Math Contest: Number Patterns

Solve each problem. Show your work and circle your final answer.

1. The first four terms of a sequence are 4, 9, 14, 19. If the pattern continues, what is the 10th term?

2. What is the value of $1 + 2 + 3 + ... + 30$?

3. What is the sum of the first 10 positive odd integers?

4. An arithmetic sequence has first term 7 and common difference 6. Which term of the sequence is equal to 109?

5. What is the sum of the first 20 positive even integers?

6. What is the value of $5 + 10 + 15 + ... + 100$?

7. The triangular numbers are 1, 3, 6, 10, 15, ..., where each term adds one more than the last number added. What is the 20th triangular number?

8. How many integers from 1 through 500 are multiples of 3 or multiples of 5?

9. An arithmetic sequence begins 12, 19, 26, ... What is the first term of the sequence that is greater than 500?

10. How many three-digit whole numbers have digits whose sum is 4?

(11) What is the units digit of 2 to the 100th power?

(12) The first term of an arithmetic sequence is 4, and the sum of its first 10 terms is 220. What is the common difference?

(13) In the list 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, ..., each positive integer n appears exactly n times. What is the 50th number in the list?

(14) What is the smallest positive integer n for which 1 + 2 + 3 + ... + n is greater than 500?

(15) The sum of 100 consecutive positive integers is 7,050. What is the largest of these integers?

(16) What is the sum of the first 50 terms of the sequence 1, -2, 3, -4, 5, -6, ...?

(17) How many terms of the sequence 4, 9, 14, 19, ... are less than 500?

(18) The first term of a sequence is 1. Each term after the first is equal to the sum of all the terms before it. What is the 12th term?

(19) The first term of an arithmetic sequence is 2, and the 5th term is 3 times the 2nd term. What is the sum of the first 10 terms?

(20) The whole numbers are written in order with no spaces: 123456789101112131415... What is the 100th digit?