

6. A classic unsolved problem in number theory asks if there are infinitely many pairs of "twin primes", pairs of primes separated by 2, such as 3 and 5, 11 and 13, or 71 and 73. Prove that the only prime triple (i.e. three primes, each 2 from the next) is 3, 5, 7.

*Proof.* Proof by contradiction.

Assume:  $(n \in \mathbb{N})(n > 3)$  and  $n, n + 1, n + 4$  is a prime triple.

By the proof in question 5 one of the prime numbers in the triple is divisible by 3 (since  $n$  is not 3). It is therefore, by definition, not a prime number - this is a contradiction.

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