Eight conjectures on chameleonic numbers involving a formula based on the multiples of 30

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Abstract. In this paper I make eight conjectures about a type of numbers which I defined in a previous paper, "The notion of chameleonic numbers, a set of composites that «hide» in their inner structure an easy way to obtain primes", in the following way: the non-null positive composite squarefree integer C not divisible by 2, 3 or 5 is such a number if the absolute value of the number P – d + 1 is always a prime or a power of a prime, where d is one of the prime factors of C and P is the product of all prime factors of C but d.

Definition 1:

The non-null positive composite squarefree integer C not divisible by 2, 3 or 5 is a *chameleonic number of first kind* if the absolute value of the number P – d + 1 is always a prime or a power of a prime, where d is one of the prime factors of C and P is the product of all prime factors of C but d.

Note: A *Coman semiprime of first kind* (see my previous paper "Eight conjectures on certain type of semiprimes involving a formula based on the multiples of 30") is a chameleonic number of first kind with two prime factors.

Definition 2:

The non-null positive composite squarefree integer C not divisible by 2, 3 or 5 is a *chameleonic number of second kind* if the absolute value of the number P + d - 1 is always a prime or a power of a prime, where d is one of the prime factors of C and P is the product of all prime factors of C but d.

Note: A *Coman semiprime of second kind* (see my previous paper "Eight conjectures on certain type of semiprimes involving a formula based on the multiples of 30") is a chameleonic number of second kind with two prime factors.

Conjecture 1:

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

Example:
(Of such prime, for p = 7, k = 1)

: 1729 = 7*13*19 is a chameleonic number of the first kind because 7*13 – 19 + 1 = 73, prime, 7*19 – 13 + 1 = 121 = 11^2, square of prime and 13*19 – 7 + 1 = 241, prime; also, for m = 1729 and k = 1, n = 30*1729 + 1 = 51871 is a prime.

Conjecture 2:

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

Example:
(Of such prime, for p = 7, k = 1)

: 8911 = 7*19*67 is a chameleonic number of the second kind because 7*19 + 67 - 1 = 199, prime, 7*67 + 19 - 1 = 487, prime and 19*67 + 7 - 1 = 1279, prime; also, for m = 8911 and k = 2, n = 60*8911 - 1 = 534659 is a prime.

Conjecture 3:

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

Conjecture 4:

For any given pair of distinct odd primes [p, q] and any k non-null positive integer there exist an infinity of odd primes r such that the number m = p*q*r is a chameleonic number of the second kind and n = 30*k*p*q*r - 1 is a prime.

Conjecture 5:

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

Example:
(Of such prime, for p = 7, k = 3)

: 1729 = 7*13*19 is a chameleonic number of the first kind (see above); also, for m = 1729 and k = 3, n = 90*1729 + 1 = 155611 = 61*2551 is a Coman semiprime of the first kind because 2551 – 61 + 1 = 2491 = 47*53 and 53 – 47 + 1 = 7, which is prime.

Conjecture 6:

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

Example:
(Of such prime, for p = 7, k = 1)

: 8911 = 7*19*67 is a chameleonic number of the first kind (see above); also, for m = 8911 and k = 7, n = 240*8911 - 1 = 2138639 = 397*5387 is a Coman semiprime of the second kind because 5387 + 397 - 1 = 5783, which is prime.

Conjecture 7:

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

Conjecture 8:

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