Nine conjectures on the infinity of certain sequences of primes

Marius Coman
Bucuresti, Romania
email: mariuscoman13@gmail.com

Abstract. In this paper I enunciate nine conjectures on primes, all of them on the infinity of certain sequences of primes.

Conjecture 1:

For any prime p there exist an infinity of positive integers n such that the number n*p – n + 1 is prime.

Examples:

: For p = 19 we have the following primes: 2*19 – 1 = 37; 4*19 – 3 = 73; 6*19 – 5 = 109; 7*19 – 6 = 127; 9*19 – 8 = 163; 10*19 - 9 = 181 etc.

Conjecture 2:

For any prime p there exist an infinity of positive integers n such that the number n*p + n - 1 is prime.

Examples:

: For p = 11 we have the following primes: 2*11 + 1 = 23; 4*11 + 3 = 47; 5*11 + 4 = 59; 6*11 + 5 = 71; 7*11 + 6 = 83; 9*11 + 8 = 107 etc.

Conjecture 3:

For any prime p there exist an infinity of positive integers n such that the number n^2*p – n + 1 is prime.

Examples:

: For p = 7 we have the following primes: 3^2*7 – 2 = 61; 4^2*7 – 3 = 109; 7^2*7 – 6 = 337; 10^2*7 – 9 = 691; 12^2*7 – 11 = 997 etc.

Conjecture 4:

For any prime p there exist an infinity of positive integers n such that the number n^2*p + n - 1 is prime.

Examples:

: For p = 11 we have the following primes: 3^2*11 + 2 = 101; 4^2*11 + 3 = 179; 6^2*11 + 5 = 401; 10^2*11 + 9 = 1109; 13^2*11 + 12 = 1871 etc.

Conjecture 5:

For any prime p there exist an infinity of positive integers n such that the number n*p – p + n is prime.

Examples:

: For p = 5 we have the following primes: 1*5 + 2 = 7; 2*5 + 3 = 13; 3*5 + 4 = 19; 5*5 + 6 = 31; 6*5 + 7 = 37; 7*5 + 8 = 43 etc.

Conjecture 6:

For any prime p there exist an infinity of positive integers n such that the number n*p - p - n is prime.

Examples:

: For p = 5 we have the following primes: 1*5 - 2 = 3; 2*5 - 3 = 7; 5*5 - 6 = 19; 6*5 - 7 = 23; 8*5 - 9 = 31; 11*5 - 12 = 43 etc.

Conjecture 7:

For any prime p there exist an infinity of positive integers n such that the number (n – 1)^2*p + n is prime.

Examples:

: For p = 7 we have the following primes: 2^2*7 + 3 = 31; 3^2*7 + 4 = 67; 5^2*7 + 4 = 179; 6^2*7 + 5 = 257; 7^2*7 + 6 = 349 etc.

Conjecture 8:

For any prime p there exist an infinity of positive integers n such that the number (n – 1)^2*p - n is prime.

Examples:

: For p = 7 we have the following primes: 3^2*7 - 4 = 59; 4^2*7 - 5 = 107; 8^2*7 - 9 = 439; 9^2*7 - 10 = 557; 15^2*7 - 16 = 1559 etc.

Conjecture 9:

For any two distinct primes greater than three p and q there exist an infinity of positive integers n such that the number (p^2 – 1)*n + q^2 is prime, also an infinity of positive integers m such that the number (q^2 – 1)*n + p^2 is prime.

Examples:

: For (p, q) = (7, 11) we have the following primes of the form 48*n + 121: 313, 409, 457, 601, 937, 1033 etc. and the following primes of the form 120*n + 49: 409, 769, 1009, 1129, 1249, 1489 etc.

Note:

The idea of these sequences didn’t come to me from “nowhere”. Many from the types of primes presented in this paper are met in the study of Fermat peudoprimes.