

Some of my elementary original problems

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E11. Find prime numbers such that

E10. Let n be integer. Prove that among the elements of the set

one can find the fourth power of an integer.

E9. The difference of two positive integers is equal to 2^k . Find them, knowing that the first number is a power of six and the second one is prime.

E8. Let a, b be integers, any two different, such that $a^2 + b^2$ is a prime. Prove that

E7. Find all strictly increasing functions $f: \mathbb{N} \rightarrow \mathbb{N}$ such that $f(n) \mid n$, whenever $n \in \mathbb{N}$.

E6. Prove that the number $2^{2^n} - 1$ can be written as the sum of two non-zero perfect squares in at least four ways.

E5. Let a, b be real numbers such that $a^2 + b^2 = 1$ and $a^3 + b^3 = 1$. Prove that

E4. Let a, b be prime numbers such that

Prove that

E3. Find all prime numbers p such that

E2. Let a, b be real numbers such that

Prove that

E1. The length sides of a triangle are

positive integers such that

Prove that triangle is
isosceles, whose perimeter is equal to 2013.