

Denver Math Club

September Meeting, Team Round

1. A semipro baseball league has teams with 21 players each. League rules state that a player must be paid at least \$15,000 and that the total of all players' salaries for each team cannot exceed \$700,000. What is the maximum possible salary, in dollars, for a single player?
2. Thirteen black and six white hexagonal tiles were used to create the figure below. If a new figure is created by attaching a border of white tiles with the same size and shape as the others, what will be the difference between the total number of white tiles and the total number of black tiles in the new figure?



3. Mrs. White has a bag of red balls. She puts 100 green balls into that bag. After mixing the bag, she randomly selects 50 balls, seeing that 23 of them are green. What is the expected number of red balls in the bag? Round your answer to the nearest whole number.
4. A *palindrome*, such as 83438, is a number that remains the same when its digits are reversed. The numbers x and $x + 32$ are three-digit and four-digit palindromes, respectively. What is the sum of the digits of x ?
5. Mary divides a circle into 12 sectors. The central angles of these sectors, measured in degrees, are all integers and they form an arithmetic sequence. What is the degree measure of the smallest possible sector angle?
6. When placing each of the digits 2, 4, 5, 6, 9 in exactly one of the boxes of this subtraction problem, what is the smallest difference that is possible?

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7. Let m and n be any two odd numbers, with n less than m . What is the greatest value of x for which 2^x divides all possible numbers of the form $m^2 - n^2$?
8. A six place number is formed by repeating a three place number; for example, 256256 or 678678, etc. What is the greatest number that exactly divides any number of this form?
9. What is the ratio of the area of a square inscribed in a semicircle of radius 1 to the area of the square inscribed in an entire circle of radius 1? Express your answer as a common fraction.
10. The product N of three positive integers is 6 times their sum, and one of the integers is the sum of the other two. Find the sum of all possible values of N .