Math Hour Olympiad
June 20, 2010
Grades 8-9

| Problem			
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Raise your hand when you are ready to discuss your solution to one (or several) of the problems. You have three discussion attempts for each problem; they will be recorded in the table above.

We kindly ask you to please **turn off your cell phone** until the end of the Olympiad.

1. In the convex quadrilateral ABCD with diagonals AC and BD, you know that angle BAC is congruent to angle CBD, and that angle ACD is congruent to angle ADB. Show that angle ABC is congruent to angle ADC.
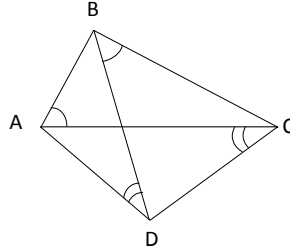
2. In how many different ways can you place 12 chips in the squares of a 4 x 4 chessboard so that

   (a) there is at most one chip in each square, and
   (b) every row and every column contains exactly three chips.

3. Students from Hufflepuff and Ravenclaw were split into pairs consisting of one student from each house. The pairs of students were sent to Honeydukes to get candy for Father's Day. For each pair of students, either the Hufflepuff student brought back twice as many pieces of candy as the Ravenclaw student or the Ravenclaw student brought back twice as many pieces of candy as the Hufflepuff student. When they returned, Professor Trelawney determined that the students had brought back a total of 1000 pieces of candy. Could she have possibly been right? Why or why not? Assume that candy only comes in whole pieces (cannot be divided into parts).

4. While you are on a hike across Deception Pass, you encounter an evil troll, who will not let you across the bridge until you solve the following puzzle. There are six stones, two colored red, two colored yellow, and two colored green. Aside from their colors, all six stones look and feel exactly the same. Unfortunately, in each colored pair, one stone is slightly heavier than the other. Each of the lighter stones has the same weight, and each of the heavier stones has the same weight. Using a balance scale to make TWO measurements, decide which stone of each color is the lighter one.

5. Alex, Bob and Chad are playing a table tennis tournament. During each game, two boys are playing each other and one is resting. In the next game the boy who lost a game goes to rest, and the boy who was resting plays the winner. By the end of tournament, Alex played a total of 10 games, Bob played 15 games, and Chad played 17 games. Who lost the second game?