Ten conjectures on primes based on the study of Carmichael numbers, involving the multiples of 30

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Abstract. In this paper are stated ten conjectures on primes, more precisely on the infinity of some types of triplets and quadruplets of primes, all of them using the multiples of the number 30 and also all of them met on the study of Carmichael numbers.

Conjecture 1:

There exist an infinity of positive integers n such that the numbers 30*n + 7, 60*n + 13 and 150*n + 31 are all three primes.

The sequence of these numbers n is: 0, 1, 2, 3 (...), corresponding to the triplets of primes [7, 13, 31], [37, 73, 181], [67, 73, 181], [97, 193, 481]...

Conjecture 2:

There exist an infinity of positive integers n such that the numbers 30*n - 23, 60*n - 47 and 90*n - 71 are all three primes.

The sequence of these numbers n is: 1, 2, 3 (...), corresponding to the triplets of primes [7, 13, 19], [37, 73, 109], [67, 133, 199]...

Conjecture 3:

There exist an infinity of positive integers n such that the numbers 30*n - 29, 60*n - 59 and 90*n - 89 are all three primes.

The sequence of these numbers n is: 8, 10 (...), corresponding to the triplets of primes [211, 421, 691], [271, 541, 811]...

Conjecture 4:

There exist an infinity of positive integers n such that the numbers 30*n - 7, 90*n - 23 and 300*n - 79 are all three primes.

The sequence of these numbers n is: 2, 9 (...), corresponding to the triplets of primes [53, 157, 521], [263, 787, 2621]...

Conjecture 5:

There exist an infinity of positive integers n such that the numbers 30*n - 17, 90*n - 53 and 150*n - 89 are all three primes.

The sequence of these numbers n is: 1, 2 (...), corresponding to the triplets of primes [13, 37, 61], [43, 127, 211]...

Conjecture 6:

There exist an infinity of positive integers n such that the numbers 60*n + 13, 180*n + 37 and 300*n + 61 are all three primes.

The sequence of these numbers n is: 2, 6 (...), corresponding to the triplets of primes [133, 397, 661], [373, 1117, 1861]...

Conjecture 7:

There exist an infinity of positive integers n such that the numbers 330*n + 7, 660*n + 13, 990*n + 19 and 1980*n + 37 are all four primes.

The sequence of these numbers n is: 1 (...), corresponding to the quadruplets of primes [133, 397, 661]...

Conjecture 8:

There exist an infinity of positive integers n such that the numbers 90*n + 1, 180*n + 1, 270*n + 1 and 540*n + 1 are all four primes.

The sequence of these numbers n is: 3 (...), corresponding to the quadruplets of primes [271, 541, 811, 1621]...

Conjecture 9:

There exist an infinity of pairs of primes [p, q] such that the numbers p + 30*n, q + 30*n and p*q + 30*n are all three primes.

Examples: [p, q] = [7, 7], [7, 11], [11, 7] etc. corresponding to the triplets [37, 67, 137], [37, 71, 167], [41, 67, 167] etc.

Conjecture 10:

There exist an infinity of primes p such that the numbers x = 30*n + p and y = 30*m*n + m*p – m + 1, where m, n are non-null positive integers, are both primes.

Examples:

: for p = 7 we have [x, y] = [30*n + 7, 30*m*n + 6*m + 1]; for [m, n] = [2, 1] we have [x, y] = [37, 73];

: for p = 11 we have [x, y] = [30*n + 11, 30*m*n + 10*m + 1]; for [m, n] = [2, 1] we have [x, y] = [41, 101];

Note:

Like I already said in Abstract, I met these triplets and quadruplets of primes in the study of Carmichael numbers: see my previous paper "A list of 13 sequences of Carmichael numbers based on the multiples of the number 30".