Seven conjectures on the squares of primes involving the number 4320 respectively deconcatenation

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Abstract. In this paper I make three conjectures regarding a certain relation between the number 4320 and the squares of primes respectively four conjectures on squares of primes involving deconcatenation.

Conjecture 1:

There exist an infinity of primes of the form p^2 + 4320, where p is prime.

Such primes are:

: 4339 = 4320 + 19^2;
: 4441 = 4320 + 11^2;
: 5281 = 4320 + 31^2;
: 5689 = 4320 + 37^2;
: 6529 = 4320 + 47^2;
: 7129 = 4320 + 53^2;
: 9649 = 4320 + 73^2;
: 12241 = 4320 + 89^2;
: 13729 = 4320 + 97^2;
: 14929 = 4320 + 103^2;
: 21481 = 4320 + 131^2.

Conjecture 2:

There exist an infinity of semiprimes of the form q1*q2 = p^2 + 4320, where p is prime, such that q2 – q1 + 1 is prime.

Such semiprimes are:

: 4369 = 4320 + 7^2 = 17*257 (257 – 17 + 1 = 241, prime);
: 4609 = 4320 + 17^2 = 11*419 (419 – 11 + 1 = 409, prime);
: 6001 = 4320 + 41^2 = 17*353 (353 – 17 + 1 = 337, prime);
: 7801 = 4320 + 59^2 = 29*269 (269 – 29 + 1 = 241, prime);

: 11209 = 4320 + 83^2 = 11*1019 (1019 - 11 + 1 = 1009, prime);
: 15769 = 4320 + 107^2 = 13*1213 (1213 - 13 + 1 = 1201, prime);
: 16201 = 4320 + 109^2 = 17*953 (953 - 17 + 1 = 937, prime);
: 23089 = 4320 + 137^2 = 11*2099 (2099 - 11 + 1 = 2089, prime);
: 23641 = 4320 + 139^2 = 47*503 (503 - 47 + 1 = 457, prime);
: 28969 = 4320 + 157^2 = 59*491 (491 - 59 + 1 = 433, prime);
: 32209 = 4320 + 167^2 = 31*1039 (1039 - 31 + 1 = 1009, prime);
: 34249 = 4320 + 173^2 = 29*1181 (1181 - 29 + 1 = 1153, prime).

Conjecture 3:

There exist an infinity of semiprimes of the form q1*q2 = p^2 + 4320, where p is prime, such that q2 - q1 + 1 is a power of prime.

Such semiprimes are:

: 4681 = 4320 + 19^2 = 31*151 (151 - 31 + 1 = 121 = 11^2);
: 4849 = 4320 + 23^2 = 13*373 (373 - 13 + 1 = 361 = 19^2);
: 6169 = 4320 + 43^2 = 31*199 (199 - 31 + 1 = 169 = 13^2);
: 8809 = 4320 + 67^2 = 23*383 (383 - 23 + 1 = 361 = 19^2);
: 10561 = 4320 + 79^2 = 59*179 (179 - 59 + 1 = 121 = 11^2);
: 26521 = 4320 + 149^2 = 11*2411 (2411 - 11 + 1 = 2401 = 7^4).

Note:

For the squares of the 27 from the first 35 primes p greater than or equal to 7 the number p^2 + 4320 is either prime either semiprime q1*q2 such that q2 - q1 + 1 is prime or square of prime. For other two primes p the number p^2 + 4320 = q1*q2*q3 such that q1 + q2 + q3 is prime (8041 = 61^2 + 4320 = 11*17*43 and 11 + 17 + 43 = 71; 9361 = 71^2 + 4320 = 11*23*37 and 11 + 23 + 37 = 71) and for other two primes p the number p^2 + 4320 is a square (13^2 + 4320 = 4489 = 67^2 and 127^2 + 4320 = 20449 = 11^2*13^2.

Conjecture 4:

There exist an infinity of primes formed by deconcatenating a square of a prime and inserting the digit 0 between the first of its digits and the others.

Such primes are:

: 409 formed from 49 = 7^2;
: 1021 formed from 121 = 11^2;
: 1069 formed from 169 = 13^2;
: 2089 formed from 289 = 17^2;
: 3061 formed from 361 = 19^2;
: 10369 formed from 1369 = 37^2;
: 20809 formed from 2809 = 53^2;
: 50329 formed from 5329 = 73^2;
: 60889 formed from 6889 = 83^2;
: 70921 formed from 7921 = 89^2;
: 100609 formed from 10609 = 103^2;
: 101449 formed from 11449 = 107^2;
: 102769 formed from 12769 = 113^2;
: 106129 formed from 16129 = 127^2;
: 108769 formed from 18769 = 137^2;
: 109321 formed from 19321 = 139^2;
: 202201 formed from 22201 = 149^2.

Conjecture 5:

There exist an infinity of semiprimes q1*q2 such that q2 - q1 + 1 is prime or square of prime formed by deconcatenating a square of a prime and inserting the digit 0 between the first of its digits and the others.

Such semiprimes are:

: 5029 = 47*107 formed from 529 = 23^2 (107 - 47 + 1 = 61, prime);
: 10681 = 11*971 formed from 1681 = 41^2 (971 - 11 + 1 = 961 = 31^2);
: 30721 = 31*991 formed from 3721 = 61^2 (991 - 31 + 1 = 961 = 31^2);
: 40489 = 19*2131 formed from 4489 = 67^2 (2131 - 19 + 1 = 2113, prime);
: 60241 = 107*563 formed from 6241 = 79^2 (563 - 107 + 1 = 457, prime);
: 90409 = 11*8219 formed from 9409 = 97^2 (8219 - 11 + 1 = 8209, prime);
: 100201 = 97*1033 formed from 9409 = 101^2 (1033 - 97 + 1 = 937, prime);
: 107161 = 101*1061 formed from 17161 = 131^2 (1061 - 101 + 1 = 961 = 31^2);

: 202801 = 139*1459 formed from 22801 = 151^2 (1459 – 139 + 1 = 1321, prime);
: 204649 = 19*10771 formed from 24649 = 157^2 (10771 – 19 + 1 = 10753, prime).

Conjecture 6:

There exist an infinity of semiprimes q1*q2 such that q2 - q1 + 1 = q3*q4 where q4 – q3 + 1 is prime or square of prime formed by deconcatenating a square of a prime and inserting the digit 0 between the first of its digits and the others.

Such semiprimes are:

: 10849 = 19*571 formed from 1849 = 43^2 (571 – 19 + 1 = 553 = 7*79 and 79 – 7 + 1 = 73, prime);
: 20209 = 7*2887 formed from 2209 = 47^2 (2887 – 7 + 1 = 2881 = 43*67 and 67 – 43 + 1 = 25 = 5^2);
: 50041 = 163*307 formed from 5041 = 71^2 (307 – 163 + 1 = 145 = 5*29 and 29 – 5 + 1 = 25 = 5^2).

Conjecture 7:

There exist an infinity of composites q1*q2*q3 such that q1 + q2 + q3 is prime formed by deconcatenating a square of a prime and inserting the digit 0 between the first of its digits and the others.

Such composites are:

: 8041 = 11*17*43 formed from 841 = 29^2 (11 + 17 + 43 = 71, prime);
: 9061 = 13*17*41 formed from 961 = 31^2 (13 + 17 + 41 = 71, prime);
: 30481 = 11*17*163 formed from 3481 = 59^2 (11 + 17 + 163 = 71, prime);
: 101881 = 13*17*461 formed from 11881 = 109^2 (13 + 17 + 461 = 491, prime);
: 206569 = 11*89*211 formed from 26569 = 163^2 (11 + 89 + 211 = 311, prime).

Note:

For all 35 from the first 35 primes greater than or equal to 7 the number formed in the way mentioned satisfies one of the conditions defined in the four conjectures above.