MathCounts Competitions
(2009)

Chapter Competition
Team Round
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1. 100 sq in

2. 1 values

3. 10 points

4. 12 foreign stamps

5. 214

6. 9 nickels

7. 3

8. 1

9. 6

10. 5 green marbles
1. Ten pictures, each measuring 4 inches by 6 inches, are mounted on a piece of green poster board so that there is no overlap. The poster board measures 20 inches by 17 inches. All the shapes are rectangular. How many square inches of the green background will show after the pictures are mounted?

2. Let $n$ equal the number of sides in a regular polygon. For $3 \leq n < 10$, how many values of $n$ result in a regular polygon where the common degree measure of the interior angles is non-integral?

3. Five players on the East High basketball team all scored a different number of points in last night's game. Each player scored more than 9 points. Amanda scored the fewest points and Kara scored the second fewest points. If Kara scored 16 points and 16 points was the average for the five players, how many points did Amanda score?

4. The ratio of domestic stamps to foreign stamps in John's stamp collection is 3:1. If John sold thirty of his domestic stamps, the ratio of domestic stamps to foreign stamps would be 1:2. How many foreign stamps does John have in his collection?

5. What is the 200th term of the increasing sequence of positive integers formed by omitting only the perfect squares?
6. Keisha has 45 coins in her piggy bank. She has one fewer nickel than she has dimes, and one fewer quarter than three times the number of nickels. If Keisha has only nickels, dimes and quarters, how many nickels does she have?

7. What is the value of \( x \) in the equation \( 6^{x+1} - 6^x = 1080 \)?

8. The mean of three numbers is \( \frac{3}{4} \). The difference between the largest and smallest number is \( \frac{1}{2} \), which happens to be one of the numbers. What is the smallest number? Express your answer as a common fraction.

9. In the equation \( w^3 + x^3 + y^3 = z^3 \), \( w^3, x^3, y^3 \) and \( z^3 \) are distinct, consecutive positive perfect cubes listed in ascending order. What is the smallest possible value of \( z \)?

10. A bag contains red marbles, white marbles, green marbles and blue marbles. There are an equal number of red marbles and white marbles, and five times as many green marbles as blue marbles. There is a 35% chance of selecting a red marble first. What is the fewest possible number of green marbles in the bag?