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# MATHCOUNTS®

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2013

■ Chapter Competition ■  
Team Round  
Problems 1–10

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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.

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Total Correct	Scorer's Initials

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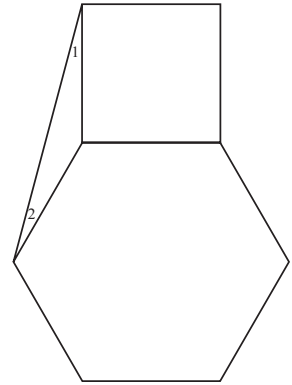
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1. \_\_\_\_\_ % At 840,000 mi<sup>2</sup>, Greenland is three times the size of Texas. By comparison, Iceland is only 39,800 mi<sup>2</sup>. What percent of Texas would be covered by Iceland? Express your answer as a decimal to the nearest tenth.

2. \_\_\_\_\_ degrees A square and a regular hexagon are coplanar and share a common side as shown. What is the sum of the degree measures of angles 1 and 2?



3. \_\_\_\_\_ students



A field trip costs \$9000 for the bus, plus \$125 per student. Each student pays \$375. How many students must go on the trip so that the total amount paid is equal to the total cost of the trip?

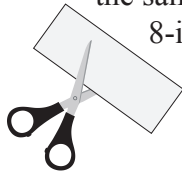
4. \_\_\_\_\_  $\triangle ABC$  has vertices at  $A(-3, 4)$ ,  $B(5, 0)$  and  $C(1, -4)$ . What is the  $x$ -coordinate of the point where the median from  $C$  intersects  $\overline{AB}$ ?

5. \_\_\_\_\_ The sum of three primes is 125. The difference between the largest and the smallest is 50. What is the largest possible median of these three prime numbers?

6. \_\_\_\_\_ What is the probability that a randomly selected integer from 1 to 81, inclusive, is equal to the product of two one-digit numbers? Express your answer as a common fraction.

7. \_\_\_\_\_ Shaina has one stick of length  $a$  cm and another of length  $b$  cm, where  $a \neq b$ . She needs a third stick with length strictly between 8 cm and 26 cm to make the third side of a triangle. What is the product  $ab$ ?

8. \_\_\_\_\_ inches A 3-inch by 8-inch sheet of paper and a 2-inch by 12-inch sheet of paper have the same area. Using just one cut (not necessarily straight), the 3-inch by 8-inch sheet can be divided into two pieces that can be rearranged to completely cover the 2-inch by 12-inch sheet. What is the length of the cut?



9. \_\_\_\_\_ Suppose  $d = 3 + 33 + 303 + 3003 + 30,003 + \dots$ , where each addend after the second has one more “interior” 0 than the previous addend. If the last addend has thirty digits, what is the sum of the digits of  $d$ ?

10. \_\_\_\_\_ seconds A bullet train traveling 210 km/h is catching up to a freight train traveling 90 km/h on a parallel track. From the time the front of the bullet train catches up to the back of the freight train to the time the back of the bullet train pulls even with the front of the freight train 24 seconds elapse. If freight trains are three times as long as bullet trains, how many seconds would it take two bullet trains, each traveling at 210 km/h, to pass by each other completely when moving in opposite directions? Express your answer as a decimal to the nearest hundredth.

