PiVerb Math Olympiad (PiMO)

Pi (Class 5 & 6) Sample paper:

1. Amit, Bharath, Chitra and Deepa are friends and one of them committed a crime. They made the following statements. If only one statement is true, find who is guilty:
   1. Amith: Bharath did it
   2. Bharath: Deepa did it
   3. Chithra: I did not do it
   4. Deepa: Bharath lied when he said I did it

2. When we write numbers from 1 to 100, how many times does the digit 3 get repeated?

3. What is the 200th digit of the number 122333444455555…

4. A six-digit number is a multiple of 77 and 143. If the 3rd digit of the number is 7, what will be the remainder when the number is divided by 10?

5. In a garden, there are 2 plants. One plant is 44cm tall and the other is 80 cm tall. The first plant grows by 3cm every 2 months and the second by 5 cm every 6 months. The number of months after which the 2 plants have equal height is _____?

6. There are 20 cities in a country. Each pair of cities is connected by an air route. How many routes are there?

7. When 26 is divided by a positive integer N, the remainder is 2. The sum of all possible values of N is _____.

8. Ram checks his purse and finds that he can buy an apple and three oranges or two apples for the money he has. From the same shop, Bheem buys two apples and two oranges for Rs. 16. How much should I pay when I buy three apples and two oranges from the same shop.

9. If we multiply 2 by itself repeatedly four times, we get $2 \times 2 \times 2 \times 2 = 16$ and its unit digit is 6. Suppose we multiply 2 with itself 2021 times we get a big number B. What is the unit digit of B?

10. Observe the sequence 9, 91, 19, 911, 191, 119, 9111, 1911, 1191, 1119. What is the 45th term of the sequence?

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Tau (Class 7 & 8) Sample paper:

1. How many times does the number 2 appear in a book having page numbers 1 to 250?

2. Consider 5 integers a, b, c, d, and e. When added pair wise they yield sums {-1, 3, 5, 6, 6, 8, 9, 12, 13, 15}. Find the largest of the 5 integers.

3. The sum of the digits of a seven-digit odd natural number is 3. How many such numbers are possible?

4. A 2021-digit number is multiplied by 54. The last digit of the product is 2 and the second last digit is 4. If the same number is multiplied by 46, the last two digits are _____.

5. I added all the positive integers from 1 to P and obtained a total of 2021. By mistake, I added a number twice. What is the correct total?

6. A quiz has 20 questions with seven points awarded for each correct answer, two points deducted for each wrong answer and zero for each question omitted. Ram scores 87 points. How many questions did he omit?

7. How many four-digit numbers with middle digit 97 are divisible by 45?

8. In how many ways can two squares be selected from an 8 x 8 chessboard so that they are not in the same row or same column?

9. p, p+50, p+100 are all prime numbers. Find the largest value of p^3-2.

10. Numbers 1, 2, 3, 4, ...2021 are written on a blackboard. Some 2 numbers are selected randomly and replaced with the difference between the 2 numbers. For example, if we selected 52 and 30, we would erase both and write down 22 instead. Which of the following could be the last remaining number on the board if we repeat this process until there is only one number on the board?
   A. 1
   B. 2
   C. 4
   D. 8