative max: | |  | b. | ​relative min: | |  | c. | ​no relative max or min | |  | d. | ​both A and B | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 215. ​Find all relative extrema of the function . Use the Second-Derivative Test when applicable.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The relative minimum is   and the relative maximum is . | |  | b. | ​The relative maximum is . | |  | c. | ​The relative minimum is . | |  | d. | ​The relative maximum is  and the relative minima are  and . | |  | e. | ​The relative minimum is   and the relative maximum is . |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 216. ​Find all relative extrema of the function . Use the Second-Derivative Test when applicable.     |  |  |  | | --- | --- | --- | |  | a. | ​The relative maximum is . | |  | b. | ​​The relative minimum is . | |  | c. | ​​The relative maximum is . | |  | d. | ​​​The relative minimum is . | |  | e. | ​​The relative maximum is . |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 217. ​State the signs of  and  on the interval (0, 2).  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​*​f*​ ' < 0  ​​*​f*​ '' = 0 | |  | b. | ​​*​f*​ ' < 0  ​​*​f*​ '' > 0  ​ | |  | c. | ​*​f*​ ' > 0​  *​f*​'' <​ 0  ​ | |  | d. | ​*f* ' > 0  *​f*​ '' > 0  ​ | |  | e. | ​*​f*​ ' < 0​  *​f*​ '' <​ 0 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 218. ​Find the *x*-value at which the given function has a point of inflection.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no point of inflection |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 219. ​Find the points of inflection and discuss the concavity of the function.  ​​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​inflection point at ; concave downward on ; concave upward on | |  | b. | ​inflection point at ; concave upward on ; concave downward on | |  | c. | ​​inflection point at ; concave downward on ; concave upward on | |  | d. | ​inflection point at ; concave upward on ; concave downward on | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 220. ​A function and its graph are given. Use the second derivative to locate all *x*-values of points of inflection on the graph of . Check these results against the graph shown.  ​  ​  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​, | |  | e. | ​, , |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 221. ​Sketch a graph of a function *f* having the following characteristics.  ​  ​        ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​  ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 222. ​The graph of *f* is shown in the figure. Sketch a graph of the derivative of *f*.  ​  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 223. ​The graph of *f* is shown in the figure. Sketch a graph of the derivative of *f*.  ​  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 224. ​The graph of *f*is shown in the figure. Sketch a graph of the derivative of *f*.  ​    ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​The derivative of *f* does not exist. | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 225. ​The graph of *f* is shown. Graph *f*, *f*' and *f*'' on the same set of coordinate axes.  ​  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​none of the above |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 226. ​The graph of *f*is shown in the figure. Sketch a graph of the derivative of *f*.  ​    ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 227. ***​Production.***Suppose that the total number of units produced by a worker in *t*hours of an 8-hour shift can be modeled by the production function . Find the number of hours before the rate of production is maximized. That is, find the point of diminishing returns.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 228. ​The profit *P* (in thousands of dollars) for a company spending an amount *s* (in thousands of dollars) on advertising is . The *point of diminishing returns* is the point at which the rate of growth of the profit function begins to decline. Find the point of diminishing returns. Round your answer to the nearest thousand dollars.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​43 thousand dollars | |  | b. | ​130 thousand dollars | |  | c. | ​104 thousand dollars | |  | d. | ​173 thousand dollars | |  | e. | ​87 thousand dollars |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 229. The number of people who donated to a certain organization between 1975 and 1992 can be modeled by the equation   donors, where *t* is the number of years after 1975. Find the inflection point(s) from  through , if any exist.  ​   |  |  |  | | --- | --- | --- | |  | a. | There are no inflection points from . | |  | b. | There is one inflection point at . | |  | c. | There are inflection points at . | |  | d. | There is one inflection point at . | |  | e. | There are inflection points at , , . |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/27/2017 5:33 AM | |

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| 230. ​Find the length and width of a rectangle that has perimeter 56 meters and a maximum area.  ​​   |  |  |  | | --- | --- | --- | |  | a. | ​7, 21 | |  | b. | ​1, 27 | |  | c. | ​14, 14 | |  | d. | ​15, 13 | |  | e. | ​18, 10 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 231. ​A rancher has 440 feet of fencing to enclose two adjacent rectangular corrals (see figure). What dimensions should be used so that the enclosed area will be a maximum?  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 232. ​Determine the dimensions of a rectangular solid (with a square base) with maximum volume if its surface area is 441 square meters.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​square base side ; height | |  | b. | ​square base side ; height | |  | c. | ​square base side ; height | |  | d. | ​​square base side ; height | |  | e. | ​square base side ; height |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 233. ​A Norman window is constructed by adjoining a semicircle to the top of an ordinary rectangular window (see figure). Find the dimensions of a Norman window of maximum area if the total perimeter is 22 feet. Round yours answers to two decimal places.    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ feet and  feet | |  | b. | ​ feet and  feet | |  | c. | ​ feet and  feet | |  | d. | ​​ feet and  feet | |  | e. | ​​ feet and  feet |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 234. ​***Volume*.** A rectangular box with a square base is to be formed from a square piece of metal with 54-inch sides. If a square piece with side *x* is cut from each corner of the metal and the sides are folded up to form an open box, the volume of the box is . What value of *x* will maximize the volume of the box?    ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​27 | |  | b. | ​2 | |  | c. | ​9 | |  | d. | ​14 | |  | e. | ​1 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 235. ​A rectangular page is to contain 144 square inches of print. The margins on each side are 1 inch. Find the dimensions of the page such that the least amount of paper is used.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​14, 14 | |  | b. | ​12, 12 | |  | c. | ​10, 10 | |  | d. | ​13, 13 | |  | e. | ​11, 11 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 236. Find the dimensions of the rectangle of maximum area bounded by the *x*-axis and *y*-axis and the graph of .  ​   |  |  |  | | --- | --- | --- | |  | a. | length 1.5; width 1.25 | |  | b. | length 2; width 1 | |  | c. | length 0.5; width 1.75 | |  | d. | length 1; width 1.5 | |  | e. | none of the above |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/28/2017 12:55 PM | |

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| 237. ​Find the point on the graph of  that is closest to the point (8, 0.5).  Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​(1.59, 2.53) | |  | b. | ​(2, 4) | |  | c. | ​(2.52, 6.35) | |  | d. | ​(1.39, 1.93) | |  | e. | ​(1.26, 1.59) |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 238. ***Minimum cost.*** From a tract of land, a developer plans to fence a rectangular region and then divide it into two identical rectangular lots by putting a fence down the middle. Suppose that the fence for the outside boundary costs $7 per foot and the fence for the middle costs $4 per foot. If each lot contains 5000 square feet, find the dimensions of each lot that yield the minimum cost for the fence.  ​   |  |  |  | | --- | --- | --- | |  | a. | Dimensions are 51.59 ft for the side parallel to the divider and 96.92 ft for the other side. | |  | b. | Dimensions are 96.92 ft for the side parallel to the divider and 51.59 ft for the other side. | |  | c. | Dimensions are 70.71 ft for the side parallel to the divider and 70.71 ft for the other side. | |  | d. | Dimensions are 88.19 ft for the side parallel to the divider and 56.7 ft for the other side. | |  | e. | Dimensions are 56.7 ft for the side parallel to the divider and 88.19 ft for the other side. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/27/2017 6:10 AM | |

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| 239. ​You are in a boat 2 miles from the nearest point on the coast. You are to go to point *Q* located 3 miles down the coast and 1 mile inland (see figure). You can row at a rate of 1 miles per hour and you can walk at a rate of 2 miles per hour. Toward what point on the coast should you row in order to reach point *Q* in the least time?    ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​3 miles | |  | b. | ​8 miles | |  | c. | ​2 miles | |  | d. | ​1 mile | |  | e. | ​5 miles |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 240. A wooden beam has a rectangular cross section of height *h* and width *w* (see figure). The strength *S* of the beam is directly proportional to the width and the square of the height. What are the dimensions of the strongest beam that can be cut from a round log of diameter *d* = 26 inches?  Round your answers to two decimal places.  [Hint:  where *k* > 0 is the proportionality constant.]    ​   |  |  |  | | --- | --- | --- | |  | a. | inches and  inches | |  | b. | inches and  inches | |  | c. | inches and  inches | |  | d. | inches and  inches | |  | e. | inches and  inches |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/31/2017 5:36 AM | |

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| 241. ​If the total revenue function for a blender is , determine how many units *x* must be sold to provide the maximum total revenue in dollars.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​625 | |  | b. | ​15,000 | |  | c. | ​25 | |  | d. | ​300 | |  | e. | ​50 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 242. ​If the total revenue function for a blender is ,  find the maximum revenue.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​$100 | |  | b. | ​$2,500 | |  | c. | ​$40 | |  | d. | ​$250 | |  | e. | ​$2,000 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 243. ​A firm has total revenue given by  for *x* units of a product. Find the maximum revenue from sales of that product.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​$2400 | |  | b. | ​$2432 | |  | c. | ​$404 | |  | d. | ​$3300 | |  | e. | ​$307 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 244. ​If the total cost function for a product is  dollars, determine how many units *x* should be produced to minimize the average cost per unit?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​450 units | |  | b. | ​400 units | |  | c. | ​141 units | |  | d. | ​200 units | |  | e. | ​97 units |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 245. ​If the total cost function for a product is  dollars. Find the minimum average cost.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​$14.25 per unit | |  | b. | $​18 per unit | |  | c. | ​$14.36 per unit | |  | d. | ​$14 per unit | |  | e. | ​$13 per unit |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 246. ​***Average costs.*** Suppose the average costs of a mining operation depend on the number of machines used, and average costs, in dollars, are given by , , where *x* is the number of machines used. How many machines give minimum average costs?  ​     |  |  |  | | --- | --- | --- | |  | a. | ​Using 14 machines gives the minimum average costs. | |  | b. | ​Using zero machines gives the minimum average costs. | |  | c. | ​Using 24 machines gives the minimum average costs. | |  | d. | ​Using 28 machines gives the minimum average costs. | |  | e. | ​Using 33 machines gives the minimum average costs. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 247. ​***Average costs.*** Suppose the average costs of a mining operation depend on the number of machines used, and average costs, in dollars, are given by , , where *x* is the number of machines used. What is the minimum average cost?  ​     |  |  |  | | --- | --- | --- | |  | a. | ​$0 | |  | b. | ​$35 | |  | c. | ​$490 | |  | d. | ​$245 | |  | e. | ​$8582 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 248. ​A firm can produce 100 units per week. If its total cost function is  dollars, and its total revenue function is  dollars, how many units *x* should it produce to maximize its profit?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​1250 units | |  | b. | ​650 units | |  | c. | ​97 units | |  | d. | ​50 units | |  | e. | ​100 units |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 249. ​A firm can produce 100 units per week. If its total cost function is  dollars, and its total revenue function is  dollars, find the maximum profit.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​$3,679 | |  | b. | ​$1,600 | |  | c. | ​$7,031 | |  | d. | ​$1,265 | |  | e. | ​$1,941 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 250. ​A travel agency will plan a tour for groups of size 53 or larger. If the group contains exactly 53 people, the price is $800 per person. However, each person’s price is reduced by $10 for each additional person above the 53. If the travel agency incurs a price of $150 per person for the tour, what size group will give the agency the maximum profit?     |  |  |  | | --- | --- | --- | |  | a. | ​6 | |  | b. | ​91 | |  | c. | ​59 | |  | d. | ​70 | |  | e. | ​32 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 251. A power station is on one side of a river that is 0.5 mile wide, and a factory is 6 miles downstream on the other side of the river. It costs $14 per foot to run overland power lines and $20 per foot to run underwater power lines. Estimate the value of *x* that minimizes the cost. The value of  is the length of the overland piece of power line.  ​   |  |  |  | | --- | --- | --- | |  | a. | 2.56 | |  | b. | 5.51 | |  | c. | 3 | |  | d. | 5.49 | |  | e. | 0.87 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/31/2017 5:48 AM | |

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| 252. ​Find the speed *v*, in miles per hour, that will minimize costs on a 125-mile delivery trip. The cost per hour for fuel is  dollars, and the driver is paid  dollars per hour. (Assume there are no costs other than wages and fuel.)  ​   |  |  |  | | --- | --- | --- | |  | a. | ​75 mph | |  | b. | ​125 mph | |  | c. | ​200 mph | |  | d. | 80​ mph | |  | e. | ​40 mph |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 253. ​Suppose the sales *S* (in billions of dollars per year) for Proctor & Gamble for the years 1997 through 2002 can be modeled by ,  where *t* represents the year. During which year were the sales increasing at the lowest rate?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​Sales are increasing at the lowest rate in the year 2002. | |  | b. | ​Sales are increasing at the lowest rate in the year 1997. | |  | c. | ​Sales are increasing at the lowest rate in the year 1998. | |  | d. | ​Sales are increasing at the lowest rate in the year 2000. | |  | e. | ​Sales are increasing at the lowest rate in the year 1999. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 254. ​*p* is in dollars and *q* is the number of units. Find the elasticity of the demand function  at the price .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–4.04 | |  | b. | ​1.00 | |  | c. | ​4.04 | |  | d. | ​–0.78 | |  | e. | ​0.78 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 255. ​A function and its graph are given. Use the graph to find the vertical asymptotes, if they exist, where  Confirm your results analytically.​  ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​**​** | |  | e. | ​no vertical asymptotes |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 256. ​A function and its graph are given. Use the graph to find the horizontal asymptotes, if they exist, where  Confirm your results analytically.​  ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​**​** | |  | e. | ​no horizontal asymptotes |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 257. ​A function and its graph are given. Use the graph to find the vertical asymptotes, if they exist. Confirm your results analytically.  ​  ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no vertical asymptotes |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 258. ​A function and its graph are given. Use the graph to find the horizontal asymptotes, if they exist. Confirm your results analytically.  ​  ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | no horizontal asymptotes |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 259. Analytically determine the location(s) of any vertical asymptote(s).  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​, | |  | d. | ​ | |  | e. | ​no vertical asymptotes |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 260. Analytically determine the location(s) of any horizontal asymptote(s).  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​, | |  | d. | ​ | |  | e. | ​no horizontal asymptotes |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 261. ​This problem contains a function and its graph, where . Use the graph to determine, as well as you can, the vertical asymptote. Check your conclusion by using the function to determine the vertical asymptote analytically.  ​  ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no vertical asymptote |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 262. ​This problem contains a function and its graph, where . Use the graph to determine, as well as you can, the horizontal asymptote. Check your conclusion by using the function to determine the horizontal asymptote analytically.  ​  ​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 263. Find any horizontal asymptotes for the given function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. | no horizontal asymptotes |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/28/2017 6:43 AM | |

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| 264. ​Find any vertical asymptotes for the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no vertical asymptotes |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 265. ​Find any horizontal asymptotes for the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no horizontal asymptotes |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 266. ​Find any vertical asymptotes for the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. |  | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no vertical asymptotes |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 267. ​Analytically determine the location of any vertical asymptotes.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no vertical asymptotes |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 268. ​Analytically determine the location of any horizontal asymptotes.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no horizontal asymptotes |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 269. ​Find any horizontal asymptotes for the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​no horizontal asymptotes |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 270. ​Match the function  with one of the following graphs.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 271. Match the function  with one of the following graphs.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 3/30/2017 3:35 AM | |

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| 272. ​Find the limit:  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​∞ | |  | b. | ​–∞ | |  | c. | ​0 | |  | d. | ​-1 | |  | e. | ​1 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 273. Find the limit:​  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0 | |  | b. | ​∞ | |  | c. | ​1 | |  | d. | ​-1 | |  | e. | ​–∞ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 274. ​For the function , use a graphing utility to complete the table and estimate the limit as *x* approaches infinity.  ​  ​   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 100 | 101 | 102 | 103 | 104 | 105 | 106 | | *f*(*x*) |  |  |  |  |  |  |  |   ​   |  |  |  | | --- | --- | --- | |  | a. | ​0.6 | |  | b. | ​2.5 | |  | c. | ​1.25 | |  | d. | ​3.68 | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 275. ​Use a table utility with *x*-values larger than 10,000 to investigate .What does the table indicate about ?    ​   |  |  |  | | --- | --- | --- | |  | a. | ​– 2 | |  | b. | ​2 | |  | c. | ​4 | |  | d. | ​0 | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 276. ​For the function , use a graphing utility to complete the table and estimate the limit as *x* approaches infinity.  ​  ​   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 100 | 101 | 102 | 103 | 104 | 105 | 106 | | *f*(*x*) |  |  |  |  |  |  |  |   ​   |  |  |  | | --- | --- | --- | |  | a. | ​2 | |  | b. | ​0.5 | |  | c. | ​1.5 | |  | d. | ​3 | |  | e. | ​1 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 277. ​Use analytic methods to find the limit as  for the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​2500 | |  | b. | ​2425 | |  | c. | ​–2425 | |  | d. | ​–2500 | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 278. ​Use analytic methods to find the limit as  for the given function.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | –​1400 | |  | b. | ​950 | |  | c. | ​–950 | |  | d. | ​1400 | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 279. ​Find the limit.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​1 | |  | d. | ​0 | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:04 AM | | *DATE MODIFIED:* | 1/21/2016 10:04 AM | |

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| 280. ​Find the limit.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​∞ | |  | b. | ​1 | |  | c. | ​0 | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 281. ​Find the limit.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​12 | |  | c. | ​–12 | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 282. ​Find the limit.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0 | |  | b. | ​ | |  | c. | ​ | |  | d. | ​∞ | |  | e. | ​–∞ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 283. ​Sketch the graph of the function  using any extrema, intercepts, symmetry, and asymptotes.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 284. ​Sketch the graph of the function  using any extrema, intercepts, symmetry, and asymptotes.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 285. ​Sketch the graph of the function  using any extrema, intercepts, symmetry, and asymptotes.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 286. Sketch the graph of the function  using any extrema, intercepts, symmetry, and asymptotes.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 3/27/2017 8:39 AM | |

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| 287. ​Sketch the graph of the equation given below. Use intercepts, extrema, and asymptotes as sketching aids.  ​  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 288. A business has a cost (in dollars) of  for producing *x* units. What is the limit of  as *x* approaches infinity?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​∞ | |  | b. | ​$0.40 | |  | c. | ​$900.40 | |  | d. | ​$900.00 | |  | e. | ​$899.60 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 289. ​The cost *C* (in millions of dollars) for the federal government to seize *p*% of a type of illegal drug as it enters the country is modeled by , for . Find the limit of *C* as .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​540 | |  | b. | ​100 | |  | c. | ​-100 | |  | d. | ​∞ | |  | e. | ​0 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 290. ​Analyze and sketch a graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 291. ​Analyze and sketch a graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 292. ​Sketch the graph of the function below.  Choose a scale that allows all relative extrema and points of inflection to be identified on the graph.  ​  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 293. ​Sketch the graph of the function given below. Choose a scale that allows all relative extrema and points of inflection to be identified on the graph.    ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​  ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 294. ​Analyze and sketch a graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 295. ​Analyze and sketch a graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​none of the above |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 296. ​Analyze and sketch a graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 297. ​Analyze and sketch a graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 298. ​Analyze and sketch a graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 299. ​Use the graph *f* ' to sketch the graph of *​f*​.    ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 300. ​Use the graph *f* '' to sketch the graph of *​f*​.    ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 301. ​An employee of a delivery company earns $25.00 per hour driving a delivery van in an area where gasoline costs $2.60 per gallon. When the van is driven at a constant speed *s* (in miles per hour, with ), the van gets  miles per gallon. Determine the most economical speed *s* for a 100-mile trip on an interstate highway.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The most economical speed is 52.0 mph. | |  | b. | ​The most economical speed is 48.0 mph. | |  | c. | ​The most economical speed is 25.0 mph. | |  | d. | ​The most economical speed is 50.0 mph. | |  | e. | ​The most economical speed is 53.0 mph. |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 302. ​Find the differential *dy* of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 303. ​Find the differential *dy* of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 304. ​Compare *dy* and Δ*y* for  at *​x*​ = 1 with *dx* = –0.01. Give your answers to four decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 305. ​Compare *dy* and Δ*y* for  at *​x*​ = –1 with Δ*​x*​ = *dx* = 0.01. Give your answers to four decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 306. ​Compare *dy* and Δ*y* for  at *​x*​ = 1 with Δ*​x*​ = *dx* = –0.09. Give your answers to four decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 307. Complete the table for the function . Let *x* = 3.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 2.00000 |  |  |  |  | | 1.00000 |  |  |  |  | | 0.20000 |  |  |  |  |   ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 2.00000 |  |  |  |  | | 1.00000 |  |  |  |  | | 0.20000 |  |  |  |  |   ​   |  | | --- | | *dy /*Δ*y* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | a. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 2.00000 | –0.22222 | –0.13333 | 0.08889 | 1.66667 | | 1.00000 | –0.11111 | –0.08333 | 0.02778 | 1.33333 | | 0.20000 | –0.05332 | –0.02083 | 0.00139 | 1.06888 |   ​ | b. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 2.00000 | –0.22222 | –0.13333 | 0.08889 | 1.66667 | | 1.00000 | –0.11111 | –0.39333 | 0.02778 | 1.33754 | | 0.20000 | –0.02222 | –0.02083 | 0.00139 | 1.06667 |   ​ | |  | c. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 2.00000 | –0.22222 | –0.13333 | 0.08889 | 1.66667 | | 1.00000 | –0.11111 | –0.08333 | 0.02778 | 1.33333 | | 0.20000 | –0.02222 | –0.02083 | 0.00139 | 1.06667 |   ​ | d. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 2.00000 | –0.17112 | –0.13333 | 0.08889 | 1.66667 | | 1.00000 | –0.11111 | –0.08333 | 0.02778 | 1.33333 | | 0.20000 | –0.05332 | –0.02083 | 0.00139 | 1.06888 | | |  | e. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 2.00000 | –0.17112 | –0.13333 | 0.08889 | 1.66667 | | 1.00000 | –0.11111 | –0.39333 | 0.02778 | 1.33754 | | 0.20000 | –0.05332 | –0.02083 | 0.00139 | 1.06888 | |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 3/30/2017 5:03 AM | |

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| 308. Complete the table for the function . Let *x* = 4.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 1.00000 |  |  |  |  | | 0.50000 |  |  |  |  | | 0.10000 |  |  |  |  |   ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 1.00000 |  |  |  |  | | 0.50000 |  |  |  |  | | 0.10000 |  |  |  |  |   ​   |  | | --- | | *dy /*Δ*y* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | a. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 1.00000 | 0.25000 | 0.23607 | –0.01393 | 1.05902 | | 0.50000 | 0.12500 | 0.12132 | –0.00368 | 1.03033 | | 0.10000 | –0.00610 | 0.02485 | –0.00015 | –0.00610 |   ​ | b. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 1.00000 | 0.25000 | 0.23607 | –0.01393 | 1.05902 | | 0.50000 | 0.12500 | 0.43132 | –0.00368 | 1.03454 | | 0.10000 | 0.02500 | 0.02485 | –0.00015 | 1.00621 |   ​ | |  | c. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 1.00000 | 0.25000 | 0.23607 | –0.01393 | 1.05902 | | 0.50000 | 0.12500 | 0.12132 | –0.00368 | 1.03033 | | 0.10000 | 0.02500 | 0.02485 | –0.00015 | 1.00621 |   ​ | d. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 1.00000 | 0.30110 | 0.23607 | –0.01393 | 1.05902 | | 0.50000 | 0.12500 | 0.12132 | –0.00368 | 1.03033 | | 0.10000 | –0.00610 | 0.02485 | –0.00015 | –0.00610 | | |  | e. | ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *dx* = Δ*x* | *dy* | Δ*y* | Δ*y – dy* | *dy /*Δ*y* | | 1.00000 | 0.30110 | 0.23607 | –0.01393 | 1.05902 | | 0.50000 | 0.12500 | 0.43132 | –0.00368 | 1.03454 | | 0.10000 | –0.00610 | 0.02485 | –0.00015 | –0.00610 | |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 3/28/2017 1:52 PM | |

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| 309. ​The revenue *R* for a company selling *x* units is . Use differentials to approximate the change in revenue if sales increase from  to  units.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​48,000 dollars | |  | b. | ​50,000 dollars | |  | c. | ​45,000 dollars | |  | d. | ​53,000 dollars | |  | e. | ​60000 dollars |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 310.  The variable cost for the production of a calculator is $13.75 and the initial investment is $210,000. Use differentials to approximate the change in the cost *C* for a one-unit increase in production when , where *x* is the number of units produced.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​687,500.00 dollars | |  | b. | ​14.75 dollars | |  | c. | ​688,500.00 dollars | |  | d. | ​13.75 dollars | |  | e. | ​23.75 dollars |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 311. ​The measurement of the circumference of a circle is found to be 54 centimeters, with a possible error of 0.7 centimeters. Approximate the percent error in computing the area of the circle.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​3.70 % | |  | b. | ​1.30 % | |  | c. | ​2.59 % | |  | d. | ​5.19 % | |  | e. | ​1.85 % |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 312. ​The measurement of the edge of a cube is found to be 18 inches, with a possible error of 0.7 inch. Use differentials to estimate the propagated error in computing (a) the volume of the cube and (b) the surface area of the cube. Give your answers to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​816.48, 151.20 | |  | b. | ​544.32, 136.08 | |  | c. | ​612.36, 136.08 | |  | d. | ​544.32, 120.96 | |  | e. | ​680.40, 151.20 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:05 AM | | *DATE MODIFIED:* | 1/21/2016 10:05 AM | |

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| 313. Evaluate the expression .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​125 | |  | b. | ​5 | |  | c. | ​25 | |  | d. | ​27 | |  | e. | ​29 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 314. Use the properties of exponents to simplify the expression .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 315. After *t* years, the remaining mass *y*(in grams) of 16 grams of a radioactive element whose half-life is 34 years is given by , for . How much of the initial mass remains after 136 years? Round your answer to two decimal places.   ​   |  |  |  | | --- | --- | --- | |  | a. | ​2.00 grams | |  | b. | ​2.20 grams | |  | c. | ​3.30 grams | |  | d. | ​2.90 grams | |  | e. | ​1.00 gram |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 316. Sketch the graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 317. ​With an annual rate of inflation of 4% over the next 10 years, the approximate cost of goods or services during any year in the decade is given by   where *t* is the time (in years) and *P* is the present cost. The price of an oil change for a car is presently $24.95. Estimate the price 10 years from now. Round your answer to the nearest cent.     |  |  |  | | --- | --- | --- | |  | a. | ​​$37.09 | |  | b. | ​$36.93 | |  | c. | ​​$89.00 | |  | d. | ​​$63.90 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 318. ​Use a graphing utility to graph the function .     |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 319. Use a graphing utility to graph the function .​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 320. Assume the population *P* (in millions) of the United States from 1992 through 2005 can be modeled by the exponential function , where *t* is the time in years, with  corresponding to 1992. Use the model to estimate the population in the year 2009. Round your answer to the nearest million.     |  |  |  | | --- | --- | --- | |  | a. | 5,973 million | |  | b. | 958 million | |  | c. | 1,336 million | |  | d. | 353 million | |  | e. | 5,972 million |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 3/27/2017 6:28 AM | |

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| 321. ​After *t* years, the value of a car that originally cost $18,000 depreciates so that each year it is worth  of its value for the previous year. Find a model for *V*(*t*), the value of the car after *t* years.     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 322. Suppose that the annual rate of inflation averages 4% over the next 10 years. With this rate of inflation, the approximate cost *C* of goods or services during any year in that decade will be given by ,  where *t* is time in years and *P* is the present cost. If the price of an oil change for your car is presently $25.95, estimate the price 10 years from now. Round your answer to two decimal places.     |  |  |  | | --- | --- | --- | |  | a. | $39.95 | |  | b. | $40.41 | |  | c. | $41.95 | |  | d. | $43.41 | |  | e. | $38.41 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 3/28/2017 5:15 AM | |

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| 323. Use the properties of exponents to simplify the expression .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 324. Sketch the graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 325. ​Sketch the graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 326. ​Use a graphing utility to graph the function . Be sure to choose an appropriate viewing window.   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 327. ​Determine whether the function below has any horizontal asymptotes.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​horizontal asymptotes: | |  | b. | ​no horizontal asymptotes | |  | c. | ​horizontal asymptotes: | |  | d. | ​horizontal asymptotes: | |  | e. | ​​horizontal asymptotes: |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 328. Determine the continuity of the function below.  ​    ​​   |  |  |  | | --- | --- | --- | |  | a. | ​discontinuous at | |  | b. | ​continuous on the entire real number line | |  | c. | ​discontinuous at | |  | d. | ​discontinuous at | |  | e. | ​discontinuous at |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 329. ​What is the resulting balance if $4,500 is invested for 5 years at an annual rate of 7% compounded monthly?     |  |  |  | | --- | --- | --- | |  | a. | ​$4,632.79 | |  | b. | ​$4,687.00 | |  | c. | ​$6,075.00 | |  | d. | ​$6,379.31 | |  | e. | ​$8,258.80 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 330. How much more interest will be earned if $7,000 is invested for 9 years at an annual rate of 9% compounded continuously, instead of at 9% compounded quarterly? Round your answer to the nearest cent.     |  |  |  | | --- | --- | --- | |  | a. | $47.49 | |  | b. | $93.15 | |  | c. | $140.64 | |  | d. | $2,924.71 | |  | e. | $3,017.87 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 7/20/2017 5:11 AM | |

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| 331. What lump sum should be deposited in an account that will earn at an annual rate of 9%, compounded quarterly, to grow to $150,000 for retirement in 20 years? Round your answer to the nearest cent.     |  |  |  | | --- | --- | --- | |  | a. | $147,330.10 | |  | b. | $18,292.68 | |  | c. | $53,571.43 | |  | d. | $24,961.93 | |  | e. | $25,294.49 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 7/20/2017 5:15 AM | |

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| 332. To help their son buy a car on his 16th birthday, a boy’s parents invest $1,900 on his 10th birthday. If the investment pays an annual rate of 9% compounded continuously, how much is available on his 16th birthday? Round your answer to the nearest cent.     |  |  |  | | --- | --- | --- | |  | a. | $3,240.96 | |  | b. | $3,260.41 | |  | c. | $3,186.49 | |  | d. | $2,926.00 | |  | e. | $16,475.16 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 7/20/2017 5:18 AM | |

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| 333. What is the annual percentage yield (or effective annual rate) for a nominal rate of 8.7% compounded quarterly? Round your answer to two decimal places.     |  |  |  | | --- | --- | --- | |  | a. | 8.70% | |  | b. | 9.06% | |  | c. | 9.09% | |  | d. | 8.99% | |  | e. | 8.89% |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 7/22/2017 6:17 AM | |

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| 334. Find the future value if $4,200 is invested for 6 years at an annual rate of 9% compounded quarterly.  ​   |  |  |  | | --- | --- | --- | |  | a. | $9,072.00 | |  | b. | $4,799.87 | |  | c. | $7,043.82 | |  | d. | $7,122.70 | |  | e. | $7,164.22 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 7/24/2017 7:26 AM | |

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| 335. ​The demand function for a product is modeled by . Find the price of the product if the quantity demanded is . Round your answer to two decimal places where applicable.     |  |  |  | | --- | --- | --- | |  | a. | ​$158.51 | |  | b. | ​$2,468.78 | |  | c. | ​$531.22 | |  | d. | ​$2,478.98 | |  | e. | ​$541.52 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 336. The demand function for a product is modeled by . What is the limit of the price as *x* increases without bound?     |  |  |  | | --- | --- | --- | |  | a. | The limit of the price as *x* increases without bound is -1. | |  | b. | The limit of the price as *x* increases without bound is 1. | |  | c. | The limit of the price as *x* increases without bound is 0. | |  | d. | The limit of the price as *x* increases without bound is 3,000. | |  | e. | The limit of the price as *x* increases without bound is 4. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 7/24/2017 7:55 AM | |

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| 337. ​The average time between incoming calls at a switchboard is 3 minutes. If a call has just come in, the probability that the next call will come within the next *t* minutes is . Find the probability that the next call will come within the next  minute. Round your answer to two decimal places.     |  |  |  | | --- | --- | --- | |  | a. | ​24.25% | |  | b. | ​2.43% | |  | c. | ​175.75% | |  | d. | ​26.48% | |  | e. | ​5.97% |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 338. ​Find the derivative of .     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 339. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 340. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 341. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 342. ​Find  if .     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 343. Find the derivative of the following function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 3/27/2017 6:45 AM | |

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| 344. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 345. ​Find  if .   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 346. ​Find the equation of the tangent line to  at the point .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 347. ​Find an equation of the tangent line to the graph of  at the point .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 348. ​Write the equation of the line tangent to the graph of .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 349. ​If , find .   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 350. If , find .​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 351. ​Use implicit differentiation to find .  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 352. ​If , find .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 353. ​Find , if  .     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 354. ​Find the extrema of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 355. ​Find the extrema of the function  by analyzing its graph below.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 356. ​Solve for the equation  for .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 357. ​The average typing speed *N* (in words per minute) after *t* weeks of lessons is modeled by . Find the rate at which the typing speed is changing when  weeks. Round your answer to two decimal places.    ​   |  |  |  | | --- | --- | --- | |  | a. | ​1.51 words/min/week | |  | b. | ​2.15 words/min/week | |  | c. | ​2.51 words/min/week | |  | d. | ​4.38 words/min/week | |  | e. | ​5.04 words/min/week |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 358. ***​Future value.*** The future value that accrues when $700 is invested at 9%, compounded continuously, is , where *t* is the number of years. At what rate is the money in this account growing when ?     |  |  |  | | --- | --- | --- | |  | a. | ​$10.03 per year | |  | b. | $65.57 per year​ | |  | c. | ​$1,003.33 per year | |  | d. | ​$725.66 per year | |  | e. | ​$90.30 per year |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 359. ​A survey of high school seniors from a certain school district who took the SAT has determined that the mean score on the mathematics portion was 500 with a standard deviation of 15.5. Assuming the data can be modeled by a normal probability density function, find a model for these data.     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 360. A survey of high school seniors from a certain school district who took the SAT has determined that the mean score on the mathematics portion was 450 with a standard deviation of 11.5. By a normal probability density function the data can be modeled as . Find the derivative of the model.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 361. Write the logarithmic equation  as an exponential equation.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 3/28/2017 5:45 AM | |

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| 362. ​Write the exponential equation  as a logarithmic equation.     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 363. ​Sketch the graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 364. ​Sketch the graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 365. ​Sketch the graph of the function .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 366. ​Simplify .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 367. ​Simplify .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 368. ​Use the properties of logarithms to approximate , given that .   ​   |  |  |  | | --- | --- | --- | |  | a. | ​–4.9767 | |  | b. | ​–1.7579 | |  | c. | ​0.4780 | |  | d. | ​5.4195 | |  | e. | ​4.9767 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 369. ​Use the properties of logarithms to expand .     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 370. ​Use the properties of logarithms to expand .   ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 371. ​Use the properties of logarithms to write the expression  as a sum, difference, or multiple of logarithms.     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 372. ​Use the properties of logarithms to write the expression as a single logarithm.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 373. ​Write the expression  as the logarithm of a single quantity.     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 374. ​Write the expression  as the logarithm of a single quantity.     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 375. ​Write the following expression as a logarithm of a single quantity.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 376. ​Write the following expression as a logarithm of a single quantity.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 377. Solve the following equation for *x* accurate to three decimal places.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 3/27/2017 6:56 AM | |

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| 378. ​Solve the following equation for *x* accurate to three decimal places.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 379. ​Solve the exponential equation. Give the answer correct to 3 decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0.675 | |  | b. | ​3.374 | |  | c. | ​7.410 | |  | d. | ​0.599 | |  | e. | ​14.979 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 380. ​Solve the exponential equation. Give the answer correct to 3 decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​–0.219 | |  | b. | ​2.033 | |  | c. | ​0.274 | |  | d. | ​–2.033 | |  | e. | ​–0.224 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 381. ​Solve the exponential equation. Give the answer correct to 3 decimal places.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​–2.993 | |  | b. | ​–0.100 | |  | c. | ​2.182 | |  | d. | ​–1.091 | |  | e. | ​5.986 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 382. Solve the exponential equation. Give answers correct to 3 decimal places.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | 343 | |  | b. | 0.571 | |  | c. | 0.712 | |  | d. | 0.356 | |  | e. | 0.805 |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 3/27/2017 6:56 AM | |

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| 383. Solve the following equation for accurate to three decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 3/27/2017 6:57 AM | |

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| 384. ​Solve  for *t*. Round your answer to four decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​1.4454 | |  | b. | ​0.3611 | |  | c. | ​2.6344 | |  | d. | ​0.3614 | |  | e. | ​2.7184 |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 385. ​How long (in years) would $800 have to be invested at an annual rate of  11%, compounded continuously, to amount to $1060? Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​2.95 years | |  | b. | ​2.70 years | |  | c. | ​0.56 years | |  | d. | 3.38​ years | |  | e. | ​2.56 years |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 386. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 387. ​Find the derivative of the following function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 388. ​Find the derivative of the following function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:06 AM | | *DATE MODIFIED:* | 1/21/2016 10:06 AM | |

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| 389. ​Find the derivative of .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 390. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 391. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 392. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 393. ​Find the derivative of the function .     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 394. ​Find the derivative of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 395. ​Find the derivative of the function .     |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 396. ​Find*​* .    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 397. ​Find .  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 398. ​Find .  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 399. ​Find .  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 400. ​Find , if .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 401. ​Find , if .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 402. ​Find , if .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 403. ​Find , if .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 404. ​Find , if .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 405. Use a change-of-base formula to rewrite the logarithm in terms of natural logarithms.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 7/25/2017 11:26 AM | |

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| 406. ​Use a calculator to evaluate the logarithm . Round your answer to three decimal places.     |  |  |  | | --- | --- | --- | |  | a. | ​0.195 | |  | b. | ​2.464 | |  | c. | ​6.402 | |  | d. | ​3.737 | |  | e. | ​5.129 |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 407. Find .  ​    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 7/25/2017 11:29 AM | |

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| 408. ​Find the derivative of the following function.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 409. Find .  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 410. ​Find , if  .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 411. For , calculate  to three decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | 1.609 | |  | b. | 24.142 | |  | c. | 7.828 | |  | d. | 0.600 | |  | e. | 4.828 |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 7/26/2017 2:19 AM | |

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| 412. ​Find an equation of the tangent line to the graph of  at the point (64, 3).  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​none of the above |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 413. ​If , find .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 414. ​Write the equation of the line tangent to the curve  at the point (2, 1).  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 415. ​Find the second derivative of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 416. ​Find the second derivative of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 417. ​The relationship between the number of decibels *β* and the intensity of a sound *I* in watts per square centimeter is given by . Find the rate of change in the number of decibels when the intensity is  watt per square centimeter. Round your answer to the nearest decibel.     |  |  |  | | --- | --- | --- | |  | a. | ​317 decibels per watt per square cm | |  | b. | ​25,645 decibels per watt per square cm | |  | c. | ​2,849 decibels per watt per square cm | |  | d. | ​230,802 decibels per watt per square cm | |  | e. | ​2,851 decibels per watt per square cm |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 418. ​Find the relative minima, and use a graphing utility to check your results.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​0 | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 419. ​Find the relative maxima, and use a graphing utility to check your results. Round your answer to the two decimal places.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 420. ​Locate any relative extrema and inflection points of the function . Use a graphing utility to confirm your results.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​relative maximum value  at ; inflection point at | |  | b. | ​​relative minimum value  at ; inflection point at | |  | c. | ​​​relative minimum value  at ; no inflection points | |  | d. | ​relative minimum value  at ; no inflection points | |  | e. | ​​relative maximum value  at ; no inflection points |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 421. ​Locate any relative extrema and inflection points of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​no relative extrema; inflection point at | |  | b. | ​relative maximum at ; inflection point at | |  | c. | ​relative minimum at ; inflection point at | |  | d. | ​no relative extrema; inflection point at | |  | e. | ​relative minimum at ; no inflection points |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 422. ​Locate any relative extrema and inflection points of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​relative minimum at ; inflection point at | |  | b. | ​relative minimum at ; no inflection points | |  | c. | ​no relative maximum or minimum; inflection point at | |  | d. | ​no relative extrema or inflection points. | |  | e. | ​relative maximum at ; inflection point at |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 423. ​Find the *y*-value at the relative minima, and use a graphing utility to check your result.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​does not exist |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 424. The cost of producing *x* units of a product is modeled by . Find the average cost function .  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 425. The cost of producing *x* units of a product is modeled by . Find the minimum average cost analytically. Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​400.00 dollars per unit | |  | b. | ​381.19 dollars per unit | |  | c. | 374.43​ dollars per unit | |  | d. | 376.66​ dollars per unit | |  | e. | ​374.53 dollars per unit |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 426. Find the exponential function  that passes through the two given points (0, 7) and (6, 8).     |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 3/31/2017 6:30 AM | |

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| 427. ​  ​Use the given information to write an equation for *y*.   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 428. ​Carbon-14 (14C) dating assumes that the carbon on the Earth today has the same radioactive content as it did centuries ago. If this is true, then the amount of 14C absorbed by a tree that grew several centuries ago should be the same as the amount of 14C absorbed by a similar tree today. A piece of ancient charcoal contains only 24% as much of the radioactive carbon as a piece of modern charcoal. How long ago was the tree burned to make the ancient charcoal? (The half-life of 14C is 5715 years.) Round your answer to the nearest integer.    ​   |  |  |  | | --- | --- | --- | |  | a. | ​2,776 years | |  | b. | ​30,751 years | |  | c. | ​2,781 years | |  | d. | ​11,767 years | |  | e. | ​11,772 years |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 429. ​The number of a certain type of bacteria increases continuously at a rate proportional to the number present. There are 100 present initially, and 200 present 6 hours later. How many will there be 20 hours after the initial time? Round your answer to the nearest integer.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​10 bacteria | |  | b. | 903 ​bacteria | |  | c. | ​1,008 bacteria | |  | d. | ​23 bacteria | |  | e. | ​18 bacteria |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 430. The effective yield is the annual rate *i* that will produce the same interest per year as the nominal rate compounded *n* times per year. For a rate that is compounded *n* times per year, the formula for effective yield is given as . Find the effective yield for a nominal rate of 9%, compounded monthly. Round your answer to two decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​0.94% | |  | b. | ​9.62% | |  | c. | ​10.01% | |  | d. | ​1.50% | |  | e. | ​9.38% |  |  |  | | --- | --- | | *ANSWER:* | e | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 431. ​The cumulative sales (in thousands of units) of a new product after it has been on the market for *t* years may be modeled by . During the first year, 5000 units were sold. What is the saturation point for this product? How many units will be sold after 5 years?  ​   |  |  |  | | --- | --- | --- | |  | a. | ​The saturation point for the market is 3,000 units and 17,944 units will be sold after 5 years. | |  | b. | ​The saturation point for the market is 30,000 units and 26,049 units will be sold after 5 years. | |  | c. | ​The saturation point for the market is 30,000 units and 17,944 units will be sold after 5 years. | |  | d. | ​The saturation point for the market is 30,000 units and 18,067 units will be sold after 5 years. | |  | e. | ​The saturation point for the market is 3,000 units and 26,049 units will be sold after 5 years. |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 432. ​Use the given information to write an exponential equation for *y*. Does the function represent exponential growth or exponential decay?    ​, when   |  |  |  | | --- | --- | --- | |  | a. | ​, exponential decay | |  | b. | ​, exponential growth | |  | c. | ​, exponential decay | |  | d. | ​, exponential growth |  |  |  | | --- | --- | | *ANSWER:* | b | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 433. ​What percent of a present amount of radioactive radium  will remain after 900 years? The half–life of radium is 1,600 years.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​45% | |  | b. | ​25% | |  | c. | ​65% | |  | d. | ​68% |  |  |  | | --- | --- | | *ANSWER:* | d | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 434. The management of a factory finds that the maximum number of units a worker can produce in a day is 30. The learning curve for the number of units *N* produced per day after a new employee has worked days is modeled by . After 20 days on the job, a worker is producing 19 units in a day. How many days should pass before this worker is producing 25 units per day?  ​   |  |  |  | | --- | --- | --- | |  | a. | about 36 days. | |  | b. | about 45 days. | |  | c. | about 30 days. | |  | d. | about 10 days. |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 7/26/2017 4:05 AM | |

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| 435. ​Determine the principal *P* that must be invested at interest rate *r* compounded continuously, so that $1,000,000 will be available for retirement in years , . Round your answer to the nearest cent.  ​   |  |  |  | | --- | --- | --- | |  | a. | ​$49787.07 | |  | b. | ​$50787.07 | |  | c. | ​$49000.04 | |  | d. | ​$40000.06 |  |  |  | | --- | --- | | *ANSWER:* | a | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | False | | *DATE CREATED:* | 1/21/2016 10:07 AM | | *DATE MODIFIED:* | 1/21/2016 10:07 AM | |

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| 436. Copy the points (–5, 5), (3, –3), (–1, –2), (3, 0), (1, –6) in the Cartesian plane.  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | | *POINTS:* | 1 | | *QUESTION TYPE:* | Multiple Choice | | *HAS VARIABLES:* | True | | *DATE CREATED:* | 12/10/2015 11:11 PM | | *DATE MODIFIED:* | 12/30/2015 11:21 AM | |