Conjecture which states that there exist an infinity of squares of primes of the form 109+420k

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Abstract. In this paper I conjecture that there exist an infinity of squares of primes of the form 109 + 420*k, also an infinity of primes of this form and an infinity of semiprimes p*g of this form such that q – p = 60.

Conjecture:

There exist an infinity of squares of primes of the form p^2 = 109 + 420*k, where k positive integer.

The first eight terms of this set:

p^2 = 529(=23^2), 1369(=37^2), 2209(=47^2), 10609(=103^2), 11449(=107^2), 26569(=163^2), 29929(=173^2), 54289(=233^2) (...), obtained for k = 1, 3, 5, 25, 27, 63, 71, 129 (...)

Conjecture:

There exist an infinity of primes of the form p = 109 + 420*k, where k positive integer.

The first twenty terms of this set:

p = 109, 1789, 3049, 3469, 3889, 4729, 5569, 6829, 7669, 8089, 8929, 9349, 9769, 12289, 14389, 15649, 16069, 17749, 18169, 19009 (...), obtained for k = 0, 4, 7, 8, 9, 11, 13, 16, 18, 19, 21, 22, 23, 29, 34, 37, 38, 42, 43, 45 (...)

Note that, for k from 55 to 60, the formula creates a chain of six consecutive primes (23209, 23629, 24049, 24469, 24889, 25309).

Conjecture:

There exist an infinity of semiprimes of the form p*q = 109 + 420*k, where k positive integer, such that q – p = 60.

The first six terms of this set:

p*q = 60483(=13*73), 5989(=53*113), 8509(67*127), 15229(=97*157), 21509(=137*197), 37909(=167*227) (...), obtained for k = 2, 14, 20, 36, 64, 90 (...)

Comment:

The conjectures above inspired me a way to find larger primes when you know two primes p, q such that q – p = 60, both primes of the form 10*k + 3 or of the form 10*k + 7. There are almost sure easy to find primes between the numbers of the form p*q – 210*k, where k positive integer.

Examples:

: m = 13*73 – 210*k is prime for k = 1 (m = 739);
: m = 23*83 – 210*k is prime for k = 1 (m = 1699);
: m = 37*97 – 210*k is prime for k = 2 (m = 3169);
: m = 43*103 – 210*k is prime for k = 1 (m = 4219);

: m = 104123*104183 – 210*k is prime for k = 7 (m = 10847845039);
: m = 104183*104243 – 210*k is prime for k = 1 (m = 10860348259);
: m = 104323*104383 – 210*k is prime for k = 3 (m = 10889547079);
: m = 104537*104597 – 210*k is prime for k = 6 (m = 10934255329);
: m = 104623*104683 – 210*k is prime for k = 1 (m = 10952249299).

Note that the formula p*q + 210*k (under the given conditions) seems also to conduct pretty soon to primes; for m from the last five examples above we have:

: 104123*104183 + 210*3 = 10847847139, prime;
: 104183*104243 + 210*9 = 10860350359, prime;
: 104323*104383 + 210*2 = 10889548129, prime;
: 104537*104597 + 210*4 = 10934257429, prime;
: 104623*104683 + 210*1 = 10952249719, prime.