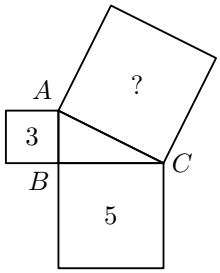
HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

1. **[5]** Each cell of the following 1×9 grid is labeled with a single-digit nonnegative integer such that any two adjacent cells have a product that is divisible by 6. Compute the least possible sum of all nine numbers in the grid.

?	6	1	?	0	2	?	?	3

2. **[5]** Squares are erected outside of right triangle ABC, as shown below. Given that the square along leg $\overline{AB}$ has perimeter 3, and the square along leg $\overline{BC}$ has perimeter 5, compute the perimeter of the square along hypotenuse $\overline{AC}$.



3. **[5]** Compute the number of nine-letter strings consisting of three A's, three B's, and three C's such that each A appears directly next to another A, each B appears directly next to another B, and each C appears directly next to another C.

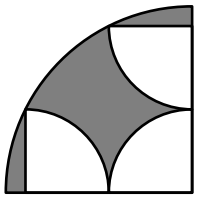
©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

4. **[6]** Compute the greatest 2-digit positive integer $\underline{ab}$ such that $\underline{ab} + \underline{ba}$ is a perfect square.

5. **[6]** Three quarter-circles of radius 1 are inscribed in a larger quarter-circle, as shown in the diagram. Compute the area of the shaded region.



6. **[6]** Snow White and the seven dwarfs are sitting in a circle facing inward. Initially, Snow White holds a basket containing 100 apples, of which 1 is poisoned and the rest are harmless. Every minute, whoever is holding the basket must choose an apple uniformly and independently at random from the basket and eat it, then pass the basket to the person to their left. This process continues until someone eats the poisoned apple.

   Compute the probability that Snow White does **not** eat the poisoned apple.

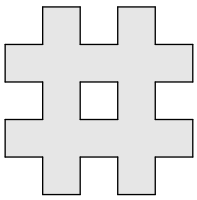
©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

7. [**7**] Suppose $P(x)$ is a quadratic polynomial with real coefficients for which $P(10) - P(1) - P(9) = 62$ and $P(10) - P(2) - P(8) = 118$. Compute $P(10) - P(3) - P(7)$.

8. [**7**] Jason splits a 5×5 square into 25 unit squares and removes 9 of them to form the following hashtag shape:



Jason then draws a line segment inside the hashtag. Compute the maximum possible length of such a segment.

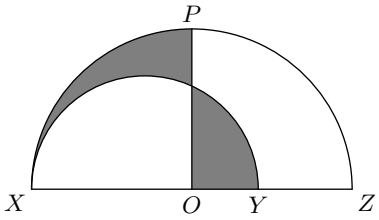
9. [**7**] Hannah has 16 colored pencils of different colors and is drawing a tricolor flag with 3 horizontal stripes. The pencils come in 8 pairs of complementary colors. Hannah randomly colors each stripe such that no two stripes have exactly the same color. Compute the probability that no two adjacent stripes have complementary colors.

©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

10. [**8**] A semicircle with diameter $\overline{XY}$ is drawn inside of a larger semicircle with diameter $\overline{XZ}$, as shown below. Furthermore, the larger semicircle is divided by radius $\overline{OP}$ into two congruent quarter-circles.



Suppose that the two shaded regions shown above have equal area. Given that $XZ = 10$, compute XY.

11. [**8**] Mark rolls a fair 6-sided die 6 times and writes down his results in order, creating a 6-digit number. Compute the probability that this number is a multiple of 15.

12. [**8**] Compute the smallest positive integer $n \geq 5$ such that

- $\binom{n}{0}$ divides $\binom{n}{1}$,
- $\binom{n}{1}$ divides $\binom{n}{2}$,
- $\binom{n}{2}$ divides $\binom{n}{3}$,
- $\binom{n}{3}$ divides $\binom{n}{4}$,
- $\binom{n}{4}$ divides $\binom{n}{5}$.

©2026 HMMT

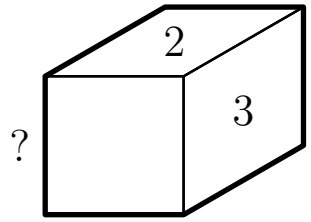
HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

13. [**9**] A circular necklace has 20 red beads and 30 green beads. Stella cuts the necklace into two halves, each with an equal number of beads, and takes one of the halves. The beads are arranged such that across all the ways Stella could have cut the necklace, the minimum possible number of red beads in Stella's half is 6, and the minimum possible number of green beads in Stella's half is N. Compute the maximum possible value of N across all such arrangements of beads.

14. [**9**] Suppose a_1, a_2, a_3, a_4 is a geometric sequence of real numbers satisfying $a_2 + a_3 = 20$ and $a_1 + a_4 = 26$. Compute $\sqrt[3]{a_1} + \sqrt[3]{a_4}$.

15. [**9**] An equilateral hexagon is divided into a square and two rhombi, as shown below. Given that the rhombi have areas 2 and 3, compute the side length of the hexagon.



©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

16. [**10**] Let N be the smallest positive integer divisible by 2026 with the property that for every positive divisor k of N, the number of positive divisors of k is also a divisor of N. Compute $\frac{N}{2026}$.

17. [**10**] On Monday, Steve writes a single-digit nonzero multiple of 4 on a blackboard. Each following day, Steve inserts a nonzero digit at any position into the number on the blackboard—possibly at the front, in the middle, or at the end—such that the number on the blackboard remains a multiple of 4. Compute the number of 4-digit numbers that could possibly appear on the blackboard on Thursday.

18. [**10**] Point D lies on side $\overline{BC}$ of triangle ABC such that $AB = BD = 14$ and $DC = 9$. Let T be a point on line AD such that $\angle BCT = 90^\circ$ and D lies between A and T. Compute the minimum possible value of AT.

©2026 HMMT

Organization _____ Team _____ Team ID# _____

19. **[11]** Let $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$, $\frac{c_1}{c_2}$, and $\frac{d_1}{d_2}$ be four positive simplified fractions for which

$$\frac{a_1}{a_2} \cdot \frac{b_1}{b_2} \cdot \frac{c_1}{c_2} = \frac{d_1}{d_2}.$$

Given that $a_1a_2 = 720$, $b_1b_2 = 108$, and $c_1c_2 = 250$, compute the minimum possible value of d_1d_2.

20. **[11]** Let ABC be a triangle with $BC = 8$. Let ω be the circle centered at A passing through the midpoint of side $\overline{BC}$. Suppose that there exist parallel tangent lines to ω through B and C. Given that the distance from A to BC is 3, compute the radius of ω.

21. **[11]** Compute the number of 10-letter strings of A's and B's that contain the same number of substrings of the form ABB as substrings of the form BBA.

©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

22. **[12]** Compute the sum of the digits in the base 10 representation of

$$\left\lfloor 10^{99} \cdot \frac{100\,008}{700\,007} \right\rfloor.$$

(Here, $\lfloor x \rfloor$ denotes the greatest integer less than or equal to x.)

23. **[12]** Call a set S of positive integers *divisorful* if for any ordered triple (a, b, c) consisting of not necessarily distinct elements of S, a divides bc. Compute the least positive integer n such that there exists a divisorful set with exactly 25 elements containing n.

24. **[12]** Gregasaurus has a unit square piece of paper with a red dot in one of its corners. A *fold* consists of the following:

    1. Selecting a line ℓ passing through the interior of the square that divides the square into two regions.
    2. Picking one of the two regions, and reflecting it across ℓ.

Gregasaurus folds the square exactly once. Compute the area of the smallest region R such that the red dot must remain in R, no matter how Gregasaurus folds the square.

©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

25. **[13]** Let $p(x)$ be a polynomial of degree at most 6 such that $p(n) = 1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{n}$ for all $n \in \{2, 3, 4, 5, 6, 7, 8\}$. Compute $p(0)$.

26. **[13]** Sophia has a 5×5 grid of dots, and selects 10 of them uniformly at random. Given that she selects exactly 2 dots in each row and each column, compute the probability that some 4 selected dots form a rectangle with grid-aligned sides.

27. **[13]** Crystal writes two 5-digit positive integers in her journal using every digit exactly once (where leading zeros are not allowed). Compute the maximum possible sum of the digits of the absolute difference between her numbers.

©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

28. **[15]** One hundred players $P_1, P_2, \ldots, P_{100}$ are playing a game. Each player P_i has an unfair coin that lands heads with probability p_i. On the n^{th} turn of the game, player P_n flips their coin, where indices are taken modulo 100. If it lands heads, the game ends immediately and they win. Otherwise, the game continues with the next player's turn.

    Given that each player has a $\frac{1}{100}$ probability of winning and that $p_{100} = \frac{6}{7}$, compute p_1.

29. **[15]** Convex pentagon $BRYAN$ has area 128 with $\angle A + \angle B = 180^\circ$ and side lengths $BR = 2$, $RY = 12$, $YA = 10$, $AN = 11$ and $NB = 11$. Compute $\sin(\angle A)$.

30. **[15]** There exists a polynomial $p(x, y)$ with real coefficients and total degree at most 4 such that $p(m, n)$ is the entry in the m^{th} row and the n^{th} column of the following table.

4	8	*	?
3	5	9	*
2	3	5	9
0	1	2	2

    Compute $p(4, 4)$, i.e., the top-right entry in the table.

©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

31. **[17]** Let $ABCD$ be a cyclic quadrilateral, and suppose rays BA and CD meet at E and rays CB and DA meet at F. Suppose the inradii of triangles EDA, EBC, FAB, and FCD are 5, 10, 6, and 10, respectively. Compute the area of $ABCD$.

32. **[17]** Mark has a radioactive ball weighing 1 gram. During the n^{th} minute, each radioactive ball has a 1/2 chance of splitting into two radioactive balls, each of weight 2^{-n} grams (regardless of the ball's initial weight or when it was initially formed). After 7 minutes, compute the expected value of the total weight in grams of Mark's radioactive balls.

33. **[17]** The decimal expansion of 1/179 has a repeating period of length 178. Compute the sum of the squares of the digits in this period.

©2026 HMMT

HMMT November 2026, November 07, 2026 — GUTS ROUND

Organization _____ Team _____ Team ID# _____

34. **[20]** Krad starts with the number 1. On each step, if his number is n, he replaces it with a random positive divisor of $6n$. Let p be the probability that after 2026 steps, Krad has the number 48. Estimate $1/p$.

    Submit a real number E. If the correct answer is A, you will receive $\left\lfloor 20.99e^{-0.02(E-A)^4} \right\rfloor$ points.

35. **[20]** Sam has a standard 6×6 checkerboard with black and white squares. Sam then colors in each white square of the checkerboard with black marker independently with probability 1/2. Estimate the expected number of contiguous black regions now on Sam's checkerboard.

    Submit a real number E. If the correct answer is A, you will receive $\left\lfloor 20.99e^{-12(E-A)^2} \right\rfloor$ points.

    (A contiguous black region is a maximal set of black squares satisfying the property that, between any two black squares of the set, there exists a path traversing only through other black squares of the set, where consecutive squares on a path share an edge.)

36. **[20]** Compute the number of positive integers $N < 10^9$ which satisfy the following two properties:

    - N is not a multiple of 2 or 5.
    - There does not exist a prime M which has the same number of digits as N and differs from N in at most one decimal place.

    Submit a positive integer E. If the correct answer is A, you will receive round $\left(20 \min\left(\frac{A}{E}, \frac{E}{A}\right)^2\right)$ points.

©2026 HMMT