Math Olympiad Beginner
Homework 7

Name Answer Key

1. If we start with 2 and count by 3s until I reach 449, I will get: 2, 5, 8, 11, … , 449 where 2 is the first number, 5 is the second number, 8 is the third number and so forth. If 449 is the Nth number, what is the value of N? (150)

2. 3x3, 3x3x3, and 3x3x3x3 are "multiplication strings" of 3s, three 3s and four 3s respectively. When each string multiplication is done, 3x3 ends in 9, 3x3x3 ends in 7, and 3x3x3x3 ends in 1. In what digit will a multiplication string of thirty-five 3s end? (7)

3. Consecutive numbers are counting numbers that follow in order as in 7, 8, 9, 10, and so forth. Suppose the average of 15 consecutive numbers is 15. What is the average of the first five numbers of the set? (10)

4. What is the sum of the following sequence?

   $101 + 103 + 105 + \ldots\ldots\ldots\ldots + 499$ (60000)

5. 1^2 means 1 x 1, 2^2 means 2 x 2, 3^2 means 3 x 3, and so forth.

   $1^2 + 2^2 + 3^2 + 4^2 + \ldots\ldots\ldots + 25^2 = 5525$, and

   $2^2 + 4^2 + 6^2 + 8^2 + \ldots\ldots\ldots + 50^2 = N$ (22100)

   Find the value of N.

6. The sum of the first 25 multiples of 4 is: $4 + 8 + 12 + \ldots\ldots\ldots + 100$.

   The sum of of the first 25 multiples of 3 is: $3 + 6 + 9 + \ldots\ldots\ldots + 75$

   What number is equal to the difference of the two numbers? (325)

7. The following number sequence is formed by starting with 7 and then adding 3 to each term to get the next term: 7, 10, 13, 16, 19, …… The 1st term of the sequence is 7, the 2nd term is 10, and so forth. What is the 100th term? (304)

8. Consecutive odd numbers are odd numbers that differ by 2 and follow in order such as 1, 3, 5, 7, 9, or 17, 19, 21. Find the first of seven consecutive odd numbers if the average of the seven numbers is 41.

35

9. What is the unit digit of 7^{95}?

3

10. How many even numbers between 1 and 101 are multiples of 3?

16