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2014 amc12b answers

Copyright © 2020 Art of Troubleshooting 2014 AMC 12B (Response Key)Printable Version: Wiki | AoPS Resources • PDF Instructions This is a 25-question and multiple choice test. Each question is followed by answers marked A, B, C, D and E. Only one of them is correct. You will receive 6 points for each correct answer, 2.5 points for each problem left unanswered if the year is before 2006, 1.5 points for each problem left unanswered if the year is after 2006, and 0 points for each incorrect answer. No aids are allowed other than scratch paper, graph paper, ruler, compass, proser and eraser (and calculators that are accepted for use in the test if before 2006. No problems in the test will require the use of a calculator). The figures are not necessarily attracted to the scale. You will have 75 minutes of work to complete the test. 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • 10 • 11 • 12 • 13 • 14 • 15 • 16 • 17 • 18 • 19 • 20 • 21 • 22 • 23 • 24 • 25 Leah has coins, all of them are coins and nickels. If she had a penny more than she has now, then she'd have the same number of pennies and coins. In cents, how much are Leah's coins worth? Solution 2 Orvin problem went to the store with enough money to buy balloons. When he arrived, he discovered that the store had a special sale on balloons: buy balloon for the normal price and stay a second off the normal price. What is the largest number of balloons Orvin could buy? Solution Problem 3 Randy drove the first third of his trip on a gravel road, the next miles on the sidewalk, and the remainder a fifth on a dirt road. In miles, how long was Randy's trip? Solution Problem 4 Susie pays for muffins and bananas. Calvin spends twice as much paying for muffins and bananas. A muffin is how many times more expensive than a banana? Solution Problem 5 Doug builds a square window using glass panels of equal size, as shown. The ratio of height to the width of each panel is, and the edges around and between the panels are inches wide. In inches, what is the side length of the square window? Solution Problem 6 Ed and Ann both have lemonade with their lunch. Ed sorts the normal size. Ann gets the big lemonade, which is 50% more than normal. After both consuming their drinks, Ann gives Ed a third of what she left, and 2 additional ounces. When they finish their lemonades they realize that they both drank the same amount. How many ounces of lemonade did they drink together? Solution Problem 7 How many positive integers is also a positive integer? Solution Problem 8 In the addition shown below, and are distinct digits. How many different values are possible? Solution problem 9 Convex quadhas, , , , and , as shown. What's the area of the quad? Solution problem 10 Danica drove her new car in trip to an entire number of average 55 miles per hour. At the beginning of the trip, miles were displayed on the pedometer, where is a 3-digit number with and . At the end of the trip, the odometer showed miles. What is it. Solution Problem 11 A list of 11 positive integers has an average of 10, a median of 9, and a single mode of 8. What is the highest possible value of an integer in the list? Solution Problem 12 A set consists of triangles whose sides have entire lengths of less than 5, and neither element is congruent or similar. What is the largest number of elements they can have? Solution problem 13 Real numbers and are chosen with such a shape that no triangle with positive area has side lengths and or e . What is the smallest possible value? Solution Problem 14 A rectangular box has a total surface area of 94 square inches. The sum of the lengths of all its edges is 48 inches. What is the sum of lengths in inches of all your inner diagonals? Solution problem 15 When, the number is an integer. What is the highest power of 2 which is a factor of ? Solution Problem 16 Let it be a cubic polynomial with , and . What the other year? Solution Problem 17 Let the parabola be with equation and leave . There are real numbers and in such a way that the line through slope does not intersect if and only if . What the other year? Solution Problem 18 Numbers, , , , must be organized in a circle. An agreement is if it is not true that for each can find a subset of the numbers that appear consecutively in the circle that add up . Arrangements that differ only by a rotation or reflection are considered the same. How many different arrangements are there? Solution Problem 19 A sphere is inscribed in a truncated right circular cone, as shown. The volume of the truncated cone is twice the sphere. What is the ratio of the radius of the lower base of the truncated cone to the radius of the top base of the truncated cone? Solution Problem 20 How many positive integers are there? Solution problem 21 In the figure, there is a square of side length . Rectangles are congruent. What the other year? Solution problem 22 In a small pond there are eleven lily pads in a line labeled from 0 to 10. A frog is sitting on platform one. When the frog is on the pad, it will jump to the block with probability and to pad with probability. Each jump is independent of previous jumps. If the frog reaches block 0, it will be ate by a snake that waits patiently. If the frog gets to block 10, he'll leave the lake so he'll never come back. How likely is the frog to escape without being ate by the snake? Solution Problem 23 The number 2017 is prime. Let. What's the rest when it's split in 2017? Solution Problem 24 Let it be a pentagon inscribed in such a circle that, and . The sum of the lengths of all diagonals is equal to where and are relatively prime positive integers. What the other year? Solution problem 25 25 the sum of all positive solutions of Solution See also The problems on this page are protected by copyright by the Mathematical Association of American Mathematical Competitions of America. AMC 12B 21 2014. In the figure, the ABCD is a square of lateral length 1. The JKHG and EBCF rectangles are congruent. What is BE? (A) (B) (C) (D) (E) With any geometry problem, the first step is to draw a diagram and label lengths and/or angles judiciously. Since we are trying to find BE (which is the same as CF), let the length of the BE be represented by : There does not seem to be enough information labeled in the diagram yet. Where can we get more information from? The four triangles, and they look important. In fact, they are all similar to each other, with and (denotes is congruent). Your relationships with each other are likely to appear somewhere in the solution. Let's label one side of the triangle with some other variable. Let us denote the length of the FH. We can then label a few more sides: Now that we have 2 variables and, we have to find 2 equations that relate them to each other. This is where similar triangles come in. In the diagram above we used the Pythagorean Theorem to determine the lateral lengths of EK and KF. We can use similar triangles to find a different expression for these lengths, and I hope this gives us 2 equations. Using similar triangles and , Using these same 2 triangles, the length of the DG is equal to . Since it is congruent, we must have, that is, we have 2 equations and ! Now we can solve them. It seems easy to make the subject of the second equation (no square root in the denominator is a good sign), which we can then replace in the first equation. After the replacement, we have: Since it can not be zero, we have . Replacing back in the second equation, the answer is (C). This entry was posted at Grade 12, USA and marked 2014, AMC, Geometry. Mark the permalink. AMC 12B 23 of 2014. The 2017 number is prime. Let. What's the rest when the S is split in 2017? (A) 32 (B) 684 (C) 1024 (D) 1576 (E) 2016 I was quite intrigued when I first saw this question. If the module we're working with is 2017, why the numerator of the binomian coefficients of 2014, not 2017? Besides, why does the sum go from 0 to 62? How are 62 related to 2014 and/or 2017? There doesn't seem to be any connection. I was also sure that the solution to the problem was not to calculate 63 remains by brute force and add them. The first line of attack we can try with this problem is to see if we can apply some established combinatorial identity. Unfortunately, that doesn't seem to be the case. Wikipedia states that there is no closed formula for . The following 2 formulas are the most used, could we use them? The second does not seem as suitable as the binomials are not constant. The first has some promise, but an application of it doesn't seem to get anywhere: While the second cases seem a little cleaner with all the numerators being the same, there is no simple formula for adding binomials whose tops are the same, but bottoms differ by 2. The next line of attack we can try is to write the binomials completely and simplify them as much as possible. As we are working on module 2017, it seems that it would be better to consider numbers (such as 2014) that are closer to 2017 as negative numbers instead: for example. it's quite simple. Let's keep climbing the binomials in the sequence: we're on to something! Did you notice how there was a cancellation in the fraction for? Let's see: Following this pattern, we get the following: . If we don't think of other brilliant ideas, we could just add those 63 numbers and split by 2017, it's certainly a lot easier than the original 63 numbers we had to calculate and add. However, realizing that it is simply the sum : Thus, the answer is (C). This entry was posted at Grade 12, USA and marked 2014, AMC, Number Theory. Mark the permalink. Permalink.

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