



Problems

1. Which positive integers can be expressed as the sum and product of the same sequence of integers?
(for example: $6 = 1 + 2 + 3 = 1 \times 2 \times 3$)
2. Let n be a 6-digit number. The first 3 digits of n and the last 3 digits of n form two 3-digit numbers. It turns out that the product of these two 3-digit numbers is one seventh of n . Find the value of n .
3. In triangle ABC , M is the midpoint of AC , the bisector of $\angle A$ meets the side BC at P and MB at N . If $\angle ANM = 90^\circ$, determine the ratio PM/CP .
4. Is it possible to partition the set of all positive integers into two parts, such that for each part P , and each integer $n \geq 15$ there exists two distinct elements $a, b \in P$ such that $a + b = n$?
5. Is $2^n + 3^n$ ever a perfect square?
6. A cyclic hexagon has side lengths 1, 1, 1, 1, 2, 2 in that order. What is the circumradius of the hexagon?