1. Let
\[ N = 9 + 99 + 999 + \cdots + \underbrace{99\ldots9}_{99}. \]
Determine the sum of digits of \( N \).

2. Evaluate
\[ \frac{1}{1 \cdot 2 \cdot 3} + \frac{1}{3 \cdot 4 \cdot 5} + \frac{1}{5 \cdot 6 \cdot 7} + \cdots \]

3. Prove that the limit
\[ \lim_{n \to \infty} \frac{1}{n^2} \prod_{i=1}^{n} \left( n^2 + i^2 \right)^{1/n} \]
exists and find its value.

4. Let \( a_1, a_2, \ldots \) be a sequence of positive real numbers, and let \( b_n \) be the arithmetic mean of \( a_1, a_2, \ldots, a_n \). Prove that if \( \sum_{n=1}^{\infty} 1/a_n \) converges, then so does \( \sum_{n=1}^{\infty} 1/b_n \).

5. Is it possible to arrange the numbers 1, 2, \ldots, 2003 in a row so that each number, with the exception of the two numbers at the left and right end, is either the sum or the absolute value of the difference of the two numbers surrounding it?

6. Find the smallest integer \( n > 11 \) for which there is a polynomial of degree \( n \) with the following properties:
   (a) \( P(k) = k^{11} \) for \( k = 1, 2, \ldots, n \);
   (b) \( P(0) \) is an integer;
   (c) \( P(-1) = 2003 \).