On the MC function, the squares of primes and the pairs of twin primes

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Abstract. In few of my previous papers I defined the MC function. In this paper I make two conjectures, involving this function, the squares of primes and the pairs of twin primes.

Conjecture 1:

There exist an infinity of primes p such that MC(p^2) = 5.

Examples:

: 3^2:
3 + 3 – 1 = 5 (prime) so MC(3^2)= 5;
: 5^2:
5 + 5 – 1 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(5^2);
: 11^2:
11 + 11 – 1 = 21 = 3*7; 3 + 7 – 1 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(11^2) ;
: 13^2:
13 + 13 – 1 = 25 = 5*5; 5 + 5 – 1 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(13^2);
: 23^2:
23 + 23 – 1 = 45 = 3*3*5; 3 + 3 + 5 – 2 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(23^2);
: 29^2:
29 + 29 – 1 = 57 = 3*19; 3 + 19 – 1 = 21 = 3*7; 3 + 7 – 1 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(29^2);
: 41^2:
41 + 41 – 1 = 81 = 3*3*3*3; 3 + 3 + 3 + 3 – 3 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(41^2);
: 43^2:
43 + 43 – 1 = 85 = 5*17; 5 + 17 – 1 = 21 = 3*7; 3 + 7 – 1 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(43^2);
: 61^2:
61 + 61 – 1 = 121 = 11*11; 11 + 11 – 1 = 21 = 3*7; 3 + 7 – 1 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(61^2);
: 67^2:
67 + 67 – 1 = 133 = 7*19; 7 + 19 – 1 = 25 = 5*5; 5 + 5 – 1 = 9 = 3*3; 3 + 3 – 1 = 5 = MC(67^2).

Note that for 10 from the first 18 odd primes p the value of the MC(p^2) is equal to 5! For the other 8 primes p, id est 7, 17, 19, 31, 37, 47, 53 and 59, the value of MC(p^2) is equal to 13, 13, 37, 61, 73, 13, 13 and 17.

Conjecture 2:

There exist an infinity of pairs of twin primes (p, p + 2) such that MC(p^2) + MC((p + 2)^2) – 1 = q^2, where q is prime.

Examples:

: MC(3^2) + MC(5^2) – 1 = 3^2;
: MC(5^2) + MC(7^2) – 1 = 3^2;
: MC(11^2) + MC(13^2) – 1 = 3^2;
: MC(17^2) + MC(19^2) – 1 = 7^2;
: MC(41^2) + MC(43^2) – 1 = 3^2;
: MC(71^2) + MC(73^2) – 1 = 5^2.