Extreme Language Scramble Math Olympiad

Year: **2024**

Day: **1**

26th ELMO
Pittsburgh, PA

June 8, 2024
1:20PM-5:50PM EDT

Problem 1. Let the diagonals of a convex quadrilateral ABCD be equal to AC and BD at E. Let ADE and BCE again intersect the perimeter AB at P, which is not equal to A and Q, not equal to B, respectively, the perimeter ACP recut AD in R, except A, and the perimeter BDQ, except S recut BC. Prove that A, B, R and S are equal.

Problem 2. Let n, k, one, two, eight, b one, b two, bk be integers, ai plus bi equal to n for all one less than or equal to i less than or equal to k. Big Bird has a deck of n cards and will ai bi of all of them, i less than or equal to k, in ascending order. Suppose Big Bird can change the order of the deck. Prove that even a big bird can reach the number of n permutations of cards.

Problem 3. For a positive integer n, the Elmo formula writes x x x by xn equals the sum of x by x xn. Elmo puts at least one f to the left of the word and adds parentheses to make it a proper word. For example, if n is three, Elmo can make the open sentence of the expression f plus f equal to the open sentence of two possible f x plus three possible x one plus two x plus three x x. Cookie Monster features Queue to Queue, a feature of the Elm Interactive System. In other words, all possibilities for Q in Elam's theorem are x one, x two, xn. k (perhaps as a function of f) can be an integer that makes k equal to f and not. Is x equal to x for everything beyond x?

Time limit: 4 hours 30 minutes.
Each problem is worth 7 points.

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Year: 2024

Day: 2

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Problem 4. Let m be a natural number. Find the number of sequences of zero and the number of sequences of integers one and two in the range zero to n such that for all integers less than or equal to zero less than or equal to k and all nonnegative integers m, there exists an integer k less than or equal to i, less than or equal to two k, so that the fraction k and the base of the denominator are equal to two to the power m ai?

Problem 5. In a triangle ABC, AB is less than AC and AB plus AC is equal to BC, Let M be the midpoint of triangle BC. We choose a point P outside A on BA and a point Q on AC with M on PQ. Let X be opposite AB and C, so that AX is parallel to BC and AX AP is parallel to AQ. Let BX be parallel to B through the circle BMQ in Y, and CX through the circle CMP in Z. Prove that A, Y and Z are parallel.

Problem 6. For a prime number p, let F be an integer mod p and enclose p in square brackets. Let F be the set of quadripolynomials containing F in p such that P is a polynomial in x such that p is an integer in F square brackets where x is an integer or all i integers k P k mod p (p is a quadripolynomial with F. Note that the terms are included in the Appendix).

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