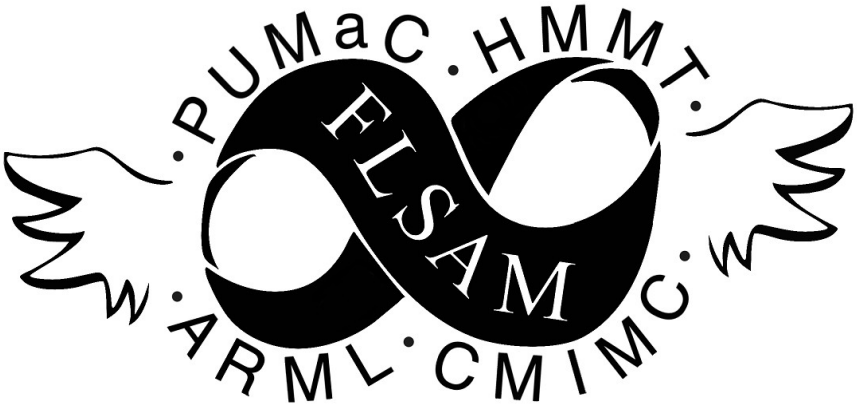
Florida Student Association of Mathematics



2026 HMMT Tryout

January 2026

Round 1: Algebra & Number Theory

Welcome to the **2026 FLSAM HMMT Tryout!** This is round one 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. There exists a unique positive integer n whose positive divisors have arithmetic mean 13. Find n.

2. Quadratic polynomials $P(x)$ and $Q(x)$ with real coefficients are such that the polynomials $P(x)$, $Q(x)$, and $P(x) + Q(x)$ achieve unique minimum values when x is 20, 26, and 25 respectively. Find the x for which $P(x) - Q(x)$ is maximized.

3. Distinct reals a, b, and c satisfy

$$a + b = \sqrt[3]{3a + 3b - 20} + 7$$
$$b + c = \sqrt[3]{3b + 3c - 20} + 7$$
$$c + a = \sqrt[3]{3c + 3a - 20} + 7$$

Compute $ab + bc + ca$.

4. Let S be the set of ordered quadruples (a, b, c, p) of positive integers for which there exists a nondegenerate triangle with side lengths a, b, and c and with perimeter p such that $p < 200$. Compute $\left\lfloor \sum_{(a,b,c,p) \in S} 2^{p-200} \right\rfloor$.

5. Let P be the product of all primes less than 20. A divisor d of P^{99} is randomly chosen. Compute the expected value of $v_2(\sigma(d))$.

[For a positive integer n, $\sigma(n)$ denotes the sum of its divisors and $v_2(n)$ denotes the largest k for which 2^k divides n.]

6. There exists a unique prime p such that $n^4 + n^3 + n^2 + n - 1$ is divisible by p for exactly 3 integer values of n between 1 and p inclusive. Find p.

Q1	Q2	Q3
Q4	Q5	Q6