Conjecture involving Harshad numbers and primes of the form 6k+1

Marius Coman
email: mariuscoman13@gmail.com

Abstract. In this paper I conjecture that for any prime p of the form 6*k + 1 there exist an infinity of Harshad numbers of the form p*q1*q2, where q1 and q2 are distinct primes, q1 = p + 6*m and q2 = p + 6*n.

Conjecture:

For any prime p of the form 6*k + 1 there exist an infinity of Harshad numbers H of the form p*q1*q2, where q1 and q2 are distinct primes, q1 = p + 6*m and q2 = p + 6*n.

Note: see the sequence A005349 for Harshad numbers.

The sequence of the numbers H for p = 7:

: 1729 (= 7*13*19), 2821 (= 7*13*31), 8911 (= 7*19*67), 19201 (= 7*13*211), 20881 (= 7*19*157) (...),
obtained respectively for (m, n) = (1, 2), (1, 4), (2, 10), (1, 34), (2, 25) (...)
and divisible respectively by 19, 13, 19, 13, 19 (...)

: other examples of numbers H for p = 7:
: H = 346549 = 7*31*1597,
: H = 3947419 = 7*37*15241,
: H = 7388647 = 7*43*24547 (...),
obtained respectively for (m, n) = (4, 265), (5, 2539), (6, 4090) (...)
and divisible respectively by 31, 37, 43 (...)

Note that the first three numbers from this sequence are also Carmichael numbers.

The sequence of the numbers H for p = 13:

: 15067 (= 13*19*61), 18031 (= 13*19*73), 19513 (= 13*19*79), 40261 (= 13*19*163) (...)
obtained respectively for (m, n) = (1, 8), (1, 10), (1, 11), (1, 25) (...)
and divisible respectively by 19, 13, 19, 13 (...)

: other examples of numbers H for p = 13:

: H = 416299 = 13*31*1033,
: H = 496093 = 13*31*1231 (...),
obtained respectively for (m, n) = (3, 170), (3, 203) (...)
and divisible respectively by 31, 31 (...)

The sequence of the numbers H for p = 19:

: 25327 (= 19*31*43), 46531 (= 19*31*79), 51319 (= 19*37*73), 57133 (= 19*31*97), 127243 (= 19*37*181), 131347 (= 19*31*223) (...)
obtained respectively for (m, n) = (2, 4), (2, 10), (3, 9), (2, 13), (3, 27), (2, 34) (...)
and divisible respectively by 19, 19, 19, 19, 19, 19 (...)

The sequence of the numbers H for p = 31:

: 69967 (= 31*37*61), 126697 (= 31*61*67), 137299 (= 31*43*103), 145669 (= 31*37*127), 185287 (= 31*43*139), 186961 (= 31*37*163), 194773 (= 31*61*103) (...)
obtained respectively for (m, n) = (1, 5), (5, 6), (2, 12), (1, 16), (2, 18), (1, 22), (5, 12) (...)
and divisible respectively by 37, 31, 31, 31, 31, 31, 31 (...)