Eight conjectures on a certain type of semiprimes involving a formula based on the multiples of 30

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Abstract. In this paper I make four conjectures about a certain type of semiprimes which I defined in a previous paper, "Two exciting classes of odd composites defined by a relation between their prime factors", in the following way: Coman semiprimes of the first kind are the semiprimes p*q with the property that q1 – p1 + 1 = p2*q2, where the semiprime p2*q2 has also the property that q2 – p2 + 1 = p3*q3, also a semiprime, and the operation is iterate until eventually pk – qk + 1 is a prime. I also defined Coman semiprimes of the second kind the semiprimes p*q with the property that q1 + p1 - 1 = p2*q2, where the semiprime p2*q2 has also the property that q2 + p2 - 1 = p3*q3, also a semiprime, and the operation is iterate until eventually pk + qk - 1 is a prime.

Conjecture 1:

For any given odd prime p there exist an infinity of odd primes q such that the number m = p*q is a Coman semiprime of the first kind and n = 30*p*q + 1 is a prime.

Examples:
(Of such primes, for p = 7)

: 7*137*30 + 1 = 28771, which is prime;
: 7*157*30 + 1 = 32971, which is prime;
: 7*163*30 + 1 = 34231, which is prime;
: 7*179*30 + 1 = 37591, which is prime.

(It can be seen that 7*137, 7*157, 7*163 and 7*179 are Coman semiprimes of the first kind because 137 – 7 + 1 = 131, prime, 157 – 7 + 1 = 151, prime, 163 – 7 + 1 = 157, prime and 179 – 7 + 1 = 173, prime)

Conjecture 2:

For any given odd prime p there exist an infinity of odd primes q such that the numbers m = p*q and n = 30*p*q + 1 are both Coman semiprimes of the first kind.

Examples:
(Of such primes, for p = 7)

: 7*173*30 + 1 = 36331 = 47*773, which is Coman semiprime of the first kind because 773 – 47 + 1 = 727, prime;
: 7*257*30 + 1 = 53971 = 31*1741, which is Coman semiprime of the first kind because 1741 – 31 + 1 = 1711 = 29*59 and 59 – 29 + 1 = 31, prime;
: 7*263*30 + 1 = 55231 = 11*5021, which is Coman semiprime of the first kind because 5021 – 11 + 1 = 5011, prime;
: 7*269*30 + 1 = 56491 = 17*3323, which is Coman semiprime of the first kind because 3323 – 17 + 1 = 3307, prime.

(It can be seen that 7*173, 7*257, 7*263 and 7*269 are Coman semiprimes of the first kind because 173 – 7 + 1 = 167, prime, 257 – 7 + 1 = 251, prime, 263 – 7 + 1 = 257, prime and 269 – 7 + 1 = 263, prime)

Conjecture 3:

For any given odd prime p and any k non-null positive integer there exist an infinity of odd primes q such that the number m = p*q is a Coman semiprime of the first kind and n = 30*k*p*q + 1 is a prime.

Examples:
(Of such primes, for (p, k) = (13, 2))

: 13*19*60 + 1 = 14821, which is prime;
: 13*29*60 + 1 = 22621, which is prime;
: 13*31*60 + 1 = 24181, which is prime.

Conjecture 4:

For any given odd prime p and any k non-null positive integer there exist an infinity of odd primes q such that the numbers m = p*q and n = 30*p*q + 1 are both Coman semiprimes of the first kind.

Examples:
(Of such primes, for (p, k) = (13, 2))

: 13*17*60 + 1 = 13261 = 89*149, which is Coman semiprime of the first kind because 149 – 89 + 1 = 61, prime;
: 13*17*60 + 1 = 13261 = 89*149, which is Coman semiprime of the first kind because 149 – 89 + 1 = 61, prime.

Conjecture 5:

For any given odd prime p there exist an infinity of odd primes q such that the number m = p*q is a Coman semiprime of the second kind and n = 30*p*q - 1 is a prime.

Examples:
(Of such primes, for p = 7)

: 7*167*30 - 1 = 35069, which is prime;
: 7*251*30 - 1 = 52709, which is prime;
: 7*263*30 - 1 = 55229, which is prime;
: 7*271*30 - 1 = 56909, which is prime;

(It can be seen that 7*167, 7*251, 7*163 and 7*179 are Coman semiprimes of the second kind because 167 + 7 - 1 = 173, prime, 251 + 7 - 1 = 257, prime, 263 + 7 - 1 = 269, prime and 271 + 7 - 1 = 277, prime)

Conjecture 6:

For any given odd prime p there exist an infinity of odd primes q such that the numbers m = p*q and n = 30*p*q + 1 are both Coman semiprimes of the first kind.

Examples:
(Of such primes, for p = 7)

: 7*257*30 - 1 = 53969 = 29*1861, which is Coman semiprime of the second kind because 1861 + 29 - 1 = 1889, prime;
: 7*433*30 - 1 = 90929 = 79*1151, which is Coman semiprime of the second kind because 1151 + 79 - 1 = 1229, prime;
: 7*461*30 - 1 = 96809 = 131*739, which is Coman semiprime of the second kind because 739 + 131 - 1 = 869 = 11*79 and 79 + 11 – 1 = 89, prime;
: 7*503*30 - 1 = 105629 = 53*1993, which is Coman semiprime of the second kind because 1993 + 53 - 1 = 2045 = 5*409 and 409 + 4 – 1 = 413 = 7*59 and 59 + 7 – 1 = 65 = 5*13 and 13 + 5 – 1 = 17, prime.

(It can be seen that 7*257, 7*433, 7*263 and 7*269 are Coman semiprimes of the second kind because 257 + 7 - 1 = 263, prime, 433 + 7 - 1 = 439, prime, 461 + 7 - 1 = 467, prime and 503 + 7 - 1 = 509, prime)

Conjecture 7:

For any given odd prime p and any k non-null positive integer there exist an infinity of odd primes q such that the number m = p*q is a Coman semiprime of the second kind and n = 30*k*p*q - 1 is a prime.

Examples:
(Of such primes, for (p, k) = (11, 3))

: 11*31*90 - 1 = 30689, which is prime;
: 11*37*90 - 1 = 36629, which is prime.

(It can be seen that 11*31 and 11* are Coman semiprimes of the second kind because 11 + 31 - 1 = 41, prime, and 11 + 37 - 1 = 47, prime)

Conjecture 8:

For any given odd prime p and any k non-null positive integer there exist an infinity of odd primes q such that the numbers m = p*q and n = 30*p*q - 1 are both Coman semiprimes of the second kind.

Examples:
(Of such primes, for (p, k) = (11, 3))

: 11*13*90 - 1 = 12869 = 17*757, which is Coman semiprime of the second kind because 757 + 17 - 1 = 773, prime;
: 11*19*90 - 1 = 18809 = 7*2687, which is Coman semiprime of the second kind because 2687 + 7 - 1 = 2693, prime.

(It can be seen that 11*13 and 11*19 are Coman semiprimes of the second kind because 11 + 13 - 1 = 23, prime, and 11 + 19 - 1 = 29, prime)