

MATHCOUNTS®

2026 STATE COMPETITION Target Round Problems 1–8

Name _____

DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO.

This section of the competition consists of eight problems, which will be presented in pairs. Work on one pair of problems will be completed and answers will be collected before the next pair is distributed. The time limit for each pair of problems is six minutes. The first pair of problems is on the other side of this sheet. When told to do so, turn the page over and begin working. This round assumes the use of calculators, and calculations also may be done on scratch paper, but no other aids are allowed. All answers must be complete, legible and simplified to lowest terms. Record only final answers in the blanks in the left-hand column of the problem sheets. If you complete the problems before time is called, use the time remaining to check your answers.

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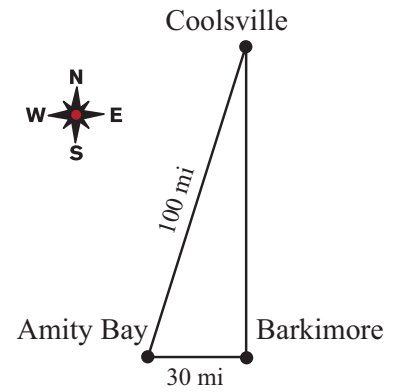
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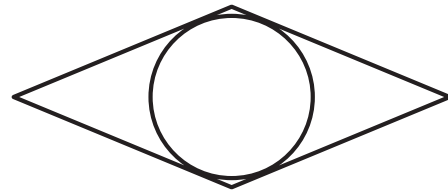
1. _____ mi

Coolsville is 100 miles away from Amity Bay. To get to Coolsville, one can take the Amity Express Train 30 miles due east to Barkimore, and then ride the Barkimore County Bus due north the rest of the way. How many miles is just the bus ride? Express your answer as a decimal to the nearest tenth.



2. _____

A circle with area 25π is inscribed in a rhombus with area 120. What is the perimeter of the rhombus?

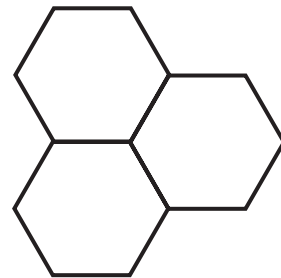
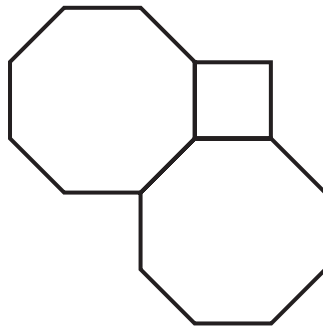


3. _____ In the expression $a^b + c^d$, the tuple (a, b, c, d) is some permutation of $(2, 0, 2, 6)$. What is the greatest possible value of the expression?

4. _____ Alexis has a fair, standard six-sided die and the 36 cards numbered 2 through 10 from a standard deck of 52 cards. After shuffling the cards, she deals herself 2 cards, without replacement, and rolls the die. What is the probability that the sum of the numbers on the die and the two cards will be 6? Express your answer as a common fraction.

5. _____ For every positive integer n , let $Q(n)$ be the sum of the greatest integers less than or equal to the square roots of the integers $1, 2, 3, \dots, n$. For example, $Q(3) = 1 + 1 + 1 = 3$ and $Q(10) = 1 + 1 + 1 + 2 + 2 + 2 + 2 + 2 + 3 + 3 = 19$. What is the least positive integer n for which $Q(1) + Q(2) + Q(3) + \dots + Q(n) \geq 2026$?

6. _____ sides Three regular polygons of side length 1 are externally glued together so that each shares a side with the other two, and all three share a common vertex. For example, this could be done with a square and two regular octagons, or with three regular hexagons. What is the greatest possible number of sides one of the three regular polygons could have?



7. _____ ft^2 The number of cubic feet in the sum of the volumes of a sphere with radius r feet, and a cone with radius r feet and height $2r$ feet, is equal to the number of square feet in the surface area of a cylinder with radius $3r$ feet and height $4r$ feet. How many square feet are in the surface area of a cube with side length r feet?
8. _____ times Lorenz has an unfair coin that comes up heads with probability $\frac{2}{3}$ and tails with probability $\frac{1}{3}$. He flips this coin until 2 of the 5 most recent flips are heads. If he gets 2 heads before he flips the coin 5 times, then he stops immediately after getting the second head. What is the expected number of times Lorenz flips the coin? Express your answer as a common fraction.

