

Theorem: The only prime triple (i.e. three primes, each 2 from the next) is 3, 5, 7.

Proof:

Define an even number as $2m$. Any even number is divisible by 2, which means it's not a prime number.

So only odd numbers are left. Refer to the previous question 5 where it was proved that either n , or $n+2$ or $n+4$ is divisible by 3. Then choose an arbitrary number n such that n is odd. If n is not divisible by three, we can assume either of the next two numbers ($n+2$ or $n+4$) are divisible by three, hence there cannot be three consecutive odd prime numbers. The obvious exception for this is $\{3, 5, 7\}$, where 3 is divisible by itself, making it a prime number. Therefore the theorem is proved.