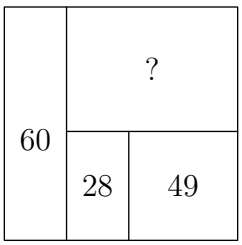
HMMT November 2026

November 07, 2026

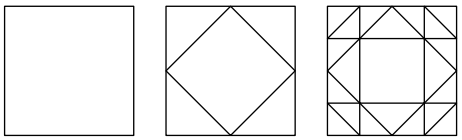
Theme Round

1. Moana is building a square raft by tying four rectangular planks together. All of the planks have integer side lengths, and three of the planks have areas 60, 28, and 49, as shown. Compute the area of the fourth plank.



2. Ariel is organizing her collection of human treasures. She can divide her dinglehoppers evenly into groups of 102, and her snarfblatts evenly into groups of 103. When she combines all of her dinglehoppers and snarfblatts, she can divide them evenly into groups of 100. Compute the minimum possible (nonzero) total number of dinglehoppers and snarfblatts in Ariel's collection.

3. Jasmine is making a new design for a flying carpet. Her first draft is a square, and to construct her $(n+1)$th draft she takes her nth draft and, for each polygonal region bounded by segments in her diagram, she connects the midpoints of adjacent sides via line segments. The first, second, and third drafts are shown at right, and contain 1, 5, and 21 polygonal regions respectively. Compute the number of polygonal regions in her 6th draft.



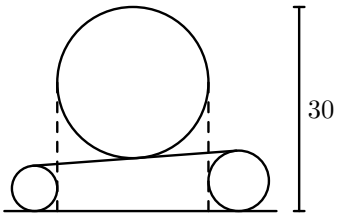
4. After some recent incidents, Snow White has decided to start eating apples again. She eats 1 apple on day 1. For each positive integer $n \geq 2$, she eats n times as many apples on day n as she did on all previous days combined. Compute the number of apples Snow White eats on day 2026.

5. Rapunzel's hair is getting too long again, so she decides to cut it every day for the next 6 days. At the start of the first day, her hair is 2026 feet long. First, she chooses a positive integer m. Then, on the n^{th} day, she cuts $\frac{m}{n}$ feet off her hair, then cuts $\frac{1}{n+1}$ of her remaining hair length off. Suppose that Rapunzel's hair does not grow back, and that at the end of each of the 6 days, her hair length is an integer number of feet. Compute the smallest possible value of m.

6. Raya is flying on the dragon Sisu over Kumandra when they spot a small circular island they want to reach. Initially, Raya and Sisu are directly above the point $(0,0)$. The island consists of all points (x,y) satisfying $(x-4)^2+(y-6)^2 \leq 1$. Without wind, Sisu can fly at 2 units per hour in any direction. Additionally, the wind blows Sisu in the positive x-direction at a constant rate of 1 unit per hour. Compute the minimum amount of time, in hours, before Raya and Sisu can be directly above any point on the island. (Assume that they remain at a constant altitude for the entirety of their flight.)

7. Mulan orders 10 soldiers to stand in a line. Each soldier points to one of their neighboring soldiers independently and uniformly at random. Compute the probability that exactly 3 pairs of neighboring soldiers point at each other.

8. Cinderella's pumpkin carriage consists of two circular wheels and a circular pumpkin, all tangent to a line segment. When on flat ground, the leftmost point of the pumpkin is directly above the rightmost point of the left wheel, and the rightmost point of the pumpkin is directly above the leftmost point of the right wheel. The wheels have radii 3 and 4. Moreover, the height of the carriage is 30. Compute the radius of the pumpkin.



9. Compute the unique triple of positive integers (b,e,ℓ) satisfying $be\ell+\ell+e=6886$ and $be+\ell+\ell e=586$.

10. Merida paints an equilateral triangle ABC with side length 4 units on her castle wall. She attempts to shoot an arrow at each vertex of this triangle. However, her arrows strike the wall at points D, E, and F, which are 1, 2, and 3 units away from A, B, and C, respectively. Furthermore, the centroid of triangle DEF coincides with the centroid of triangle ABC. Compute the maximum possible area of triangle DEF.

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