MATHCOUNTS®

2011
■ School Competition ■
Team Round
Problems 1–10

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.

Team
Members _____ , Captain

_____

_____

_____

| Total Correct	Scorer's Initials

1. Lauren's cell phone company charges a monthly fee of $20.00 for unlimited calls plus $0.05 per text message sent or received. What is Lauren's total bill for the month of January if her total number of sent and received text messages is 75?

1. $ _____

2. The line $2x - 3y = -3$ is graphed and then reflected over the x-axis. If the equation of its reflection is $y = mx + b$, what is the value of $m + b$? Express your answer as a common fraction.

2. _____

3. Wei has designed a logo for his new company using circles and a large square, as shown. Each circle is tangent to two sides of the square and its two adjacent circles. If he wishes to create a version of this logo that is 20 inches on each side, how many square inches will be shaded? Express your answer as a decimal to the nearest hundredth.
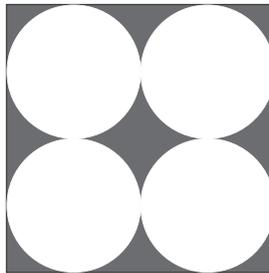
3. _____ sq inches

4. It takes Mickey a total of 45 minutes to ride his bike 5 miles to Minnie's house and then walk the remaining mile to school with her. If he rides his bike the entire distance to school at the same rate he rode to Minnie's house, it will take him 30 minutes. What is his walking speed, in miles per hour?

4. _____ mph

5. A Value Meal consists of exactly one selection from each column of the menu below (entrée, drink and dessert). The price of any Value Meal is calculated by subtracting 50 cents from the sum of the prices of the individual items. For example, the least expensive Value Meal would cost $3.40. If a customer orders exactly one of each of the three most expensive Value Meals, what is the total cost of the customer's three Value Meals?

5. $ _____

Entrée	Drink	Dessert
Pizza: $2.50	Tea: $0.75	Cookie: $0.65
Fish: $3.00	Soda: $1.25	Brownie: $1.10
Ribs: $4.50		Cheesecake: $1.85

6. The mean of the increasing ordered set of numbers, $\{6, x, 22\}$, is equal to the median. What is the value of x?

6. _____

7. Two points are drawn on each side of a square with an area of 81 square units dividing the side into 3 congruent parts. Quarter-circle arcs connect the points on adjacent sides to create the figure shown. What is the length of the boundary of the bolded figure? Express your answer as a decimal to the nearest tenth.
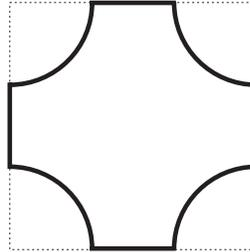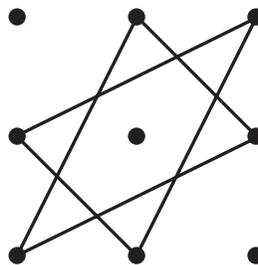

7. _____ units

8. In the game of Double Dragon, a flip is worth 4 points and a flop is worth 7 points. Flips and flops are the only ways to score. Notice that scores such as 4, 11 (or 4 + 7) and 18 (or 7(2) + 4) are possible to obtain, but scores of 2 and 6 are not possible. What is the largest integer score that is not possible to obtain when playing this game?

8. _____

9. John has a bag of coins in which he keeps all of his pennies, nickels, dimes and quarters and no other coins. The mean value of the coins in his bag is 20 cents. If he were to add one quarter to his bag, the new mean value would be 21 cents. How many quarters did he originally have in his bag?

9. _____ quarters

10. The nine points of this grid are equally spaced horizontally and vertically. The distance between two neighboring points is 1 unit. What is the area of the region where the two triangles overlap?

10. _____ sq units