MAA AMC AMERICAN MATHEMATICS COMPETITIONS

MAA American Mathematics Competitions
44th Annual

AIME II

American Invitational Mathematics Examination II
Wednesday, February 11, 2026

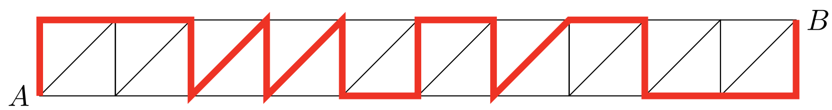
INSTRUCTIONS

1. DO NOT TURN THE PAGE UNTIL YOUR COMPETITION MANAGER TELLS YOU TO BEGIN.
2. This is a 15-question competition. All answers are integers ranging from 000 to 999, inclusive. Make sure each of your answers is 3 digits, even if the first digit is zero.
3. Mark your answer to each problem on the answer sheet by completely filling the circle with a #2 pencil. Check blackened answers for accuracy and erase errors completely. Only answers that are properly marked on the answer sheet and appear sufficiently dark will be scored.
4. SCORING: You will receive 1 point for each correct answer, 0 points for each problem left unanswered, and 0 points for each incorrect answer.
5. Only blank scratch paper, rulers, compasses, and erasers are allowed as aids. Prohibited materials include calculators, smartwatches, phones, computing devices, protractors, and graph paper.
6. Figures are not necessarily drawn to scale.
7. You will have 3 hours to complete the competition once your competition manager tells you to begin, though all work must be submitted by 5:30 pm ET regardless of starting time.
8. You may only take the AIME once. Taking both the AIME I and II will result in disqualification.

The problems and solutions for this AIME were prepared by the
MAA AIME Editorial Board under the direction of:
Jonathan Kane and Ioana Mihaila, Co-Editors-in-Chief

Problem 1:
Find the sum of the 10th terms of all arithmetic sequences of integers that have first term equal to 4 and include both 24 and 34 as terms.

Problem 2:
The figure below shows a grid of 10 squares in a row. Each square has a diagonal connecting its lower left vertex to its upper right vertex. A bug moves along the line segments from vertex to vertex, never traversing the same segment twice and never moving from right to left along a horizontal or diagonal segment. Let N be the number of paths the bug can take from the lower left corner (A) to the upper right corner (B). One such path from A to B is shown by the thick line segments in the figure. Find $\sqrt{N}$.



Problem 3:
Let $ABCDE$ be a nonconvex pentagon with internal angles $\angle A = \angle E = 90°$ and $\angle B = \angle D = 45°$. Suppose that $DE < AB$, $AE = 20$, $BC = 14\sqrt{2}$, and points B, C, and D lie on the same side of line AE. Suppose further that AB is an integer with $AB < 2026$ and the area of pentagon $ABCDE$ is an integer multiple of 16. Find the number of possible values of AB.

Problem 4:
For each positive integer n let $f(n)$ be the value of the base-ten numeral n viewed in base b, where b is the least integer greater than the greatest digit in n. For example, if $n = 72$, then $b = 8$, and 72 as a numeral in base 8 equals $7 \cdot 8 + 2 = 58$; therefore $f(72) = 58$. Find the number of positive integers n less than 1000 such that $f(n) = n$.

Problem 5:
An urn contains n marbles. Each marble is either red or blue, and there are at least 7 marbles of each color. When 7 marbles are drawn randomly from the urn without replacement, the probability that exactly 4 of them are red equals the probability that exactly 5 of them are red. Find the sum of the five least values of n for which this is possible.

Problem 6:
Find the sum of all real numbers r such that there is at least one point where the circle with radius r centered at $(4, 39)$ is tangent to the parabola with equation $2y = x^2 - 8x + 12$.

Problem 7:
A standard fair six-sided die is rolled repeatedly. Each time the die reads 1 or 2, Alice gets a coin; each time it reads 3 or 4, Bob gets a coin; and each time it reads 5 or 6, Carol gets a coin. The probability that Alice and Bob each receive at least two coins before Carol receives any coins can be written as $\frac{m}{n}$, where m and n are relatively prime positive integers. Find $100m + n$.

Problem 8:
Isosceles triangle $\triangle ABC$ has $AB = BC$. Let I be the incenter of $\triangle ABC$. The perimeters of $\triangle ABC$ and $\triangle AIC$ are in the ratio $125 : 6$, and all the sides of both triangles have integer lengths. Find the minimum possible value of AB.

Problem 9:
Let S denote the value of the infinite sum

$$\frac{1}{9}+\frac{1}{99}+\frac{1}{999}+\frac{1}{9999}+\cdots.$$

Find the remainder when the greatest integer less than or equal to $10^{100}S$ is divided by 1000.

Problem 10:
Let $\triangle ABC$ be a triangle with D on $\overline{BC}$ such that $\overline{AD}$ bisects $\angle BAC$. Let ω be the circle that passes through A and is tangent to segment $\overline{BC}$ at D. Let $E \neq A$ and $F \neq A$ be the intersections of ω with segments $\overline{AB}$ and $\overline{AC}$, respectively. Suppose that $AB = 200$, $AC = 225$, and all of AE, AF, BD, and CD are positive integers. Find the greatest possible value of BC.

Problem 11:
Find the greatest integer n such that the cubic polynomial

$$x^3 - \frac{n}{6}x^2 + (n-11)x - 400$$

has roots α^2, β^2, and γ^2, where α, β, and γ are complex numbers, and there are exactly seven distinct possible values for $\alpha+\beta+\gamma$.

Problem 12:
Consider a tetrahedron with two isosceles triangle faces with side lengths $5\sqrt{10}$, $5\sqrt{10}$, and 10 and two isosceles triangle faces with side lengths $5\sqrt{10}$, $5\sqrt{10}$, and 18. The four vertices of the tetrahedron lie on a sphere with center S, and the four faces of the tetrahedron are tangent to a sphere with center R. The distance RS can be written as $\frac{m}{n}$, where m and n are relatively prime positive integers. Find $m+n$.

Problem 13:
Call finite sets of integers S and T *cousins* if

- S and T have the same number of elements,
- S and T are disjoint, and
- the elements of S can be paired with the elements of T so that the elements in each pair differ by exactly 1.

For example, $\{1,2,5\}$ and $\{0,3,4\}$ are cousins. Suppose that the set S has exactly 4040 cousins. Find the least number of elements the set S can have.

Problem 14:
For integers a and b, let $a \circ b = a - b$ if a is odd and b is even, and $a+b$ otherwise. Find the number of sequences $a_1, a_2, a_3, \ldots, a_n$ of positive integers such that

$$a_1 + a_2 + a_3 + \cdots + a_n = 12 \quad \text{and} \quad a_1 \circ a_2 \circ a_3 \circ \cdots \circ a_n = 0,$$

where the operations are performed from left to right; that is, $a_1 \circ a_2 \circ a_3$ means $(a_1 \circ a_2) \circ a_3$.

Problem 15:
Find the number of ordered 7-tuples $(a_1, a_2, a_3, \ldots, a_7)$ having the following properties:

- $a_k \in \{1, 2, 3\}$ for all k.
- $a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7$ is a multiple of 3.
- $a_1a_2a_4 + a_2a_3a_5 + a_3a_4a_6 + a_4a_5a_7 + a_5a_6a_1 + a_6a_7a_2 + a_7a_1a_3$ is a multiple of 3.