

Conjecture: Prove that the only prime triplets (i.e. three primes, each 2 from the next) is 3,5,7

From question 5. we know that for any integer n , at least one of n , $n + 2$, $n + 4$ is divisible by 3.

By the definition of a prime number, this means that any three integers separated by 2 cannot be prime unless one of n , $n + 2$, $n + 4$ is 3.

If $n = 3$,

$n = 3$, $n + 2 = 5$, $n + 4 = 7$, which is a prime triple which agrees with the conjecture.

If $n + 2 = 3$,

$n = 1$, $n + 2 = 3$, $n + 4 = 5$, 1 is not prime, so this is not a prime triple.

If $n + 4 = 3$,

$n = -1$, $n + 2 = 1$, $n + 4 = 3$, 1 and -1 are not prime, so this is not a prime triple either.

So, we have shown that the only possible prime triple is 3,5,7.