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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Which of the following is the correct graph of ?  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 2. Which of the following is the correct graph of ?  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. Which of the following is the correct graph of ?  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 4. Which of the following is the correct graph of ?  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 5. Find all intercepts:  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | *x*-intercepts: (8,0), (–4,0); *y*-intercepts: (0, 8), (0, 4) | |  | b. | *x*-intercept: (32, 0); *y*-intercepts: (0, 8), (0, 4) | |  | c. | *x*-intercepts: (8, 0), (–4,0); *y*-intercept: (0, –32) | |  | d. | *x*-intercepts: (8, 0), (–4,0); *y*-intercepts: (0, –32), (0, 32) | |  | e. | *x*-intercept: (–4, 0); *y*-intercept: (0, –32) |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 6. Find all intercepts:  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | *x*-intercepts: (–3, 0), (3, 0); no *y*-intercept | |  | b. | *x*-intercept: (0, 0); *y*-intercepts: (0, 0), (0, –3), (0, 3) | |  | c. | *x*-intercepts: (0, 0), (–3, 0), (3, 0); *y*-intercept: (0, 0) | |  | d. | *x*-intercepts: (0, 0), (–3, 0), (3, 0); no *y*-intercept | |  | e. | *x*-intercepts: (–3, 0), (3, 0); *y*-intercept: (0, 0) |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 7. Find all intercepts:  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | *x*-intercepts: (3, 0), (–4, 0), (4, 0); *y*-intercepts: (0, 0), (0, –12) | |  | b. | *x*-intercepts: (3, 0), (4, 0); *y*-intercept: (0, –12) | |  | c. | *x*-intercepts: (3, 0), (4, 0); *y*-intercept: (0, 12) | |  | d. | *x*-intercepts: (3, 0), (–4, 0), (4, 0); *y*-intercept: (0, –12) | |  | e. | *x*-intercepts: (3, 0), (–4, 0), (4, 0); *y*-intercept: (0, 12) |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 8. Test for symmetry with respect to each axis and to the origin.  ​   |  |  |  | | --- | --- | --- | |  | a. | symmetric with respect to the origin | |  | b. | symmetric with respect to the *x*-axis | |  | c. | symmetric with respect to the *y*-axis | |  | d. | no symmetry | |  | e. | a, b, and c |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 9. Test for symmetry with respect to each axis and to the origin.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | symmetric with respect to the origin | |  | b. | symmetric with respect to the *y*-axis | |  | c. | symmetric with respect to the *x*-axis | |  | d. | both B and C | |  | e. | no symmetry |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 10. Sketch the graph of the equation:  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. | non of the above |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 11. Sketch the graph of the equation:  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 12. Sketch the graph of the equation:  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. | non of the above |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 13. Find the points of intersection of the graphs of the equations:  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 14. The table given below shows the Consumer Price Index (CPI) for selected years. Use the regression capabilities of a graphing utility to find a mathematical model of the form for the data. In the model, represents the CPI and represents the year, with corresponding to 1975. Round all numerical values in your answer to three decimal places.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Year | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 | | CPI | 56.5 | 80.4 | 105.5 | 130.7 | 152.4 | 171.6 | 195.6 |   ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 15. The table given below shows the Consumer Price Index (CPI) for selected years. Use a graphing utility to plot the data and graph the model , where *y* represents the CPI and *t* represents the year with corresponding to 1975.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Year | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 | | CPI | 55.5 | 80.6 | 105.5 | 135.5 | 160.5 | 172.5 | 150.5 |   ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 16. The table given below shows the Consumer Price Index (CPI) for selected years. The mathematical model for the data given below is where *y* represents the CPI and *t* represents the year, with corresponding to 1975. Use the model to predict the CPI for the year 2010. Round your answer to the nearest integer.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Year | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 | | CPI | 57.8 | 80.6 | 103.6 | 130.7 | 152.4 | 170.5 | 192.5 |   ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 17. Find the sales necessary to break even  if the cost  of producing  units is and the revenue *R* for selling *x* units is . Round your answer to the nearest integer.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 18. The resistance *y* in ohms of 1000 feet of solid metal wire at  can be approximated by the model where *x* is the diameter of the wire in mils (0.001 in). Use a graphing utility to graph the model .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 19.  The resistance *y* in ohms of 1000 feet of solid metal wire at  can be approximated by the model ,  where is the diameter of the wire in mils (0.001 in). If the diameter of the wire is doubled, the resistance is changed by approximately what factor? In determining your answer, you can ignore the constant –0.38.  ​   |  |  |  | | --- | --- | --- | |  | a. | 5 | |  | b. |  | |  | c. | 4 | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 20. Estimate the slope of the line from the graph.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | 6 | |  | c. | 3 | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 21. Sketch the line passing through the point (4, 3) with the slope .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 22. Find the slope of the line passing through the pair of points.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. | 0 |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 23. Find the slope of the line passing through the points and .  ​   |  |  |  | | --- | --- | --- | |  | a. | 16 | |  | b. | -2 | |  | c. |  | |  | d. | 2 | |  | e. | - |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 24. If a line has slope and passes through the point , through which of the following points does the line also pass?  ​   |  |  |  | | --- | --- | --- | |  | a. | (3, 12) | |  | b. | (3, 5) | |  | c. | (3, –12) | |  | d. | (7, –15) | |  | e. | (7, –28) |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 25. A moving conveyor is built to rise 9 meters for every 11 meters of horizontal change. Find the slope of the conveyor.  ​   |  |  |  | | --- | --- | --- | |  | a. | 0 | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 26. A moving conveyor is built to rise 1 meter for every 7 meters of horizontal change. Suppose the conveyor runs between two floors in a factory. Find the length of the conveyor if the vertical distance between floors is 10 meters. Round your answer to the nearest meter.  ​   |  |  |  | | --- | --- | --- | |  | a. | 81 meters | |  | b. | 59 meters | |  | c. | 71 meters | |  | d. | 70 meters | |  | e. | 61 meters |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 27. Find the slope of the line .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 28. Find the *y*-intercept of the line .  ​   |  |  |  | | --- | --- | --- | |  | a. | (0, 5) | |  | b. | (0, 7) | |  | c. | (0, 35) | |  | d. | (7, 0) | |  | e. | (5, 0) |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 29. Find an equation of the line that passes through the point (7, –5) and has the slope *m* that is undefined.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 30. Find an equation of the line that passes through the point and has the slope .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 31. Find an equation of the line that passes through the points and .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 32. Find an equation of the line that passes through the points and .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 33. Use the result, “the line with intercepts  and  has the equation , , ”, to write an equation of the line with and *y*-intercept: .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 34. Sketch a graph of the equation .  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 35. Write an equation of the line that passes through the given point and is perpendicular to the given line.  Point             Line  ​    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 36. Write an equation of the line that passes through the given point and is parallel to the given line.  Point          Line  ​    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 37. Write an equation of the line that passes through the point and is perpendicular to the line .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 38. Write an equation of the line that passes through the point and is parallel to the line .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 39. Suppose that the dollar value of a product in and the rate at which the value of the product is expected to increase per year during the next . Write a linear equation that gives the dollar value of the product in terms of the year . (Let represent 2,000.) Round the numerical values in your answer to one decimal place, where applicable.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 40. Find an equation of the line through the points of intersection of  and .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 41. A company reimburses its sales representatives per day for lodging and meals plus ¢ per mile driven. Write a linear equation giving the daily cost to the company in terms of , the number of miles driven. Round the numerical values in your answer to two decimal places, where applicable.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 42. A company reimburses its sales representatives per day for lodging and meals plus ¢ per mile driven. How much does it cost the company if a sales representative drives miles on a given day? Round your answer to the nearest cent.  ​   |  |  |  | | --- | --- | --- | |  | a. | 231.00 | |  | b. | 221.40 | |  | c. | 142.41 | |  | d. | 166.41 | |  | e. | 197.40 |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 43. A real estate office handles an apartment complex with 50 units. When the rent is per month, all 50 units are occupied. However, when the rent is , the average number of occupied units drops to 47. Assume that the relationship between the monthly rent and the demand is linear. Write a linear equation giving the demand in terms of the rent .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 44. A real estate office handles an apartment complex with 50 units. When the rent is per month, all 50 units are occupied. However, when the rent is , the average number of occupied units drops to 47. Assume that the relationship between the monthly rent and the demand is linear. Predict the number of units occupied if the rent is raised to .  ​   |  |  |  | | --- | --- | --- | |  | a. | 37 units | |  | b. | 60 units | |  | c. | 63 units | |  | d. | 43 units | |  | e. | 40 units |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 45. Find the distance between the point and line using the formula, for the distance between the point and the line .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 46. Evaluate (if possible) the function at . Simplify the result.  ​   |  |  |  | | --- | --- | --- | |  | a. | 9 | |  | b. | 31 | |  | c. | 7 | |  | d. | 33 | |  | e. | undefined |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 47. Evaluate (if possible) the function  at . Simplify the result.  ​   |  |  |  | | --- | --- | --- | |  | a. | 2 | |  | b. | undefined | |  | c. | –1 | |  | d. | 3 | |  | e. | 1 |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 48. Evaluate (if possible) the function  at . Simplify the result.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 49. Let . Then simplify the expression .  ​   |  |  |  | | --- | --- | --- | |  | a. | –1 | |  | b. | –2 | |  | c. | 3 | |  | d. | –5 | |  | e. | undefined |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 50. Let . Evaluate the expression and then simplify the result.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. | undefined |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 51. Find the domain and range of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | domain:  range: | |  | b. | domain:  range: | |  | c. | domain:  range: | |  | d. | domain:  range: | |  | e. | domain:  range: |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 52. Find the domain and range of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | domain:  range: | |  | b. | domain:  range: | |  | c. | domain:  range: | |  | d. | domain:  range: | |  | e. | none of the above |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 53. Find the domain and range of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | domain:  range: | |  | b. | domain:  range: | |  | c. | domain:  range: | |  | d. | domain:  range: | |  | e. | domain:  range: |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 54. Evaluate the function at *f*(2).  ​   |  |  |  | | --- | --- | --- | |  | a. | *f*(2) = 3 | |  | b. | *f*(2) = 2 | |  | c. | *f*(2) = 7 | |  | d. | *f*(2) = 5 | |  | e. | *f*(2) = 6 |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 55. Determine the domain and range of the function .  ​   |  |  |  | | --- | --- | --- | |  | a. | domain:  range: | |  | b. | domain:  range: | |  | c. | domain:  range: | |  | d. | domain:  range: | |  | e. | domain:  range: |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 56. Determine whether *y* is a function of *x*.  *y* – 4*x*2 = 3  ​   |  |  |  | | --- | --- | --- | |  | a. | no | |  | b. | yes |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 57. Determine whether *y* is a function of *x*.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | no | |  | b. | yes |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 58. Use the graph of *y* = *f*(*x*) given below to find the graph of the function *y* = *f*(*x* + 1).  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 59. Use the graph of *y* = *f*(*x*) given below to find the graph of the function *y* = *f*(*x*) + 4.  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. |  | b. |  | |  | c. |  | d. |  | |  | e. |  |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 60. Specify a sequence of transformations for the function that will yield the graph of *h* from the graph of the function *f*(*x*) = sin*x*.  ​   |  |  |  | | --- | --- | --- | |  | a. | The function is a horizontal shift  *unit* to the right, followed by a vertical shift 3 *units* downwards. | |  | b. | The function is a horizontal shift  *unit* to the left, followed by a vertical shift 3 *units* upwards. | |  | c. | The function is a horizontal shift  *unit* to the left, followed by a horizontal shift 3 *units* to the right. | |  | d. | The function is a vertical shift  *unit* downwards, followed by a horizontal shift 3 *units* to the right. | |  | e. | The function is a vertical shift  *unit* upwards, followed by a horizontal shift 3 *units* to the left. |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 61. Given  *f*(*x*) = cos *x* and , evaluate *f*(*g*(–3)).  ​   |  |  |  | | --- | --- | --- | |  | a. | 1 | |  | b. |  | |  | c. |  | |  | d. | 0 | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 62. An open box of maximum volume is to be made from a square piece of material 22 centimeters on a side by cutting equal squares from the corners and turning up the sides (see figure). Write the volume *V* as a function of *x*, the length of the corner squares.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | *V* = *x*(22 - 2*x*)2 | |  | b. | *V* = *x +* (22 - 2*x*)2 | |  | c. | *V* = *x*2 *+* (22 - 2*x*) | |  | d. | *V* = *x*2(22 - 2*x*) | |  | e. | *V* = *x*(22 - 2*x*) |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 63. Determine whether the function is even, odd, or neither.  ​  *f*(*x*) = *x*2(4 - *x*)2  ​   |  |  |  | | --- | --- | --- | |  | a. | odd | |  | b. | even | |  | c. | neither |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 64. Determine whether the function is even, odd, or neither.  ​  *f*(*x*) = *x* sin2*x*  ​   |  |  |  | | --- | --- | --- | |  | a. | even | |  | b. | odd | |  | c. | neither |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 65. Find the coordinates of a second point on the graph of a function *f* if the given point is on the graph and the function is even.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 66. Find the coordinates of a second point on the graph of a function *f* if the given point is on the graph and the function is odd.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 67. The horsepower *H* required to overcome wind drag on a certain automobile is approximated by *H*(*x*) = 0.004*x*2 + 0.002*x* - 0.026, 10 ≤ *x* ≤ 100, where *x* is the speed of the car in miles per hour. Find . Round the numerical values in your answer to five decimal places.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 68. An open box of maximum volume is to be made from a square piece of material 30 centimeters on a side by cutting equal squares from the corners and turning up the sides(see figure). What is the domain of the function *V* = *x*(30 - 2*x*)2.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | domain: 0 < *x* < ∞ | |  | b. | domain: 30 | |  | c. | domain: 0 < *x* < 15 | |  | d. | domain: 0 < *x* < 30 | |  | e. | domain: 15 |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 69. Determine two coterminal angles in degree measure (one positive and one negative) for the angle.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 128, –128 | |  | b. | 412, –412 | |  | c. | 308, –308 | |  | d. | 308, –412 | |  | e. | 412, –308 |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 70. Determine two coterminal angles in radian measure (one positive and one negative) for the angle.  ​  ​  where .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 71. Convert the degree measure to radian measure as a multiple of and as a decimal accurate to three decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 72. Convert the radian measure to degree measure.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 73. Find , , and .  ​  ​  where , , and .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 74. Evaluate the six trigonometric functions of the angle .  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 75. Evaluate the sine, cosine, and tangent of the angle. Do not use a calculator.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 76. Evaluate the sine, cosine, and tangent of the angle. Do not use a calculator.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 77. Use a calculator to evaluate each trigonometric function. Round your answers to four decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | –0.8660 | |  | b. | –0.5000 | |  | c. | 0.8660 | |  | d. | 0.5000 | |  | e. | –1.1547 |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 78. Use a calculator to evaluate each trigonometric function. Round your answers to four decimal places.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 14.1014 | |  | b. | 0.0709 | |  | c. | 0.9975 | |  | d. | 0.0707 | |  | e. | 1.0025 |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 79. Determine the quadrant in which lies.  ​   and  ​   |  |  |  | | --- | --- | --- | |  | a. | IV Quadrant | |  | b. | II Quadrant | |  | c. | I Quadrant | |  | d. | III Quadrant |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 80. Determine the quadrant in which lies.  ​   and  ​   |  |  |  | | --- | --- | --- | |  | a. | II Quadrant | |  | b. | III Quadrant | |  | c. | I Quadrant | |  | d. | IV Quadrant |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 81. Find two solutions of the equation. Give your answers in radians (). Do not use a calculator.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 82. Solve the equation for , where .  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 83. Solve the equation for , where .  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 84. Determine the period and amplitude of the function.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | Amplitude: –3; Period: | |  | b. | Amplitude: 3; Period: | |  | c. | Amplitude: 3; Period: | |  | d. | Amplitude: –3; Period: | |  | e. | Amplitude: not applicable; Period: |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 85. Sketch the graph of the function.  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 86. Sketch the graph of the function.  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 87. Find , , and such that the graph of the function matches the graph in the figure.  ​  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 88. An airplane leaves the runway climbing at an angle of with a speed of 270 feet per second (see figure). Find the altitude a of the plane after 1 minute.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 74 ft | |  | b. | 4,465 ft | |  | c. | 15,572 ft | |  | d. | 16,200 ft | |  | e. | 1,361 ft |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 89. Match the graph of the function given below with the graph of its inverse function.  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 90. Match the graph of the function given below with the graph of its inverse function.  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​ | d. | ​ | |  | e. | ​ |  |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 91. Use the Horizontal Line Test to determine whether the following statement is true or false.  ​  The function is one-to-one on its entire domain and therefore has an inverse function.  ​   |  |  |  | | --- | --- | --- | |  | a. | false | |  | b. | true |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 92. Use the Horizontal Line Test to determine whether the following statement is true or false.  ​  The function is one-to-one on its entire domain and therefore has an inverse function.  ​   |  |  |  | | --- | --- | --- | |  | a. | true | |  | b. | false |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 93. True or False: The function is one-to-one on its entire domain.  ​   |  |  |  | | --- | --- | --- | |  | a. | false | |  | b. | true |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 94. True or False: The function is one-to-one on the domain .  ​   |  |  |  | | --- | --- | --- | |  | a. | false | |  | b. | true |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 95.  Find  if .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 96. Find  if .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 97. Find  if .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 98. Find  if .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 99. Find  if .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 100. Find  if .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. | does not exist |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 101. Find  if .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 102. You need 50 pounds of two commodities costing $ and $ per pound. Find the inverse function of the cost function .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 103. You need 50 pounds of two commodities costing $1.55 and $1.90 per pound. Determine the number of pounds of the less expensive commodity purchased if the total cost is .  ​   |  |  |  | | --- | --- | --- | |  | a. | 20 pounds | |  | b. | 27 pounds | |  | c. | 17 pounds | |  | d. | 15 pounds | |  | e. | 23 pounds |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 104. Use the functions and to find the function .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 105. Use the functions and to find the function .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 106. Evaluate the expression  without using a calculator.  ​   |  |  |  | | --- | --- | --- | |  | a. | 0 | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 107. Evaluate the expression without using a calculator.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 108. Evaluate the expression  without using a calculator.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 109. Write the following expression in algebraic form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 110. Write the following expression in algebraic form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 111. Write the following expression in algebraic form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 112. Solve the following equation for .  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 113. Solve the following equation for .  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  |  |  |  | | --- | --- | | *ANSWER:* | e | |