Conjecture on the numbers \((p^2 - n)/(n - 1)\) where \(p\) prime

**Abstract.** In this paper I state the following conjecture: for any \(p\) prime there exist at least a value of \(n\), different from \(p\), for which the number \((p^2 - n)/(n - 1)\) is prime.

**Conjecture:**

For any \(p\) prime there exist at least a value of \(n\), different from \(p\), for which the number \(q = (p^2 - n)/(n - 1)\) is prime.

**Verifying the conjecture:**

(for the first 7 primes \(p\))

: for \(p = 5\), \(q = 23\), prime, for \(n = 2\); also \(q = 11\), prime for \(n = 3\); also \(q = 7\), prime for \(n = 4\);
  : for \(p = 7\), \(q = 47\), prime, for \(n = 2\); also \(q = 23\), prime for \(n = 3\); also \(q = 11\), prime, for \(n = 5\);
  : for \(p = 11\), \(q = 29\), prime, for \(n = 5\); also \(q = 23\), prime for \(n = 6\); also \(q = 19\), prime, for \(n = 7\);
  : for \(p = 13\), \(q = 167\), prime, for \(n = 2\); also \(q = 83\), prime, for \(n = 3\); also \(q = 4\), prime, for \(n = 5\); also \(q = 23\), prime, for \(n = 8\);
  : for \(p = 17\), \(q = 71\), prime, for \(n = 5\); also \(q = 47\), prime, for \(n = 7\); also \(q = 31\), prime, for \(n = 10\); also \(q = 23\), prime, for \(n = 13\);
  : for \(p = 19\), \(q = 359\), prime, for \(n = 1\); also \(q = 179\), prime, for \(n = 3\); also \(q = 89\), prime, for \(n = 5\); also \(q = 71\), prime, for \(n = 6\); also \(q = 59\), prime, for \(n = 7\); also \(q = 29\), prime, for \(n = 13\); also \(q = 23\), prime, for \(n = 16\);
  : for \(p = 23\), \(q = 263\), prime, for \(n = 3\); also \(q = 131\), prime, for \(n = 5\); also \(q = 47\), prime, for \(n = 12\); also \(q = 43\), prime, for \(n = 13\).

Note that many primes (I conjecture that an infinity of primes) can be written as \(\text{sqr}(24m - 23)\):

: \(7 = \text{sqr}(24*3 - 23)\);
: \(11 = \text{sqr}(24*6 - 23)\);
: \(13 = \text{sqr}(24*8 - 23)\);
: \(17 = \text{sqr}(24*13 - 23)\);
: \(19 = \text{sqr}(24*16 - 23)\).

I also conjecture that there exist an infinity of primes that can be written as \(\text{sqr}(48m - 47)\); examples: 7, 17, 23 for \(n = 2, 7, 12\).