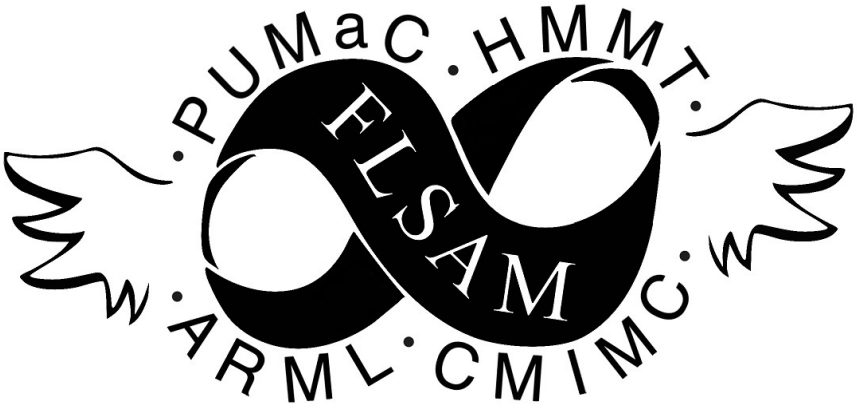
Florida Student Association of Mathematics



2026 HMMT Tryout

January 2026

Round 3: Combinatorics

This is round three of three, consisting of six problems to be completed in 40 minutes. Scoring is simply based on correct answers; there is no penalty for wrong answers.

1. Twelve distinguishable socks, four of each of the colors red, blue, and green, are randomly placed into three bins with each bin receiving four socks. Compute the probability that each bin has exactly one pair of identically colored socks.

2. Ten apples of distinct sizes are randomly arranged in a circle. An alligator is first located at the smallest apple and eats it. Every second from there, the alligator looks at the two apples adjacent to him and eats the larger one, repeating until there is only one apple left, which he also eats. Compute the probability that the alligator eats the second largest apple before the largest apple.

3. Jason places each of his 100 marbles numbered 1 to 100 into one of two distinguishable jars so that each jar has at least one marble. Compute the number of ways he can do this so that the product of the numbers in each of the two jars are relatively prime to each other.

4. Ten identical pandas sit in a row of 14 chairs such that each chair is occupied by at most one panda. Each panda rolls either two chairs to the left or two chairs to the right. Compute the number of initial positions of the pandas such that it is possible for the pandas to occupy distinct chairs at the end.

5. In an archipelago of 5 islands, for each of the $\binom{5}{2}$ pairs of islands, Jacob has built a two-way bridge between them independently with probability $\frac{1}{2}$. He now collapses the maximum possible number of bridges so that any two islands that a hooligan could previously travel between by a sequence of bridges can still be traveled between. Compute the expected number of bridges remaining.

6. In triangle ABC with area 1, points D, E, F are chosen randomly and uniformly on sides BC, AC, AB respectively. The cevians AD, BE, CF form a triangle that does not share boundary points with any point on the perimeter of ABC. Compute the expected value of the area of this triangle.

Q1	Q2	Q3
Q4	Q5	Q6