

MOAA 2026: Accuracy Round

October 10th, 2026

Rules

- You have 45 minutes to complete 10 problems. Each answer is a nonnegative integer no greater than 1,000,000.
- If m and n are relatively prime, then the greatest common divisor of m and n is 1.
- No mathematical texts, notes, or online resources of any kind are permitted. Rely on your brain!
- Compasses, protractors, rulers, straightedges, graph paper, blank scratch paper, and writing implements are generally permitted, so long as they are not designed to give an unfair advantage.
- No computational aids (including but not limited to calculators, phones, calculator watches, and computer programs) are permitted on any portion of the MOAA.
- No individual may receive help from any other person, including members of their team. Consulting any other individual is grounds for disqualification.

How to Compete

- **In Person:** After completing the test, write your answers down in the provided Accuracy Round answer sheet. The proctors will collect your answer sheets immediately after the test ends.
- **Online:** Log into the Classtime session to access the test. Input all answers directly into the provided form. Select for the test to be handed in once you are ready.

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Accuracy Round Problems

- A1. [3] Find the last digit of

$$2^{2026} + 0^{2026} + 2^{2026} + 6^{2026}.$$

- A2. [3] Find the number of ordered pairs of positive integers (m, n) that satisfy the equation

$$\frac{1}{m} + \frac{1}{n} = \frac{1}{2026}.$$

- A3. [4] Call a convex polygon *almost-rigid* if all but exactly one of its interior angles form an integer non-constant arithmetic progression. Find the maximum number of sides an almost-rigid polygon can have.

- A4. [4] Bill is forming a math team from a group of 12 students. He wants to select a team of at least two students and then designate exactly two students to be the president and vice-president. Determine the number of different ways can Bill form the team.

- A5. [5] Three vertices of a regular nonagon are chosen independently and uniformly at random, repetition allowed. If the probability that the chosen points form an acute triangle can be written as $\frac{m}{n}$ for relatively prime positive integers m and n , find $m + n$.

- A6. [6] Let $N = 2026 \cdot 2024 \cdot \dots \cdot 2$. Sophia writes N in base 11. Kaylee also writes N in a positive integer base, b . Suppose that Kaylee's base- b representation of N has at least as many trailing zeroes as Sophia's. If S is the sum of all possible values of b , find the sum of all distinct prime divisors of S .

Note: $b = 1$ is allowed, in which case Kaylee just writes a very long string of 0s.

- A7. [8] A compass starts with legs at $A(0, 0)$ and $B(1, 0)$. Each second, one leg is randomly fixed (starting with A) while the other rotates to a random adjacent lattice point. If the probability that A reaches the line $x + y = -2$ before $x + y = 2026$ can be written as $\frac{m}{n}$ for relatively prime positive integers m and n , find $m + n$.

- A8. [8] A rectangular box has integer side lengths $a \leq b \leq c$ such that its volume is equal to its surface area. Compute the sum of $a + b + c$ over all such boxes.

- A9. [9] Let ABC be a triangle with circumradius 25 and circumcircle Ω . A point P lies on Ω . The line through P perpendicular to BC meets Ω at $D \neq P$, the line through P perpendicular to CA meets Ω at $E \neq P$, and the line through P perpendicular to AB meets Ω at $F \neq P$. Suppose that $AEBDCF$ is a convex hexagon with $AD = 48$, $BE = 30$, and $CF = 40$. Find the area of $AEBDCF$.

- A10. [10] A hunter and rabbit play a game on an infinite square lattice. The hunter starts at the origin and the rabbit starts at a point (p, q) , where $1 \leq p, q \leq 2026$. In the n -th round of the game, two things occur in order:

- The rabbit moves either up, left, down, or right exactly 1 unit.
- The hunter moves directly towards the rabbit along a straight line until it hits a grid point distinct from its starting point.

The rabbit is considered “caught” when the hunter moves to the same point as the rabbit. Let N be the number of starting points the rabbit can choose for which there exists a strategy to ensure it will never be caught. Find the remainder when N is divided by 1000.