

MATHCOUNTS®

2026 STATE COMPETITION Team Round Problems 1–10

School _____
Team Members _____, Captain

DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO.

This section of the competition consists of 10 problems which the team has 20 minutes to complete. Team members may work together in any way to solve the problems. Team members may talk to each other during this section of the competition. 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. The team captain must record the team's official answers on his/her own competition booklet, which is the only booklet that will be scored. If the team completes the problems before time is called, use the remaining time to check your answers.

Total Correct	Scorer's Initials

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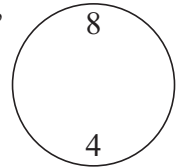
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1. _____ What is the least positive integer whose digits have a product of 100?

2. _____ degrees On Planet Mathian, the Mathinian folk measure time on an 8 “hour” clock with 90 “minutes” per “hour”. How many degrees are in the measure of the smaller angle formed by the hands of this clock when the time is 2:24?



3. _____ If A, I, M and S are distinct digits such that $I \times AM = SAM$ and S is nonzero, what is the greatest possible value of the 4-digit number AIMS?

4. _____ When List B is created by appending the numbers 17 and 23 to List A, the mean decreases by p and the median increases by q . What is the value of $p + q$? Express your answer as a decimal to the nearest tenth.

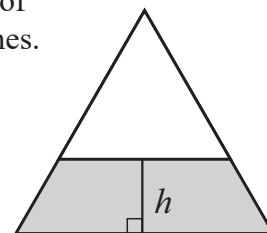
List A: 11, 13, 104, 23, 11, 23

List B: 11, 13, 104, 23, 11, 23, 17, 23

5. _____ Let M, A, T and H have the following coordinates: M(0, 7), A(0, 12), T(3, 2), and H(10, 8). Point P is chosen at random on segment TH. What is the probability that the area of triangle MAP is greater than or equal to 15? Express your answer as a common fraction.

6. _____

Mrs. Gemma Tree has a window in her house in the shape of an equilateral triangle. The height of the window is 48 inches. She has a window shade that rises from the bottom of the window upward. When the height of the shade is h inches, the total area covered by the shade is given by the formula $A = (ph^2 + qh)$ square inches, for h ranging from 0 to 48. What is the value of pq ?



7. _____ divisors

A positive integer n has 18 positive integer divisors. What is the greatest possible number of positive integer divisors that n^2 could have?

8. _____

A circle is centered at point C with coordinates (11, 4) and passes through point D with coordinates (17, 10). The line $y = x - 1$ splits the circle into two regions. What is the area of the smaller region? Express your answer as a decimal to the nearest tenth.

9. _____

A random number generator repeatedly picks one of the numbers 20 or 26 with equal probability, each pick independent of the others. What is the expected value of the sum of the chosen numbers when the sum is greater than or equal to 100 for the first time? Express your answer as a common fraction.

10. _____ ordered
pairs

How many ordered pairs of two-digit positive integers (a, b) are there such that $\gcd(30, a, b) \times \text{lcm}(30, a, b) = 30ab$?

