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Numbers with inverted squares

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Resumen

Some natural numbers have interesting properties. For instance, the number 28 is the sum of its divisor lower than itself, that is, 28 = 1+2+4+7+14. The same occurs with the number 6. Another example is the pair (220, 284) which has the property that each of them is the sum of the proper divisors of another. In this talk, we introduce another pair of number with special characteristics. An example of these numbers is the pair (12, 21) which satisfies the following:

 $12^2 = 144$, $21^2 = 441$ and $(1+2)^2 = 1+4+4$.

The pair (13,31) has the same properties. A natural question in this context is the following what is the set of all numbers $a_n a_{n-1} \cdots a_1 a_0$ which satisfy the properties:

- 1. If $(a_n a_{n-1} \cdots a_1 a_0)^2 = b_m b_{m-1} \cdots b_1 b_0$, then $(a_0 a_1 \cdots a_{n-1} a_n)^2 = b_m b_{m-1} \cdots b_1 b_0$.
- 2. $(a_0 + a_1 + \dots + a_{n-1} + a_n)^2 = b_0 + b_1 + \dots + b_{m-1} + b_m$.

In this talk we present some results related with above problem.

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