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| 1. Do the operation and express the answer in *a* + *bi* form. Use fractions in your answer.  ​ |

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| *Indicate the answer choice that best completes the statement or answers the question.* |

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| 2. Write the expression as a single radical. Then simplify your answer.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 3. Solve the following absolute value equation for *q*.  ​   |  |  |  | | --- | --- | --- | |  | a. | –3, 13 | |  | b. | –3, –1 | |  | c. | 13 | |  | d. | –3, 3 | |  | e. | –1 | |

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| 4. Place the correct symbol ( <, >, or = ) between the two real numbers.  ​  | –4 |     4  ​   |  |  |  | | --- | --- | --- | |  | a. | | –4 | = 4 | |  | b. | | –4 | ≥ 4 | |  | c. | | –4 | ≤ 4 | |  | d. | | –4 | < 4 | |  | e. | | –4 | > 4 | |

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| 5. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 6. Approximate the numbers and place the correct symbol (< or >) between them.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | –4.5 > 2 | |  | b. | –4.5 ≤ 2 | |  | c. | –4.5 = 2 | |  | d. | –4.5 < 2 | |  | e. | –4.5 ≥ 2 | |

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| 7. Evaluate the expression without using a calculator.    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. | 128 | |  | e. | –128 | |

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| 8. The height, *h*, in feet, of a baseball above the ground *t* seconds after it is hit is given by . Use this equation to determine the number of seconds, to the nearest tenth of a second, from the time the ball is hit until the ball hits the ground.  ​   |  |  |  | | --- | --- | --- | |  | a. | 3.8 s | |  | b. | 3.9 s | |  | c. | 4.0 s | |  | d. | 4.1 s | |  | e. | 4.2 s | |

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| 9. Write the number in scientific notation.  ​  12,000.4  ​   |  |  |  | | --- | --- | --- | |  | a. | 1.20004 × 102 | |  | b. | 12,000.4 × 102 | |  | c. | 12,000.4 × 104 | |  | d. | 1.20004 × 104 | |  | e. | 1.20004 × 103 | |

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| 10. Simplify the radical expression.    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 11. Solve the following equation (if possible) :  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 7 | |  | b. | -5 | |  | c. | -7 | |  | d. | 5 | |  | e. | No solution | |

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| 12. Simplify the following expression.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 13. Perform the operation and write the result in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 14. Find real numbers *a* and *b* such that the equation is true.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 15. Factor out the common factor.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 16. Simplify the complex fraction.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 17. Evaluate the following expression.  ​  42 · 4  ​   |  |  |  | | --- | --- | --- | |  | a. | 9 | |  | b. | 68 | |  | c. | 27 | |  | d. | 67 | |  | e. | 64 | |

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| 18. Factor the trinomial.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 19. Evaluate when *y* = 5 and *z* = –2.  ​   |  |  |  | | --- | --- | --- | |  | a. | –60 | |  | b. | 3,000 | |  | c. | –216,000 | |  | d. | –1,500 | |  | e. | –1,200 | |

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| 20. Plot the following real number on the real number line.  ​  –3.5  ​   |  |  |  | | --- | --- | --- | |  | a. | ​ | |  | b. | ​ | |  | c. | ​ | |  | d. | ​ | |  | e. | ​ | |

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| 21. Write the complex number in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 9*i* | |  | b. | –9*i* | |  | c. | 81*i* | |  | d. | 10*i* | |  | e. | –81*i* | |

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| 22. Use a calculator to approximate the number. (Round your answer to three decimal places.)    ​   |  |  |  | | --- | --- | --- | |  | a. | 2.520 | |  | b. | 48.000 | |  | c. | 4.000 | |  | d. | 5.333 | |  | e. | 19.000 | |

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| 23. Simplify the complex number and write it in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 24. Jordan is driving along a highway that passes through Moyock. His distance, *d*, in miles, from Moyock is given by the equation  where *t* is the time, in hours, since the start of his trip and . Determine when Jordan will be exactly 90 miles from Moyock. Round to the nearest minute.  ​   |  |  |  | | --- | --- | --- | |  | a. | 7 hrs 52.5 min and 2 hrs 22.5 min | |  | b. | 2 hrs 52.5 min and 2 hrs 22.5 min | |  | c. | 7 hrs 22.5 min | |  | d. | 2 hrs 52.5 min and 7 hrs 22.5 min | |  | e. | 2 hrs 22.5 min | |

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| 25. Use absolute value notation to describe the situation.  ​  The distance between *x* and –12 is at least 5.  ​   |  |  |  | | --- | --- | --- | |  | a. | |*x* + 12| > 5 | |  | b. | |*x* + 12| ≤ 5 | |  | c. | |*x* + 12| = 5 | |  | d. | |*x* + 12| < 5 | |  | e. | |*x* + 12| ≥ 5 | |

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| 26. Find all solutions of the equation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 6 | |  | b. | 3 | |  | c. | 4 | |  | d. | 5 | |  | e. | 7 | |

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| 27. Perform the operation and write the result in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 28. Write the complex conjugate of the complex number. Then multiply the number by its complex conjugate.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 29. Write the rational expression in the simplest form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 30. Determine whether the value of  is a solution of the inequality.  ​   |  |  |  | | --- | --- | --- | |  | a. | Yes | |  | b. | No | |

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| 31. Perform the operation(s). (Write fractional answers in simplest form.)  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 48 | |  | b. |  | |  | c. | 14 | |  | d. |  | |  | e. | 2 | |

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| 32. Evaluate the following expression.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 33. Use a graphing utility to graph the equation. Use the graph to approximate the values of *x* that satisfy each inequality.  ​  *Equation:*  ​  *Inequality:*  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​  ​ | b. | ​  ​ | |  | c. | ​  ​ | d. | ​  ​ | |  | e. | ​  ​ |  |  | |

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| 34. Use the properties of radicals to simplify the following expression.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 35. Solve the following equation.  ​   |  |  |  | | --- | --- | --- | |  | a. | –7 | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 36. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 37. Use a graphing utility to graph the equation. Use the graph to approximate the values of *x* that satisfy the inequality.  ​  *Equation:*  ​  *Inequality:*  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​  ​ | b. | ​  ​ | |  | c. | ​  ​ | d. | ​  ​ | |  | e. | ​  ​ |  |  | |

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| 38. Perform the operation and write the result in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 39. Evaluate the following expression without using a calculator.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 3.6 × 104 | |  | b. | 3.6 × 10–3 | |  | c. | 3.6 × 107 | |  | d. | 3.6 × 10–7 | |  | e. | 3.6 × 10–4 | |

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| 40. Determine which number/s in the set is/are natural number/s.  ​  {2.65, 0.669..., –2, 0.019937247..., 35, –20}  ​   |  |  |  | | --- | --- | --- | |  | a. | 35, –20 | |  | b. | 2.65, 0.669..., –2, 35, –20 | |  | c. | –2, 35, –20 | |  | d. | 0.019937247... | |  | e. | 35 | |

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| 41. Solve the equation and write complex solutions in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 42. Determine which of the given expressions is NOT a polynomial.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 43. The period *T* (in seconds) of a pendulum is , where *L* isthe length of the pendulum (in feet). Find the period of a pendulum whose length is 4.0000 feet.  ​   |  |  |  | | --- | --- | --- | |  | a. | 1.004 sec | |  | b. | 2.220 sec | |  | c. | 4.220 sec | |  | d. | 3.220sec | |  | e. | 2.720 sec | |

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| 44. An artisan can produce and sell *x* hats per month. The total cost *C* (in dollars) for producing *x* hats is *C* = 410 + 17*x* and the total revenue *R* (in dollars) is *R* = 37*x*. Find the profit *P* in terms of *x* and, using that function, find the profit obtained by selling 50 hats per month.  ​   |  |  |  | | --- | --- | --- | |  | a. | Profit in terms of *x*: 20*x* - 410  Sell per month: $590 | |  | b. | Profit in terms of *x*: 20*x* - 410  Sell per month: $17 | |  | c. | Profit in terms of *x*: 20*x* + 410  Sell per month: $590 | |  | d. | Profit in terms of *x*: 37*x* + 410  Sell per month: $590 | |  | e. | Profit in terms of *x*: 37*x* - 410  Sell per month: $590 | |

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| 45. Which of the following “geometric factoring models” represents the factoring formula?  ​  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | ​ | b. | ​ | |  | c. | ​  ​ | d. | ​ | |  | e. | ​  ​  ​ |  |  | |

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| 46. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 47. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | (]  ​  ​ | |  | b. | (]  ​  ​ | |  | c. | (]  ​  ​ | |  | d. | (]  ​  ​ | |  | e. | (]  ​  ​ | |

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| 48. Describe the error.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 49. Find all solutions of the equation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 50. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 51. Use the position equation  , where *s* represents the height of an object (in feet),  represents the initial velocity of the object (in feet per second),  represents the initial height of the object (in feet), and *t* represents the time (in seconds).  A projectile is fired straight upward from ground level  with an initial velocity of  160 feet per second. At what instant will it be back at ground level?  ​   |  |  |  | | --- | --- | --- | |  | a. | sec | |  | b. | sec | |  | c. | sec | |  | d. | sec | |  | e. | sec | |

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| 52. Use a calculator to find the decimal form of the rational number. If it is a nonterminating decimal, write the repeating pattern.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | 1 | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 53. Solve the inequality and write the solution set in interval notation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 54. Reduce the index of the radical.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. | (*x* + 1)  ​ | |  | e. |  | |

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| 55. When two resistors of resistances  and are connected in parallel (see figure), the total resistance *R* satisfies the equation  ​  .      Find  for a parallel circuit in which  ohms and *R* must be at least 1 ohm.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 56. Solve the absolute value equation below for *x*.  ​   |  |  |  | | --- | --- | --- | |  | a. | –19 and –7 | |  | b. | –20 and –7 | |  | c. | –19 and 12 | |  | d. | -20 and 12 | |  | e. | –7 and 12 | |

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| 57. After 2 years, an investment of $1,100 compounded annually at an interest rate *r* will yield an amount of 1,100(1 + *r*)3. Use a calculator to evaluate the polynomial for the values of *r* shown in the table. (Round the answer to two decimal places.)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *r* | 2% | 3% |  | 4% |  | | 1,100(1 + *r*)3 |  |  |  |  |  |   What conclusion can you make from the table?  ​   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | a. | ​   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *r* | 2% | 3% |  | 4% |  | | 1,100(1 + *r*)3 | 1,167.33 | 1,202.00 | 1,219.59 | 1,237.35 | 1,255.28 |   The amount decreases with increasing *r*. | |  | b. | ​   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *r* | 2% | 3% |  | 4% |  | | 1,100(1 + *r*)3 | 1,255.28 | 1,237.35 | 1,219.59 | 1,202.00 | 1,167.33 |   The amount increases with decreasing *r*. | |  | c. | ​   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *r* | 2% | 3% |  | 4% |  | | 1,100(1 + *r*)3 | 1,255.28 | 1,237.35 | 1,219.59 | 1,202.00 | 1,167.33 |   The amount increases with increasing *r*. | |  | d. | ​   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *r* | 2% | 3% |  | 4% |  | | 1,100(1 + *r*)3 | 1,167.33 | 1,202.00 | 1,219.59 | 1,237.35 | 1,255.28 |   The amount increases with decreasing *r*. | |  | e. | ​   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | *r* | 2% | 3% |  | 4% |  | | 1,100(1 + *r*)3 | 1,167.33 | 1,202.00 | 1,219.59 | 1,237.35 | 1,255.28 |   The amount increases with increasing *r*. | |

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| 58. Write the number in decimal notation.  ​  8.25 × 105  ​   |  |  |  | | --- | --- | --- | |  | a. | 82,500 | |  | b. | 8,250,000 | |  | c. | 825 | |  | d. | 8,250 | |  | e. | 825,000 | |

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| 59. Perform the addition or subtraction and write the result in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 13 – 8*i* | |  | b. | 12 – 7*i* | |  | c. | 9 – 4*i* | |  | d. | 11 – 6*i* | |  | e. | 10 – 5*i* | |

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| 60. Use inequality notation and interval notation to describe the set.  ​  *y* is no more than 20.  ​   |  |  |  | | --- | --- | --- | |  | a. | Inequality : *y* ≤ 20  Interval : (∞, –20] | |  | b. | Inequality : *y* ≤ 20  Interval : (–∞, 20] | |  | c. | Inequality : *y* ≥ 20  Interval : (–∞, 20] | |  | d. | Inequality : *y* ≥ 20  Interval : (–∞, –20] | |  | e. | Inequality : *y* ≤ 20  Interval : (∞, 20] | |

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| 61. A rectangular playing field with a perimeter of  94 meters is to have an area of at least 420 square meters. Within what bounds must the length of the rectangle lie?  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 62. A company has determined that the profit *P*, in dollars, it can expect from the manufacture and sale of *x* tennis racquets is given by . How many racquets should the company manufacture and sell to earn a profit of $483,000?  ​   |  |  |  | | --- | --- | --- | |  | a. | 4600 or 6900 racquets | |  | b. | 4600 or 5500 racquets | |  | c. | 5500 or 6900 racquets | |  | d. | 5100 or 5500 racquets | |  | e. | 4600 or 5100 racquets | |

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| 63. Evaluate the expression for the given value of *x.*  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 64. Write the following exponential expression in the simplest form.  ​    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 65. Factor by grouping.  ​     |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 66. Use the Quadratic Formula to solve the equation . (Round your answer to three decimal places.)  ​   |  |  |  | | --- | --- | --- | |  | a. | *x* = –1.349, *x* = 2.025 | |  | b. | *x* = 2.174, *x* = –1.281 | |  | c. | *x* = 0.707, *x* = 1.930 | |  | d. | *x* = 1.973, *x* = –0.628 | |  | e. | *x* = –0.434, *x* = 4.075 | |

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| 67. Write the quotient in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 68. Solve the following equation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 69. Find all solutions of the equation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 70. Factor the sum or difference of cubes.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 71. Find real numbers *a* and *b* such that the equation is true.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | *a* = 0, *b* = 5 | |  | b. | *a* = 0, *b* = | |  | c. | *a* = 0, *b* = | |  | d. | *a* = 0, *b* = 4 | |  | e. | *a* = 0, *b* = | |

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| 72. Find all solutions of the equation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 3 | |  | b. | 4 | |  | c. | 1 | |  | d. | 2 | |  | e. | 0 | |

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| 73. Solve the quadratic equation by factoring.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 0, 4 | |  | b. | 1, | |  | c. | 0, | |  | d. | 0, | |  | e. | 0, | |

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| 74. Find all solutions of the equation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 75. Rationalize the denominator of the following expression and then simplify your answer.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 76. Simplify the expression.    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 77. Complete the following statement using the appropriate symbol.  ​   \_\_\_\_  ​   |  |  |  | | --- | --- | --- | |  | a. | > | |  | b. | = | |  | c. | < | |  | d. | ≤ | |  | e. | ≥ | |

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| 78. Find the distance between *a* and *b*.  ​  *a* = 173, *b* = 57  ​   |  |  |  | | --- | --- | --- | |  | a. | 59 | |  | b. | 118 | |  | c. | 175 | |  | d. | 230 | |  | e. | 116 | |

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| 79. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 80. Solve:     |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 81. Completely factor the difference of two squares.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 82. Factor the difference of cubes.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 83. Solve the inequality and graph the solution on the real number line  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 84. The accounting department of a sports drink bottling company is checking to see whether the actual expenses of a department differ from the budgeted expenses by more than $500 or by more than 5%. Fill in the missing parts of the table, and determine whether each actual expense passes the “budget variance test.”  ​   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | Bubget Expense, *b* | Actual Expense, *a* | |*a* – *b*| | 0.05*b* | | Utilities | $9400 | $9772 |  |  |   ​   |  |  |  | | --- | --- | --- | |  | a. | Utilities: |*a* – *b*| = 372, 0.05*b* = 50  Because the difference between the actual expense and the budget is less than $500 and greater than 5% of budgeted amount there is compliance with the budget variance test. | |  | b. | Utilities: |*a* – *b*| = 372, 0.05*b* = 470  Because the difference between the actual expense and the budget is greater than $500 and greater than 5% of budgeted amount there is compliance with the budget variance test. | |  | c. | Utilities: |*a* – *b*| = 372, 0.05*b* = 470  Because the difference between the actual expense and the budget is less than $500 and less than 5% of budgeted amount there is compliance with the budget variance test. | |  | d. | Utilities: |*a* – *b*| = 372, 0.05*b* = 470  Because the difference between the actual expense and the budget is $500 and greater than 5% of budgeted amount there is compliance with the budget variance test. | |  | e. | Utilities: |*a* – *b*| = 372, 0.05*b* = 470  Because the difference between the actual expense and the budget is greater than $500 and less than 5% of budgeted amount there is compliance with the budget variance test. | |

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| 85. Use inequality notation to describe the set.  ​  *q* is at least 6 but less than 22  ​   |  |  |  | | --- | --- | --- | |  | a. | 6 ≤ *q* ≤ 22 | |  | b. | 6 ≤ *q* < 22 | |  | c. | 22 ≤ *q* < 6 | |  | d. | 22 < *q* ≤ 6 | |  | e. | 6 < *q* < 22 | |

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| 86. Write the complex number in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. | – | |  | d. |  | |  | e. |  | |

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| 87. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 88. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 89. Do the operation and express the answer in *a* + *bi* form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 24 – 2 *i* | |  | b. | – 24 + 2 *i* | |  | c. | – 2 + 2 *i* | |  | d. | 2 – 2 *i* | |  | e. | 24 + 2 *i* | |

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| 90. A stream of water moving at the rate of *v* feet per second can carry particles of size  inches. Find the size of the largest particle that can be carried by a stream flowing at the rate of  foot per second. (Round your answer to three decimal places.)  ​   |  |  |  | | --- | --- | --- | |  | a. | 0.052 | |  | b. | 0.072 | |  | c. | 0.032 | |  | d. | 0.042 | |  | e. | 0.062 | |

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| 91. The gas mileage *m*, in miles per gallon, obtained during a long trip is given by  where *s* is the speed of the automobile in miles per hour and . At what constant speed can the automobile drive to obtain a gas mileage of exactly 29 miles per gallon?  ​   |  |  |  | | --- | --- | --- | |  | a. | 33 mph and 43 mph | |  | b. | 37 mph and 45 mph | |  | c. | 33 mph and 37 mph | |  | d. | 43 mph and 45 mph | |  | e. | 37 mph and 43 mph | |

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| 92. Evaluate the expression.  ​  | –49 |  ​   |  |  |  | | --- | --- | --- | |  | a. | –49 | |  | b. | 98 | |  | c. | 49 | |  | d. | –47 | |  | e. | –50 | |

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| 93. Do the operation and express the answer in *a* + *bi* form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | – 17 + 36*i* | |  | b. | 17 + 18*i* | |  | c. | – 17 + 18*i* | |  | d. | – 17 – 18*i* | |  | e. | 17 – 18*i* | |

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| 94. Evaluate the expression below.  ​  3-3  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. | 27 | |  | d. |  | |  | e. | 9 | |

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| 95. Find all solutions to the following equation.      ​   |  |  |  | | --- | --- | --- | |  | a. | no solution | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 96. Rewrite the expression with positive exponents and simplify.    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 97. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 98. Write the complex conjugate of the complex number. Then multiply the number by its complex conjugate.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | –23*i*, 24 | |  | b. | *i*, 24 | |  | c. | 576*i*, 24 | |  | d. | –*i*, 24 | |  | e. | –*i*, 24 | |

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| 99. Perform the addition and simplify.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 100. Simplify the following radical expression.    ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 101. Write the number in scientific notation.  One milligram is about 0.015430 grain.   |  |  |  | | --- | --- | --- | |  | a. | 0.1543 × 10–1 | |  | b. | 15.43 × 10–3 | |  | c. | 1.543 × 10–2 | |  | d. | 1.543 × 10–3 | |  | e. | 0.015430 × 10–2 | |

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| 102. Perform the division and simplify.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 103. Do the operation and express the answer in *a* + *bi* form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 9*i* | |  | b. | – 9*i* | |  | c. | – 90*i* | |  | d. | – 9 | |  | e. | 9 | |

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| 104. Perform the following operation.  ​  Multiply  and  .  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 105. Find all solutions of the equation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 106. Perform the operation and write the result in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | + *i* | |  | b. | – *i* | |  | c. | + *i* | |  | d. | *i* | |  | e. | – *i* | |

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| 107. Use a calculator to evaluate the expression. (Round your answer to three decimal places.)  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 6.069 × 107 | |  | b. | 6.069 × 108 | |  | c. | 8.427 × 106 | |  | d. | 8.427 × 108 | |  | e. | 8.427 × 107 | |

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| 108. Simplify the complex number and write it in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 205,379*i* | |  | b. | –59*i* | |  | c. | –*i* | |  | d. | *i* | |  | e. | –205,379*i* | |

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| 109. Write a polynomial that fits the description.  ​  A fifth-degree polynomial with leading coefficient 9.  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 110. Fill in the missing form of the expression.  ​  *Radical Form               Rational Exponent Form*  *-------*  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. | 4.5 | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 111. Use a calculator to approximate the number. (Round your answer to three decimal places.)    ​   |  |  |  | | --- | --- | --- | |  | a. | –2.421 | |  | b. | 1006.831 | |  | c. | 867.741 | |  | d. | 3.678 | |  | e. | 6.216 | |

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| 112. Find all solutions of the equation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | –1 | |  | b. | 0 | |  | c. | –3 | |  | d. | –2 | |  | e. | 1 | |

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| 113. Solve the inequality and graph the solution on the real number line.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | ​  ​ | |  | b. | ​  ​ | |  | c. | ​  ​ | |  | d. | ​  ​ | |  | e. | ​  ​ | |

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| 114. Solve the inequality and write the solution set in interval notation.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. | ​ | |

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| 115. Find a polynomial that represents the total number of square feet for the floor plan shown in the figure, *a* = 20 ft and  *b* = 30 ft.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 116. Solve the quadratic equation by factoring.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 0, | |  | b. |  | |  | c. | 0, | |  | d. | 1, | |  | e. |  | |

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| 117. Is the interval bounded or unbounded?  ​  –5 < *x* < –3  ​   |  |  |  | | --- | --- | --- | |  | a. | bounded | |  | b. | unbounded | |

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| 118. Factor the perfect square trinomial.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. |  | |  | b. |  | |  | c. |  | |  | d. |  | |  | e. |  | |

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| 119. Determine whether the value of  is a solution of the inequality.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | Yes | |  | b. | No | |

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| 120. Simplify the complex number and write it in standard form.  ​  ​   |  |  |  | | --- | --- | --- | |  | a. | 81 | |  | b. | –81 | |  | c. | 81*i* | |  | d. | –81*i* | |  | e. | 3*i* | |

**Answer Key**

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| 1. ​ |

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| 2. b |

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| 3. a |

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| 4. a |

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| 5. a |

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| 6. d |

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| 8. d |

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| 9. d |

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| 10. b |

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| 11. e |

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| 12. a |

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| 13. a |

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| 14. c |

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| 15. a |

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| 16. e |

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| 17. e |

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| 18. c |

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| 19. b |

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| 20. b |

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| 21. a |

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| 22. a |

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| 23. e |

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| 24. d |

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| 25. e |

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| 26. b |

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| 27. d |

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| 28. e |

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| 29. a |

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| 30. a |

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| 31. a |

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| 32. a |

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| 33. d |

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| 34. a |

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| 35. e |

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| 36. e |

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| 37. b |

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| 38. b |

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| 39. a |

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| 40. e |

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| 41. d |

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| 42. a |

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| 43. b |

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| 44. a |

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| 45. b |

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| 46. b |

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| 47. a |

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| 48. d |

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| 49. e |

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| 50. a |

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| 51. b |

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| 52. e |

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| 53. b |

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| 54. c |

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| 55. c |

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| 56. d |

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| 57. e |

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| 58. e |

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| --- |
| 59. c |

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| 60. b |

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| 61. c |

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| 62. c |

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| 63. c |

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| 64. d |

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| 65. c |

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| 66. c |

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| 67. d |

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| 68. d |

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| 69. a |

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| 70. a |

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| 71. b |

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| 72. d |

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| 73. e |

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| 74. d |

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| 75. a |

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| 76. b |

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| 77. a |

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| 78. e |

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| 79. d |

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| 80. c |

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| 81. c |

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| 82. b |

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| 83. a |

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| 84. c |

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| 85. b |

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| 86. c |

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| 87. a |

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| 88. b |

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| 89. e |

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| 90. c |

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| 91. c |

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| 92. c |

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| 93. e |

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| 94. a |

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| 95. e |

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| 96. d |

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| 97. a |

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| 98. d |

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| 99. a |

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| 100. e |

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| 101. c |

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| 102. b |

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| 103. d |

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| 104. c |

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| 105. c |

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| 106. e |

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| 107. e |

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| 108. c |

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| 109. b |

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| 110. d |

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| 111. d |

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| 112. c |

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| 113. a |

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| 114. e |

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| 115. a |

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| 116. e |

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| 117. a |

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| 118. e |

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| 119. a |

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| 120. a |