

2024 SSMO Tiebreaker Round

SMO Team

Tiebreaker Round Problem 1: Compute the exact value of

$$2^2 + 0^2 + 2^2 + 4^2 + 20^2 + 22^2 + 24^2 + 40^2 + 42^2 + 202^2.$$

Tiebreaker Round Problem 2: Bob is attempting to shoot a 3-point throw. Bob attempts the basket 97 times. Each time, Bob has a 35% chance of making the shot. If S_1 denotes the expected number of points Bob will make and S_2 the number of points Bob is most likely to make, then $|S_1 - S_2| = \frac{m}{n}$, where m and n are relatively prime positive integers. Find $m + n$.

Tiebreaker Round Problem 3: Let $A = \dots a_2 a_1 a_0 . a_{-1} a_{-2} a_{-3} \dots$ be a terminating decimal. The length of A is defined to be the length of the shortest sub-sequence of consecutive digits that include all nonzero digits and at least one of a_0, a_{-1} . So, the length of 12.03 is 4 and the length of 0.123 is 3. Let $f(n)$ be the average of all numbers with a terminating decimal of length n . Find the value of $\left\lfloor \sum_{n=0}^{10} (n+1)f(n) \right\rfloor$.