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| --- | --- | --- |
| **ID** | **QUESTIONS** | **ANSWER** |
| 1.1 | Mr. Wilk is a high school math teacher whose salary is $33,660 for this school year, which has 180 days. In Mr. Wilk’s school district, substitute teachers are paid $85 per day. If Mr. Wilk takes a day off without pay and a substitute teacher is paid to teach his classes, how much less does the school district pay in salary by paying a substitute teacher instead of Mr. Wilk for that day?  A. $57  B. $85  C. $102  D. $114  E. $187 | C |
| 1.2 | A student has earned the following scores on four 100-point tests this marking period: 63, 72, 88, and 91. What score must the student earn on the fifth and final 100-point test of the marking period to earn an average test grade of 80 for the five tests?  A. 79  B. 86  C. 89  D. 94  E. The student cannot earn an average of 80. | B |
| 1.3 | The oxygen saturation of a lake is found by dividing the amount of dissolved oxygen the lake water currently has per liter by the dissolved oxygen capacity per liter of the water, and then converting that number into a percent. If the lake currently has 6.4 milligrams of dissolved oxygen per liter of water and the dissolved oxygen capacity is 9.5 milligrams per liter, what is the oxygen saturation level of the lake, to the nearest percent?  A. 64%  B. 67%  C. 70%  D. 89%  E. 95% | B |
| 1.4 | A rectangular lot that measures 125 feet by 185 feet is completely fenced. What is the length, in feet, of the fence?  A. 310  B. 435  C. 620  D. 740  E. 1,240 | C |
| 1.5 | The expression a [(b − c) + d] is equivalent to:  A. ab + ac + ad  B. ab − ac + d  C. ab − ac + ad  D. ab − c + d  E. a − c + d | C |
| 1.6 | What two numbers should be placed in the blanks below so that the difference between the consecutive numbers is the same?  13, \_\_, \_\_, 34    A. 19, 28  B. 20, 27  C. 21, 26  D. 23, 24  E. 24, 29 | B |
| 1.7 | The number of students participating in fall sports at a certain high school can be shown with the following matrix:   |  |  |  |  | | --- | --- | --- | --- | | Tennis | Soccer | Cross-Country | Football | | 25 | 30 | 50 | 80 |   The athletic director estimates the ratio of the number of sports awards that will be earned to the number of students participating with the following matrix:   |  |  | | --- | --- | | Tennis | 0.2 | | Soccer | 0.5 | | Cross-Country | 0.3 | | Football | 0.4 |   Given these matrices, what is the athletic director’s estimate for the number of sports awards that will be earned for these fall sports?  A. 55  B. 60  C. 65  D. 67  E. 74 | D |
| 1.8 | Reggie knows how to make 5 different entrees, 4 different side dishes, and 6 different desserts. How many distinct complete meals, each consisting of an entrée, a side dish, and a dessert, can Reggie make?  A. 16  B. 26  C. 72  D. 120  E. 144 | D |
| 1.9 | The following chart shows the current enrollment in all social studies classes—Geography, US History, World Cultures, and Government—at Iron Mountain High School.   |  |  |  |  | | --- | --- | --- | --- | | Course title | Section | Period | Enrollment | | Geography | A | 1 | 23 | | B | 2 | 24 | | US History | A | 2 | 25 | | B | 3 | 29 | | C | 4 | 24 | | World Cultures | A | 3 | 27 | | Government | A | 4 | 26 | | B | 6 | 27 |   What is the average number of students enrolled per section in US History?  A. 25  B. 26  C. 27  D. 29  E. 34 | B |
| 1.10 | The following chart shows the current enrollment in all social studies classes—Geography, US History, World Cultures, and Government—at Iron Mountain High School.   |  |  |  |  | | --- | --- | --- | --- | | Course title | Section | Period | Enrollment | | Geography | A | 1 | 23 | | B | 2 | 24 | | US History | A | 2 | 25 | | B | 3 | 29 | | C | 4 | 24 | | World Cultures | A | 3 | 27 | | Government | A | 4 | 26 | | B | 6 | 27 |   The school wants to have all of the students enrolled in social studies classes read the same book at the same time so that the author of the book can speak to the students at an assembly. The school originally purchased two classroom sets of 30 books each, but now one set is missing 3 books and the other is missing 5. For which of the following class periods, if any, are there NOT enough books available for each student to have one book?  A. Period 2 only  B. Period 3 only  C. Period 4 only  D. Period 3 and 4 only  E. There are enough books for each class period | B |
| 1.11 | What expression must the center cell of the table below contain so that the sums of each row and each column are equivalent?   |  |  |  | | --- | --- | --- | |  |  |  | |  |  |  | |  |  |  |   A.  B.  C. 0  D.  E. | B |
| 1.12 | At a bottling plant, 10,000 liters of carbonated water are needed to produce 3,000 bottles of soda. How many liters of carbonated water are needed to produce 750 bottles of soda?  A. 225  B. 1,500  C. 2,500  D. 4,000  E. 5,000 | C |
| 1.13 | Which of the following is a solution to the equation ?  A. 50  B. 25  C. 5  D. −5  E. −25 | E |
| 1.14 | After a snowstorm, city workers removed an estimated 12,000 cubic meters of snow from the downtown area. If this snow were spread in an even layer over an empty lot with dimensions 62 meters by 85 meters, about how many meters deep would the layer of snow be?  A. Less than 1  B. Between 1 and 2  C. Between 2 and 3  D. Between 3 and 4  E. More than 4 | C |
| 1.15 | What is the-coordinate of the point in the standard coordinate plane at which the two lines and intersect?  A. 10  B. 5  C. 3  D. 2  E. 1 | D |
| 1.16 | If 125% of a number is 425, what is 65% of the number?  A. 221  B. 276  C. 284  D. 308  E. 340 | A |
| 1.17 | What is the distance in the standard ) coordinate plane between the points () and ()?  A. 3  B. 5  C.  D.  E. | D |
| 1.18 | The ratio of the radii of two circles is 9:16. What is the ratio of their circumferences?  A. 3:4  B. 9:16  C. 18:32  D. 3:  E. :16 | B |
| 1.19 | After polling a class of 24 students by a show of hands, you find that 9 students play soccer and 21 students play basketball. Given that information, what is the number of students in the class who must play both soccer and basketball?  A. 0  B. 1  C. 3  D. 6  E. 9 | D |
| 1.20 | John wants to draw a circle graph showing his friends’ favorite ice cream flavors. When he polled his friends asking each their favorite flavor of ice cream, 35% of his friends said chocolate, 20% of his friends said vanilla, 15% of his friends said strawberry, 25% of his friends said mint chocolate chip, and 5% of his friends said flavors other than those previously listed. What will be the degree measure of the vanilla sector of the circle graph?  A.  B. 108  C.  D.  E. | D |
| 1.21 | If and, which of the following expresses in terms of ?    A.  B.  C.  D.  E. | B |
| 1.22 | If , then  A.  B.  C.  D.  E. 10 | B |
| 1.23 | If a gumball is randomly chosen from a bag that contains exactly 6 yellow gumballs, 5 green gumballs, and 4 red gumballs, what is the probability that the gumball chosen is NOT green?  A.  B.  C.  D.  E. | A |
| 1.24 | If , then =?  A. 81  B. 27  C. −3  D. −27  E. −81 | A |
| 1.25 | Of the 517 graduating seniors at Brighton High School, approximately will be attending college, and approximately of those going to college will be attending a state college. Which of the following is the closest estimate of the number of graduating seniors who will be attending a state college?  A. 170  B. 200  C. 260  D. 300  E. 320 | B |
| 1.26 | Points B and C lie on segment AD as shown below. The length of segment AD is 25 units; the segment AC is 19 units long; and the segment BD is 14 units long. How many units long, if it can be determined, is the segment BC?  A picture containing text, device  Description automatically generated  A. 5  B. 6  C. 8  D. 11  E. Cannot be determined from the given information. | C |
| 1.27 | A square is circumscribed about a circle of a 5-foot radius, as shown below. What is the area of the square, in square feet?  Diagram, venn diagram  Description automatically generated  A. 144  B. 100  C. 25π  D. 50  E. 25 | B |
| 1.28 | In the figure shown below, each pair of intersecting line segments meets at a right angle, and all the lengths are given in inches. What is the perimeter, in inches, of the figure?  Diagram  Description automatically generated with low confidence  A. 30  B. 36  C. 42  D. 52  E. 62 | D |
| 1.29 | For all positive integers a, b, and c, which of the following expressions is equivalent to ?  A.  B.  C.  D.  E. | A |
| 1.30 | The table below shows the number of pounds of apples grown last year in 4 cities. (Each whole apple on the graph represents 1,000 pounds of apples.) According to the graph, what fraction of the apples grown in all 4 cities were grown in Appleton?  Graphical user interface  Description automatically generated with low confidenceA.  B.  C.  D.  E. | A |
| 1.31 | For all pairs of real numbers S and T where S = 4T −7, T =?  A.  B.  C.  D.  E. | E |
| 1.32 | 4*x*3× 3*xy*2× 2*xy*2 is equivalent to:  A.9*x*3*y*4  B.9*x*5*y*4  C.24*x*3*y*4  D.24*x*5*y*4  E**.**24*x*5*y*6 | D |
| 1.33 | If x is a real number such that = 729, then + =?  A. 9  B. 27  C. 30  D. 84  E. 90 | D |
| 1.34 | Let for all integers x and y. Which of the following is the value of 5 (−3)?  A. 121  B. 64  C. 41  D. 1  E. −31 | A |
| 2.1 | A distance in meters, M, can be approximated by multiplying a distance in yards, Y, by 1.0936. Which of the following expresses this approximation method? (Note: The symbol means “is approximately equal to.”)  A. M  B. M  C. M Y (1.0936)  D. M Y + 1.0936  E. M Y (1.0936Y) | C |
| 2.2 | The daily totals of enrollments at Sunnyside Summer Camp last Monday through Saturday were 17, 19, 23, 14, 25, and 28. What was the average number of enrollments per day?  A. 126  B. 28  C. 21  D. 18  E. 14 | C |
| 2.3 | A carton of paper is priced at $27.00 now. If the paper goes on sale for 25% off the current price, what will be the sale price of the carton?  A. $6.75  B. $20.25  C. $22.00  D. $26.75  E. $33.75 | B |
| 2.4 | What is the slope of any line parallel to the line ?  A. −3  B.  C.  D. 2  E. 3 | C |
| 2.5 | Andrew won a cash prize on a game show. Andrew paid taxes of 30% on the original cash prize and had $28,000 remaining. How much was the original cash prize?  A. $19,600  B. $28,300  C. $36,400  D. $40,000  E. $84,000 | D |
| 2.6 | Melissa had 3 fewer apples than Marcia. Then, she gave 2 apples to Marcia. Now how many fewer apples does Melissa have than Marcia?  A. 0  B. 2  C. 3  D. 5  E. 7 | E |
| 2.7 | What is the value of if ?  A. −14  B. −4  C. 4  D. 9  E. 14 | C |
| 2.8 | For all m and ?  A.  B. − 2  C. 2 − n −  D.  E. | E |
| 2.9 | For all =?  A.  B.  C.  D.  E. | A |
| 2.10 | is equivalent to:  A.  B  C. 11  D. 11  E. 77 | A |
| 2.11 | The perimeter of a square is 48 centimeters. What is its area, in square centimeters?  A. 12  B. 96  C. 144  D. 192  E. 2,304 | C |
| 2.12 | What is the product of the 2 solutions of the equation ?  A. −63  B. −21  C. −20  D. 20  E. 21 | B |
| 2.13 | When n = , what is the value of ?  A. 18  B. 9  C. −3  D. −9  E. −18 | E |
| 2.14 | A proofreader can read 40 pages in one hour. How many pages can this proofreader read in 90 minutes?  A. 45  B. 60  C. 150  D. 360  E. 940 | B |
| 2.15 | In the standard coordinate plane, what is the slope of the line joining the points (3,7) and  (4, −8)?  A. −15  B. −1  C.  D.  E. 15 | A |
| 2.16 | A triangle has sides of length 4.7 meters and 9 meters. Which of the following CANNOT be the length of the third side, in meters?  A. 5  B. 7  C. 8  D. 11  E. 14 | E |
| 2.17 | ++=?  A.  B.  C.  D.  E. 9 | C |
| 2.18 | In order to clean her aquarium, Stephanie must remove half of the water. The aquarium measures 30 inches long, 16 inches wide, and 12 inches deep. The aquarium is currently completely full. What volume of water, in cubic inches, must Stephanie remove?  A. 1,440  B. 2,880  C. 4,320  D. 5,760  E. 7,200 | B |
| 2.19 | The bowling league selects its 4 officers by first selecting the president, then the vice president, then the secretary, then the treasurer. If there are 40 bowlers who are eligible to hold office and no member can hold more than one office, which of the following gives the number of different possible results of the election?  A.  B.  C.  D. 39 × 38 × 37 × 36  E. 40 × 39 × 38 × 37 | E |
| 2.20 | What value of will satisfy the equation ?  A. −675  B. −540  C. 0  D. 540  E. 675 | A |
| 2.21 | In the standard () coordinate plane, which of the following lines goes through (3,4) and is parallel to  A.  B.  C.  D.  E. | B |
| 2.22 | The volume of a cube is given by the formula where is the length of a side. If a cube has a volume of 64, and the length of each side is halved, the new cube’s volume will be:  A. 3  B. 6  C. 8  D 16  E. 32 | C |
| 2.23 | In the standard coordinate plane, what is the equation of the line that passes through the origin and the point  A  B.  C.  D.  E. | C |
| 2.24 | What is the smallest possible value for the product of 2 integers that differ by 7?  A. 8  B. 0  C. −6  D. −10  E. −12 | E |
| 3.1 | 5× 2 × 3is equivalent to:  A. 10  B. 10  C. 30  D. 30  E. 30 | D |
| 3.2 | What is the fourth term in the arithmetic sequence 13, 10, 7, …?  A. 14  B. 9  C. 4  D. 0  E. −7 | C |
| 3.3 | When written in symbols, “the product of and , raised to the fourth power,” is represented as: | C |
| 3.4 | Mandy and Jordan each bought some of the same notebooks and the same three-ring binder. Mandy paid $5.85 for 3 notebooks and 1 binder. Jordan paid $4.65 for 2 notebooks and 1 binder. What is the price of one of the notebooks?  A. $2.70  B. $2.25  C. $1.80  D. $1.20  E. $0.75 | D |
| 3.5 | If and , and , which of the following is equal to ?  A. 1  B.  C.  D.  E. | E |
| 3.6 | If , then  A.  B.  C.  D. 1  E. 2 | A |
| 3.7 | What percent of 5 is 7?  A. 14%  B. 35%  C. 71%  D. 140%  E. 157% | D |
| 3.8 | If x is a positive real number such that = 16,  A. 18  B. 20  C. 66  D. 68  E. 74 | C |
| 3.9 | −|−16| − (−16)  A. −16  B. 0  C. 4  D. 16  E. 32 | B |
| 3.10 | Which of the following is a simplified form of ?  A.  B.  C.  D.  E | D |
| 3.11 | If , then  A. 64  B. 16  C. −4  D. −16  E. −64 | A |
| 3.12 | If is an integer, which of the following could NOT equal ?  A. 0  B. 1  C. 4  D. 8  E. 9 | D |
| 3.13 | Justin owns 6 different dress shirts, 3 different pairs of pants, and 5 different ties. How many distinct outfits, each consisting of a shirt, a pair of pants, and a tie, can Justin make?  A. 14  B. 42  C. 90  D. 120  E. 144 | C |
| 3.14 | What is the slope of a line that passes through the origin DO YOUR FIGURING HERE. and the point  A. 3  B. 1/3  C. −1/3  D. −3  E. −6 | C |
| 3.15 | What is the slope-intercept form of ?  A.  B.  C.  D.  E. | D |
| 3.16 | If the volume of a cube is 64, what is the shortest distance from the center of the cube to the base of the cube?  A. 2  B. 4  C. 2  D.  E. 16 | A |
| 3.17 | For all pairs of real numbers M and N where  A. -5  B. +6  C. 6M + 5  D.  E. | D |
| 3.18 | The average of 7 consecutive numbers is 16. What is the sum of the least and greatest of the 7 integers?  A. 13  B. 14  C. 16  D. 19  E. 32 | E |
| 3.19 | For what value of n would the following system of equations have an infinite number of solutions?    A. 4  B. 9  C. 16  D. 36  E. 48 | C |
| 3.20 | What is the distance in the standard coordinate plane between the points and  A.  B. 3  C. 4  D. 5  E. | D |
| 3.21 | If each element in a data set is multiplied by, and each resulting product is then reduced by which of the following expressions gives the mean of the resulting data set in terms of  A.  B.  C. +  D. + 4  E. + | B |
| 4.1 | One foot is equivalent to approximately 0.3048 meters. If a building is 65-feet long, what is the length of the building in meters, to the nearest tenth?  A. 19.8  B. 31.1  C. 65.3  D. 198.1  E. 213.3 | A |
| 4.2 | To keep up with rising costs, a carpenter needs to increase his 30.00 per hour rate by 18%. What will be his new hourly rate?  A. 30.18  B. 31.80  C. 35.40  D. 38.00  E. 48.00 | C |
| 4.3 | Contributions to the school dance fund are made by each of 4 student groups according to the table below.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Student group | A | B | C | D | | Contribution in dollars | 25 | 40 | 30 | 15 |   What is the average dollar amount of the contributions made by the 4 student groups?  A. 110.00  B. 55.00  C. 35.00  D. 27.50  E. 22.50 | D |
| 4.4 | Which of the following is a value of r for which  A. 6  B. 0  C. −2  D. −3  E. −6 | C |
| 4.5 | A rectangular garden has a length of and a width of . The garden has its length reduced by 3 feet and its width extended by 2 feet. What is the area of the new garden?  A.  B  C.  D.  E. | D |
| 4.6 | If = 3, what is in terms of and ?  A.  B.  C.  D.  E. | A |
| 4.7 | Which of the following is the product of (3− 1) (− 4)?  A. 3 + 13 + 4  B. 3 + 5  C. 3 - 13 + 4  D. 3 - 12 + 4  E. 3 + 12 + 4 | C |
| 4.8 | Reduce to its simplest terms.  A.  B.  C.  D.  E. | B |
| 4.9 | =?  A. −3  B. −2  C. 0  D. 2  E. 9 | B |
| 4.10 | What are the values for a that satisfy the equation  A  B.  C.  D.  E. | A |
| 4.11 | What is the slope of the line given by the equation  A. −7  B. −3  C.  D.  E. 7 | E |
| 4.12 | what is the value of  A. 4  B. 5  C. 7  D. 8  E. 9 | B |
| 4.13 | For all x > 0, + =?  A.  B.  C.  D.  E. | C |
| 4.14 | If cos A = , and sin A = , then tan A =?  A.  B.  C.  D.  E. | A |
| 4.15 | If = for all a 0, which of the following must be true?  A.  B.  C.  D.  E. | D |
| 4.16 | , which of the following is a possible value  A. 2  B. 3  C. 4  D. 5  E. 6 | E |
| 4.17 | What value of will satisfy the equation  A. −3,420  B. −313.64  C. 313.64  D. 342  E. 380 | E |
| 4.18 | Amy can run 3.5 miles in minutes. At that pace, how many minutes would it take her to run 10.5 miles?  A.  B.  C.  D.  E. | E |
| 4.19 | For what value of b would the following system of equations have an infinite number of solutions?  A. 9  B. 27  C. 36  D. 81  E. 126 | C |
| 4.20 | Which of the following calculations will yield an even integer for any integer a?  A. 2 + 3  B. 4+ 1  C. 5 + 2  D. 6 + 6  E. – 3 | D |
| 5.1 | Which of the following lists all the positive factors of 32?  A. 1, 32  B. 2, 16  C. 2, 4, 8, 16  D. 2, 4, 8, 16, 32  E. 1, 2, 4, 8, 16, 32 | E |
| 5.2 | All CDs are equally priced. If 8 CDs cost $76.00, what is the cost of 1 CD?  A.  B.  C.  D.  E. | D |
| 5.3 | × × is equivalent to:  A.  B.  C.  D.  E. | C |
| 5.4 | × =?  A.  B.  C.  D.  E. | D |
| 5.5 | Which of the following numbers is the least in value?  A.  B.  C.  D.  E. | C |
| 5.6 | The sum of the real numbers a and b is 13. Their difference is 5. What is the value of ab?  A. 5  B. 8  C. 18  D. 36  E. 65 | D |
| 5.7 | For all =?  A.  B.  C.  D.  E. | E |
| 5.8 | If = −3 − 8, then =?  A. −56  B. −40  C. 8  D. 24  E. 40 | A |
| 5.9 | ?  A.  B.  C.  D.  E. | E |
| 5.10 | The ratio of to is 3 to 5, and the ratio of y to is 1 to 5. What is the ratio of to ?  A. 5:3  B. 5:1  C. 3:1  D. 1:3  E. 1:1 | C |
| 5.11 | What is the smallest possible value for the product of 2 real numbers that differ by 6?  A. −9  B. −8  C. −5  D. 0  E. 7 | A |
| 6.1 | The lowest temperature on a winter morning was −7F. Later the same day the temperature reached a high of 21F. By how many degrees Fahrenheit did the temperature increase?  A. 32  B. 28  C. 21  D. 14  E. 7 | B |
| 6.2 | Disregarding sales tax, how much will you save when you buy a 12.00 video that is on sale for 20% off?  A. 0.24  B. 0.48  C. 1.20  D.2.40  E. 3.60 | D |
| 6.3 | As part of a school report on the cost of gasoline, Raquel wants to find the average cost of purchasing a gallon of regular unleaded gasoline from local gas stations. She surveys 4 stations and finds the cost per gallon of regular unleaded gas from the 4 stations to be , respectively. Using this data, what is the average cost of purchasing one gallon of regular unleaded gasoline from these 4 gas stations?  A. 2.55  B. .53  C.2.50  D. .49  E. 2.45 | C |
| 6.4 | What is the volume, in cubic inches, of a cube whose edges each measure 5 inches in length?  A. 15  B. 25  C. 50  D. 125  E. 500 | D |
| 6.5 | If  A. −9  B. −  C. −1  D.  E. 5 | C |
| 6.6 | The price of a cantaloupe is directly proportional its weight. If a cantaloupe that weighs 3.0 pounds costs 3.87, approximately how much will a 2.25-pound cantaloupe cost?  A. 2.90  B. 2.65  C. 2.25  D. 1.87  E. 1.29 | A |
| 6.7 | A. -11  B. -7  C.  D.  E. 7 | C |
| 6.8 | Which of the following is always equal to  A.  B.  C.  D.  E. | D |
| 6.9 | What is the area, in square inches, of a circle with a diameter equal to 12 inches?  A. 144  B. 36  C. 12π  D. 36π  E. 144π | D |
| 6.10 | In the standard coordinate plane, what are the coordinate of the midpoint of a line segment with endpoints  A. (1,8)  B. (3,2)  C.  D.  E. | D |
| 6.11 | Rebecca is trying to schedule volunteers to help at a school carnival. There are 5 one-hour shifts to be filled by 5 different volunteers. If each shift must have one and only one volunteer, how many different arrangements can the schedule have?  A. 5  B. 20  C. 25  D. 50  E. 120 | E |
| 6.12 | In the standard coordinate plane, what is the distance between the points  A. 5  B. 12  C. 13  D. 20  E. 26 | C |
| 6.13 | What is the slope of a line that is perpendicular to the line determined by the equation  A. −3  B. −  C.  D.  E. | E |
| 7.1 | Which point in the standard coordinate plane below has the coordinates (  Chart, scatter chart  Description automatically generated  A. A  B. B  C. C  D. D  E. E | C |
| 7.2 | For what value of a is the equation true?  A. 9  B. 8  C. 5  D. 4  E. 2 | D |
| 7.3 | On the real number line below, numbers decrease in value from right to left, and Y is positive. The value of X must be:  A screenshot of a video game  Description automatically generated with low confidence  A. positive.  B. negative.  C. greater than Y.  D. less than Y.  E. between 0 and Y. | D |
| 7.4 | If  A. 3  B. 1  C.  D. −  E. − | D |
| 7.5 | Which of the following is a factor of the polynomial? ?  A  B.  C  D.  E. | E |
| 7.6 | + is equivalent to:  A.  B.  C.  D.  E. | D |
| 7.7 | A pie recipe calls for cup sugar to make one 9-inch pie. According to this recipe, how many cups of sugar should be used to make three 9-inch pies?  A.  B.  C. 1  D. 1  E. 3 | C |
| 7.8 | |5 - 3| - |2 - 6|?  A. −4  B. −2  C. 2  D. 4  E. 6 | B |
| 7.9 | If , what is the value ?  A. −80  B. −20  C. 5  D. 20  E. 50 | D |
| 7.10 | For what value of a is a solution to the equation ?  A. −3.5  B. −1.5  C. 0  D. 3.5  E. 7 | A |
| 7.11 | If , then  A. 7  B. 18  C. 25  D. 36  E. 43 | E |
| 7.12 | − =?  A.  B.  C.  D.  E. | A |
| 7.13 | In the standard coordinate plane shown below, what is the distance on the y-axis, in units, from point A to point B?    A. −3  B. −5  C. 3  D. 5  E. 11 | D |
| 7.14 | Which of the following is NOT a solution of  A. 5  B. 3  C. −3  D. −5  E. −9 | D |
| 7.15 | If , then which of the following represents 552?  A.  B.  C. + 5 + 2  D. + 5 + 2  E. + 5 + 2 | C |
| 7.16 | What is the value of b in the solution to the system of equations below?  A. −10  B. −3  C. 3  D. 6  E. cannot be determined with the given information | B |
| 7.17 | Which of the following is an equivalent form of ?  A. 5  B. + 3  C. 3 +  D. 5  E. + | C |
| 7.18 | Due to inflation, a refrigerator that formerly sold for $450 now sells for 7% more. Which of the following calculations gives the current cost, in dollars, of the refrigerator?  A. 450 + 7  B. 450 + 450(0.07)  C. 450 + 450(0.7)  D. 450 + 450(7)  E. 450(0.07) | B |
| 7.19 | An overlay of an accessibility ramp of a building is placed on the standard coordinate plane so that the aligns with the horizontal. The line segment representing the side view of the ramp goes through the points and . What is the slope of the accessibility ramp?  A. −3  B.-  C. -  D.  E. | D |
| 7.20 | The number 0.002 is 100 times as large as which of the following numbers?  A. 0.000002  B. 0.00002  C. 0.0002  D. 0.02  E. 0.2 | B |
| 7.21 | The volume, of a sphere is determined by the formula = , where is the radius of the sphere. What is the volume, in cubic inches, of a sphere with a diameter 12 inches long?  A. 48π  B. 72π  C. 288π  D. 864π  E. 2304π | C |
| 7.22 | Which of the following is equal to ?  A.  B.  C.  D  E. | B |
| 7.23 | One traffic light flashes every 6 seconds. Another traffic light flashes every 9 seconds. If they flash together and you begin counting seconds, how many seconds after they flash together will they next flash together?  A. 6  B. 9  C. 18  D. 36  E. 54 | C |
| 7.24 | , then ?  A. −4  B. 2  C. 4  D. 8  E. 16 | D |
| 7.25 | How many ordered pairs of real numbers will satisfy the equation  A. 0  B. 1  C. 2  D. 3  E. Infinitely many | E |
| 7.26 | If − = 49 and , then  A. 14  B. 7  C. 4  D −4  E. −7 | B |
| 7.27 | is equivalent to:  A. 1  B. 3  C.  D.  E. | E |
| 7.28 | A circle in the standard coordinate plane has center and radius 5 units. Which of the following equations represents this circle?  A.  B.  C.  D.  E. | D |
| 7.29 | For all , =?  A. -  B.  C.  D. −  E. | A |
| 7.30 | If the circumference of a circle is π inches, how many inches long is its radius?  A.  B.  C.  D.  E. | C |
| 7.31 | If , and are consecutive positive integers and × × = 512, then + + =?  A. 6  B. 9  C. 14  D. 16  E. 28 | E |
| 7.32 | For which values of will  A  B  C  D.  E. | A |
| 7.33 | and , which of the following expresses y in terms of ?  A.  B  C.  D  E. | E |
| 7.34 | A wheel 27 inches in diameter rolls along a line. How many inches does the wheel roll along the line in 32 revolutions?  A. 27π  B. 32π  C. 432π  D. 864π  E. 1,728π | D |
| 7.35 | For any real number a, the equation . On a number line, how far apart are the 2 solutions for ?  A.  B.  C.  D. 5  E. 10 | E |
| 8.1 | ?  A. −8  B. −6  C. −4  D. 0  E. 8 | D |
| 8.2 | An editor charges $30 for each hour he works on a book project, plus a flat $25 editing fee. How many hours of work are included in a $190 bill for a book project?  A. 3  B. 4  C. 5  D. 6  E. 7 | C |
| 8.3 | Runner A averages 5 miles per hour, and Runner B averages 6 miles per hour. At these rates, how much longer does it take Runner A than Runner B to run 15 miles?  A. 0.5 hour  B. 1 hour  C. 1.5 hours  D. 2.5 hours  E. 3 hours | A |
| 8.4 | is equivalent to:  A.  B.  C.  D.  E. | C |
| 8.5 | The expression is equivalent to:  A.  B.  C.  D.  E. | E |
| 8.6 | Blair expects an increase of in her current annual salary of . What would her new annual salary be?  A.  B.  C.  D.  E. | C |
| 8.7 | If Tom traveled 45 miles in 12 hours and Jim traveled four times as far in one-third the time, what was Jim’s average speed, in miles per hour?  A. 5  B. 15  C. 30  D. 45  E. 90 | 45 |
| 8.8 | What percent of the students polled chose Spartans in the poll?  A. 40%  B. 30%  C. 25%  D. 20%  E. 15% | E |
| 8.9 | If the information in the table were converted to a pie chart, then the central angle of the sector for Lions would measure how many degrees?  A. 144  B. 108  C. 72  D. 54  E. 45 | C |
| 8.10 | If the poll is indicative of how the 3,000 students at Center High School will actually vote, which of the following is the best estimate of the number of votes Knights will receive?    A. 50  B. 200  C. 525  D. 750  E. 900 | D |
| 8.11 | Which of the following is the slope of a line parallel to the line in the standard coordinate plane?  A.  B.  C.  D. 2  E. | C |
| 8.12 | For all x > 0, the expression equals:  A.  B.  C.  D.  E. | A |
| 8.13 | The fixed costs of printing a certain textbook are per week. The variable costs are per textbook. Which of the following expressions can be used to model the cost of printing t textbooks in 1 week?  A.  B.  C.  D.  E. | E |
| 8.14 | The table below shows the total number of touchdowns scored in each of 16 football games during a regular season. What is the average number of touchdowns scored per game, to the nearest tenth?   |  |  | | --- | --- | | Total number of touchdowns in a game | Number of games with this total | | 0 | 2 | | 1 | 3 | | 2 | 3 | | 3 | 5 | | 4 | 2 | | 5 | 1 |   A. 2.6  B. 2.3  C. 2.0  D. 1.5  E. 0.9 | B |
| 8.15 | is equivalent to:    A.  B.  C.  D.  E. | E |
| 8.16 | If , which of the following is a possible value of?  A.  B.  C.  D.  E. | A |
| 8.17 | If , then is equivalent to which of the following?  A.  B.  C.  D.  E. | E |
| 8.18 | In the complex numbers, where ,?  A.  B.  C.  D.  E. | D |
| 8.19 | Amy’s best marathon time decreased by from 2005 to 2006 and by from 2006 to 2007. By what percent did her best marathon time decrease from 2005 to 2007?  A.  B.  C.  D.  E. | A |
| 8.20 | In 3 fair coin tosses, where the 2 outcomes, heads and tails, are equally likely, what is the probability of obtaining exactly 2 heads?  A.  B.  C.  D.  E. | B |
| 10.1 | The 65-member high school band raised money to go on a trip by having a bake sale. If the original cost per band member for the trip is $18.50 and the band members earned a total of $585.00 at the bake sale, how much more money does each band member need in order to pay for the trip?  A. $9.00  B. $9.50  C. $18.50  D. $46.50  E. $65.00 | B |
| 10.2 | Fred works at a car wash where he makes $40.00 per day plus $1.75 per car that he washes. Yesterday, Fred made a total of $61.00. How many cars did he wash yesterday?  A. 10  B. 12  C. 17  D. 20  E. 34 | B |
| 10.3 | Which of the following is equivalent to 4.2 ×?  A. 0.000042  B. 0.00042  C. 42,000  D. 420,000  E. 4,200,000 | A |
| 10.4 | 3.234 × 0.01 =?  A. 323.4  B. 32.34  C. 3.234  D. 0.3234  E. 0.03234 | E |
| 10.5 | For all , is equal to?  A. 1  B  C.  D.  E. | E |
| 10.6 | If , what is the value of ?  A. −2  B. −1  C. 2  D. 3  E. 8 | A |
| 10.7 | The graph below represents which of the following inequalities?    A  B.  C.  D.  E. | D |
| 10.8 | If , then =?  A. −435  B. −249  C. −156  D. 249  E. 435 | B |
| 10.9 | Jordan went for a 3.5-mile jog on Monday that took him 40 minutes. If on Tuesday Jordan jogs at the same rate of speed, how far will he jog in 60 minutes?  A. 3.5 miles  B. 4.0 miles  C. 5.25 miles  D. 7.0 miles  E. 7.25 miles | C |
| 10.10 | A floor has the dimensions shown below. How many square feet of tile are needed to cover the entire floor?    A. 50  B. 95  C. 160  D. 190  E. 220 | E |
| 10.11 | There are 32 ounces in a quart. If 2 quarts of milk costs $2.65, what is the cost of milk per ounce, to the nearest cent?  A. $0.04  B. $0.08  C. $0.24  D. $0.41  E. $0.64 | A |
| 10.12 | Given the system of equations below,  A. 1  B. 3  C. 5  D. 7  E. 9 | B |
| 10.13 | =?  A.  B.  C.  D.  E. | E |
| 10.14 | For all  A. − – 2  B. 9 + – 2  C. 9 − + 2  D. 8 −  E.9 − + 2 | C |
| 10.15 | For all x ≠−3, =?  A.  B.  C.  D.  E. | B |
| 10.16 | If is 1 solution for the equation , what is the value of ?  A. −2  B. 0  C. 3  D. 5  E. 6 | C |
| 10.17 | Daniel is painting a wall in his bedroom. He can cover 36 square feet with 1 gallon of paint. If the wall is 8 feet high and 12 feet long, how many gallons, to the nearest whole gallon, will Daniel need to paint the wall?  A. 20  B. 16  C. 12  D. 4  E. 3 | E |
| 10.18 | What is the sum of all the solutions to  A. −3  B. −2  C. 2  D. 5  E. 8 | A |
| 10.19 | A. 0  B. 6  C. 8  D. 10  E. 13 | B |
| 10.20 | , what is the greatest real value that can have?  A. 10  B. 5  C. 4  D. 3  E. 0 | C |
| 10.21 | In an isosceles right triangle, the hypotenuse is 12. What is the length of one (1) of the sides?  A.6  B.2  C. 2  D. 2  E. | A |
| 10.22 | In the standard coordinate plane, what is the center of a circle with the equation  A.  B.  C.  D.  E. | C |
| 10.23 | What is the slope of the line determined by the equation  A. −6  B. −3  C.-  D.  E. 2 | D |
| 10.24 | Fifty (50) households were surveyed to determine the number of TVs in each of the households. The number of TVs in each household is shown in the chart below. What is the average number of TVs per household for these 50 households?    A. 1.0  B. 1.3  C. 2.7  D. 3.6  E. 4.2 | D |
| 10.25 | In the figure below, both circles are centered around . The length of is 2 units and the length of is 6 units. If the smaller circle is cut out of the larger circle, how much of the area, in square units, of the larger circle will remain?    A. 12π  B. 16π  C. 32π  D. 36π  E. 40π | C |
| 10.26 | In the standard coordinate plane, what is the x intercept of a line that has a slope of and passes through the point  A.  B.  C.  D.  E. | B |
| 10.27 | What is the slope of the line pictured in the standard coordinate plane below that passes through and in the standard coordinate plane?    A. −2  B.  C.  D.  E. | D |
| 10.28 | Three vertices of a rectangle in the standard coordinate plane have the coordinates and What are the coordinates of the fourth vertex?  A.  B.  C.  D.  E. | E |
| 10.29 | If two lines in the standard coordinate plane are perpendicular and the slope of one of the lines is - , what is the slope of the other line?  A.  B.  C.  D.  E. | A |
| 10.30 | Anne made apple jelly and applesauce out of a bushel of apples. If the number of jars of jelly, is 3 less than twice the number of jars of applesauce, , which expression shows the relationship of jars of jelly, , to the jars of applesauce, ?  A.  B.  C.  D.  E. | D |
| 10.31 | What are the solutions for the equation  A.  B. | B |
| 10.32 | Which of the following represents the values of x that are solutions for the inequality  A.  B.  C.  D.  E | B |
| 10.33 | A line in the standard coordinate plane has a slope of and passes through points and . What is the value of ?  A. 3  B. 2  C. 0  D. −2  E. −6 | E |
| 10.34 | What values of x make the inequality true?  A.  B.  C.  D.  E. | C |
| 10.35 | Which of the following intervals contains the solution to the equation = ?  A.  B.  C.  D.  E. − | B |
| 9.1 | One pound is equivalent to 16 ounces. If a book weighs 1.5 pounds, how many ounces, to the nearest tenth, does the book weigh?  A. 10.7  B. 17.5  C. 24.0  D. 61.5  E. 165.0 | C |
| 9.2 | Which of the following expressions is equivalent to  A. 3 +  B. 3 +  C. 3 − 1  D. 3 −  E. 3 + | D |
| 9.3 | Let a function of 2 variables be defined by What is the value of  A. 89  B. 73  C. 71  D. 34  E. 0 | B |
| 9.4 | What is 1/5 of 16% of 24,000?  A. 160  B. 768  C. 3,840  D. 4,032  E. 7,500 | B |
| 9.5 | If  A. 2.5  B. 10  C. 20  D. 50  E. 62.5 | B |
| 9.6 | A. −28  B. −16  C. −12  D. 16  E. 28 | E |
| 9.7 | If en y + =?  A. 78  B. 30  C. −6  D. −30  E. −78 | E |
| 9.8 | Two professors were hired to begin work at the same time. Professor A’s contract called for a starting salary of 50,000 with an increase of 1,500 after each year of employment. Professor B’s contract called for a starting salary of 42,000 with an increase of 2,800 after each year of employment. If y represents the number of full years of employment (that is, the number of yearly increases each professor has received), which of the following equations could be solved to determine the number of years until B’s yearly salary equals A’s yearly salary?  A.  B.  C.  D.  E. | A |
| 9.9 | If then which of the following is an expression for in terms of  A.  B.  C. WXY  D.  E. | B |
| 9.10 | Two whole numbers have a greatest common factor of 8 and a least common multiple of 48. Which of the following pairs of whole numbers will satisfy the given conditions?  A. 4 and 9  B. 5 and 10  C. 10 and 16  D. 14 and 20  E. 16 and 24 | E |
| 9.11 | If for all real numbers , then  A. 11  B. 22  C. 44  D. 88  E. 176 | A |
| 9.12 | Jenny ran 3 miles on Saturday and 2 miles on Sunday. The total distance, in miles, Jenny ran during those 2 days is within which of the following ranges?  A. At least 6 and less than 6  B. At least 6 and less than 6  C. At least 6 and less than 6  D. At least 5 and less than 6  E. At least 5 and less than | C |
| 9.13 | In the standard ) coordinate plane, how many times does the graph of intersect the axis?    A. 1  B. 4  C. 6  D. 10  E. 24 | B |
| 9.14 | Marcia’s horse’s rectangular corral is 50 feet wide by 125 feet long. Marcia wants to increase the area by 1,850 square feet by increasing the width and length by the same amount. What will be the new dimensions (width by length), in feet?  A. 55 by 130  B. 60 by 135  C. 65 by 135  D. 65 by 140  E. 70 by 145 | B |
| 9.15 | The lengths of the sides of a triangle are 3 consecutive even integers. If the perimeter of the triangle is 48 inches, what is the length, in inches, of the longest side?  A. 12  B. 14  C. 16  D. 18  E. 24 | D |
| 9.16 | In the standard coordinate plane, what is the slope of the line with equation  A. −  B. −6  C.  D. 3  E. 6 | C |
| 9.17 | Which of the following are the coordinates of the image of R under a 90counterclockwise rotation about the origin?  A.  B.  C.  D.  E. | E |
| 9.18 | Which of the following is closest to the perimeter of quadrilateral , in coordinate units?  A. 26.0  B. 22.5  C. 19.8  D. 15.0  E. 14.0 | C |
| 9.19 | What is the slope-intercept form of  A.  B.  C.  D.  E. | D |
| 9.20 | What is the least common multiple of  A.  B.  C. 60b  D.  E. 120b | B |
| 9.21 | What is the coordinate of the point in the standard coordinate plane at which the 2 lines intersect?  A. 1  B. 2  C. 4  D. 6  E. 10 | E |
| 9.22 | If , then =?  A. 16  B. 8  C. 1  D. −8  E. −16 | A |
| 9.23 | When x/y = 4, − 12=?  A.  B.  C.  D.  E. | B |
| 9.24 | The ratio of the side lengths for a triangle is exactly 15:14:12. In a second triangle similar to the first, the longest side is 10 inches long. To the nearest tenth of an inch, what is the length of the shortest side of the second triangle?  A. 6.4  B. 8.0  C. 9.3  D. 12.0  E. Cannot be determined from the given information | B |
| 9.25 | The costs of carriage rides of different lengths, given in half miles, are shown in the table below:    Each cost consists of a fixed charge and a charge per half mile. What is the fixed charge?  A. 0.50  B. 1.00  C. 5.50  D. 5.00  E. 1.50 | C |
| 9.26 | What is the largest integer value of that satisfies the inequality > ?  A. 30  B. 19  C. 18  D. 10  E. 8 | B |
| 9.27 | What is the distance in the standard ) coordinate plane between the points (  A.  B.  C. 4  D. 6  E. 16 | B |
| 9.28 | What is the matrix product [1, 0, −1]?  A.  B.  C.  D.  E. | A |
| 9.29 | The average of is 6 and the average of , and is 11. What is the value of  A. 21  B. 17  C. 13  D. 8  E. 5 | A |
| 9.30 | The greatest integer of a set of consecutive even integers is 12. If the sum of these integers is 40, how many integers are in this set?  A. 5  B. 6  C. 12  D. 20  E. 40 | A |
| 9.31 | Let be the set of all integers that can be written as 2where n is a nonzero integer. Which of the following integers is in  A. 6  B. 30  C. 46  D. 64  E. 80 | E |
| 9.32 | If are positive integers such that is even and the value of is odd, which of the following must be true?  A. is odd  B. is even  C. is odd  D. is evenis odd  E. is oddis odd | D |
| 9.33 | A bag contains only quarters, dimes, and nickels. The probability of randomly selecting a quarter is 1/6. The probability of randomly selecting a nickel is 1/4. Which of the following could be the total number of coins in the bag?  A. 15  B. 24  C. 30  D. 32  E. 40 | B |