MATHCOUNTS®

2025 State Competition
Team Round Problems 1–10

School _____

Chapter _____

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

1. _____ cats

Olivia has 120 stuffed cats on her bed. The colors of the cats are mutually exclusive: one-third of the cats are black, one-fifth are orange, one-fourth are calico, and 16 cats are white. The remaining cats are gray. How many cats are gray?

2. _____

Rowechen flips a fair coin repeatedly until it lands heads up for the first time. Then, Yochen flips a different fair coin repeatedly until it lands heads up for the first time. What is the probability that Rowechen flipped his coin strictly more times than Yochen flipped his? Express your answer as a common fraction.

3. _____ minutes

Maria runs twice as fast as she walks. It takes 40 minutes for her to walk from her home to school in the morning. She then runs from school to her friend's house in the afternoon. If her friend lives three times as far from the school as Maria does, how many minutes does Maria spend running in the afternoon?

4. _____ integers

Nikki makes a list of integers n between 100 and 200, inclusive, that have the same remainder, which may be zero, when divided by 6 as when divided by 8. How many integers are on her list?

5. _____ faces

The faces of a $5 \times 5 \times 5$ cube are painted red. The cube is split into 125 unit cubes. If a unit cube is chosen at random, what is the expected value of the number of red faces on the unit cube? Express your answer as a common fraction.

6. _____ ft^2 A rectangular prism-shaped glass display box is designed to have an interior volume of 36 cubic feet while minimizing the amount of glass used for its 6 faces. Each dimension of the box is a whole number of feet. What is the total inner surface area of the box, in square feet?

7. _____ The average test scores for freshmen and sophomores from two different high schools are given in the table below. What was the average score (marked "X" in the table) for the sophomores at the two schools combined?

Average Test Scores

	Central HS	Western HS	Combined (CHS & WHS)
Freshmen	71	81	79
Sophomores	76	90	X
Combined (Fresh & Soph)	74	84	

8. _____ Positive integers x and y are chosen uniformly at random, with replacement, from 1 to 10, inclusive. What is the probability that $x^2 - 4xy + y^2 \geq 0$? Express your answer as a common fraction.

9. _____ in^3 Five of the six edges of a tetrahedron each have length 3 inches, and the sixth edge has length 4 inches. What is the volume of the tetrahedron, in cubic inches? Express your answer in simplest radical form.

10. _____ students At a certain math contest, every student's score is a nonnegative integer from 0 to 46, inclusive. Of all the students' scores, the median was 12, the mean was 20, and the unique mode was 15. What is the fewest number of students that could possibly be at this contest?