An amazing formula for producing big primes based on the numbers 25 and 906304

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Abstract. In this paper I present a formula for generating big primes and products of very few primes, based on the numbers 25 and 906304, formula equally extremely interesting and extremely simple, id est 25^n + 906304. This formula produces for n from 1 to 30 (and for n = 30 is obtained a number p with not less than 42 digits) only primes or products of maximum four prime factors.

Observation:

The number p = 25^n + 906304 is often a prime or a product of very few primes.

Note:

I came to this formula more or less by chance, but the number 906304 has at least one other special property: 906304 = 952^2 = 1105^2 – 561^2, where 561 and 1105 are the first and the second Carmichael numbers.

Examples:

: p = 25^1 + 906304 = 906329 prime;
: p = 25^2 + 906304 = 906929 prime;
: p = 25^3 + 906304 = 921929 = 37*24917;
: p = 25^4 + 906304 = 1296929 prime;
: p = 25^5 + 906304 = 10671929 = 421*25349;
: p = 25^6 + 906304 = 245046929 = 97*2526257;
: p = 25^7 + 906304 = 245046929 = 113*2957*18269;
: p = 25^8 + 906304 = 152588796929 = 36269*4207141;
: p = 25^9 + 906304 = 3814698171929 prime;
: p = 25^10 + 906304 = 95367432546929
= 41*2326034940169;
: p = 25^11 + 906304 = 2384185791921929
= 5573*427810118773;
: p = 25^12 + 906304 = 59604644776296929
= 61*139361*7011468949;
: p = 25^13 + 906304 = 1490116119385671929
= 1097*84389*16096358813;
: p = 25^14 + 906304 = 37252902984620046929 prime;
: p = 25^15 + 906304 = 931322574615479421929

= 671477*1386976135616677;
: p = 25^16 + 906304 = 23283064365386963796929
= 1609*1830341*7905914013541;
: p = 25^17 + 906304 = 582076609134674073171929 prime;
: p = 25^18 + 906304 = 14551915228366851807546929
= 53^2*5180461099454201426681;
: p = 25^19 + 906304 = 363797880709171295166921929
prime;
: p = 25^20 + 906304 = 9094947017729282379151296929
= 41*237776289649*932927233281481;

Notes:

For n from 1 to 20, were obtained for p seven values which are primes, seven values which are semiprimes and six values which are products of three prime factors! Note also that the larger prime obtained in the examples above, p = 25^19 + 906304 = 363797880709171295166921929, has 27 digits!

For n from 21 to 30 were also obtained products of maximum four primes; these are the following values of p:

: n = 21, p = 227373675443232059478760671929;
: n = 22, p = 5684341886080801486968995046929;
: n = 23, p = 142108547152020037174224854421929;
: n = 24, p = 3552713678800500929355621338796929;
: n = 25, p = 88817841970012523233890533448171929;
: n = 26, p = 2220446049250313080847263336182546929;
: n = 27, p = 55511151231257827021181583404541921929;
: n = 28, p = 1387778780781445675529539585113526296929;
: n = 29, p = 34694469519536141888238489627838135671929;
: n = 30, p = 867361737988403547205962240695953370046929.

For n from 31 to 37 were also obtained products of maximum five primes; these are the following values of p:

: n = 31,
p = 21684043449710088680149056017398834229421929
: n = 32,
P = 542101086242752217003726400434970855713796929
: n = 33,
p = 13552527156068805425093160010874271392823171929
: n = 34,
P = 338813178901720135627329000271856784820557546929
: n = 35,
P = 8470329472543003390683225006796419620513916921929
: n = 36,
P = 211758236813575084767080625169910490512847901296929
: n = 37,
P = 5293955920339377119177015629247762262821197510671929

Note that the number $25^{34} + 906304$ is a prime with 48 digits!

Conjecture:

There exist an infinity of primes p of the form $p = 25^n + 906304$.