Sierpinski problems

## Definition

For the original Sierpinski problem, it is finding and proving the smallest *k* such that *k*×*bn*+1 is not prime for all integers *n* ≥ 1 and GCD(*k*+1, *b*-1)=1.

### **Extended definiton**

Finding and proving the smallest *k* such that (*k*×*bn*+1)/GCD(*k*+1, *b*-1) is not prime for all integers *n* ≥ 1.

### **Notes**

All *n* must be >= 1.

*k*-values that make a full covering set with all or partial algebraic factors are excluded from the conjectures.

*k*-values that are a multiple of base (*b*) and where (*k*+1)/gcd(*k*+1,*b*-1) is not prime are included in the conjectures but excluded from testing.

Such *k*-values will have the same prime as *k* / *b*.

## Table

| **Base** | **Conjectured smallest Sierpinski *k*** | **Covering set** | ***k*'s that make a full covering set with all or partial algebraic factors** | **Remaining *k* to find prime**  **(*n* testing limit)** | **Top 10 *k*'s with largest first primes: *k* (*n*)**  **(sorted by *n* only)** | **Comments** |
| --- | --- | --- | --- | --- | --- | --- |
| **2** | 78557 | 3, 5, 7, 13, 19, 37, 73 |  | 21181, 22699, 24737, 55459, 65536, 67607 (k = 65536 at n=8.589G, other k at n=34M) | 10223 (31172165)  19249 (13018586)  27653 (9167433)  28433 (7830457)  33661 (7031232)  5359 (5054502)  4847 (3321063)  54767 (1337287)  69109 (1157446)  65567 (1013803) |  |
| **3** | 11047 | 2, 5, 7, 13, 73 |  | 1187, 1801, 3007, 3047, 3307, 5321, 5743, 5893, 6427, 6569, 6575, 7927, 8161, 8227, 8467, 8609, 8863, 8987, 9263, 9449 (all at n=16.3K) | 621 (20820)  3061 (15772)  10243 (9731)  2747 (7097)  10207 (6089)  823 (6087)  10741 (6028)  821 (5512)  5147 (5153)  9721 (5040) |  |
| **4** | 419 | 3, 5, 7, 13 |  | none - proven | 186 (10458)  94 (291)  176 (228)  129 (207)  89 (167)  86 (108)  174 (103)  369 (71)  101 (66)  293 (58) |  |
| **5** | 7 | 2, 3 |  | none - proven | 4 (2)  3 (2)  6 (1)  5 (1)  2 (1)  1 (1) |  |
| **6** | 174308 | 7, 13, 31, 37, 97 |  | 1296, 1814, 9589, 12179, 13215, 14505, 22139, 23864, 29014, 43429, 49874, 50252, 57189, 62614, 67894, 73814, 76441, 80389, 87284, 87289, 87800, 97131, 100899, 112783, 117454, 122704, 124874, 127688, 132614, 135199, 139959, 145984, 151719, 152209, 166753, 168610 (k = 1296 at n=268.4M, k = 1814 at n=200K, other k = 4 mod 5 at n=33.5K, other k at n=4M) | 124125 (2018254)  139413 (1279992)  33706 (910462)  125098 (896696)  31340 (833096)  59506 (780877)  10107 (559967)  113966 (511831)  172257 (349166)  121736 (298935) |  |
| **7** | 209 | 2, 3, 5, 13, 43 |  | none - proven | 141 (1044)  121 (252)  101 (216)  21 (124)  181 (80)  173 (48)  87 (47)  145 (46)  77 (44)  187 (35) |  |
| **8** | 47 | 3, 5, 13 | All k = m^3 for all n;  factors to:  (m\*2^n + 1) \*  (m^2\*4^n - m\*2^n + 1) | none - proven | 31 (20)  46 (4)  40 (4)  37 (4)  28 (4)  16 (4)  13 (4)  45 (3)  38 (3)  36 (3) | k = 1, 8, and 27 proven composite by full algebraic factors. |
| **9** | 31 | 2, 5 |  | none - proven | 26 (6)  21 (4)  24 (3)  17 (3)  28 (2)  23 (2)  16 (2)  11 (2)  10 (2)  7 (2) |  |
| **10** | 989 | 3, 7, 11, 13 |  | 100, 269 (k = 100 at n=2.147G, k = 269 at n=100K) | 804 (5470)  342 (338)  485 (230)  912 (215)  815 (190)  378 (188)  494 (135)  640 (120)  737 (117)  603 (107) |  |
| **11** | 5 | 2, 3 |  | none - proven | 4 (2)  1 (2)  3 (1)  2 (1) |  |
| **12** | 521 | 5, 13, 29 |  | 12 (33.55M) | 404 (714558)  378 (2388)  261 (644)  407 (367)  354 (291)  37 (199)  30 (144)  88 (113)  17 (78)  274 (74) |  |
| **13** | 15 | 2, 7 |  | none - proven | 11 (564)  8 (4)  13 (3)  3 (2)  2 (2)  14 (1)  12 (1)  10 (1)  9 (1)  7 (1) |  |
| **14** | 4 | 3, 5 |  | none - proven | 1 (2)  3 (1)  2 (1) |  |
| **15** | 673029 | 2, 17, 113, 1489 |  | 225, 341, 343, 641, 965, 1205, 1827, 2263, 2323, 2403, 2445, 2461, 2471, 2531, 2813, 3347, 3625, 3797, 3935, 3959, 4045, 4169, 4355, 4665, 4733, 5169, 5793, 5891, 5983, 6061, 6331, 6476, 6553, 6598, 6661, 6775, 6849, 7087, 7693, 7711, 7773, 7975, 7979, 8017, 8161, 8181, 8271, 8603, 8881, 9215, 9643, 9767, 9783, 9857 (for k <= 10K) (k = 225 at n=524K, other k at n=1.5K) | 6598 (11715)  6476 (1522)  5529 (1446)  6313 (1276)  7763 (1179)  4787 (1129)  219 (1129)  5975 (1099)  7957 (1082)  5653 (1064) |  |
| **16** | 38 | 3, 7, 13 | All k=4\*q^4 for all n:  let k=4\*q^4  and let m=q\*2^n; factors to:  (2\*m^2 + 2m + 1) \*  (2\*m^2 - 2m + 1) | none - proven | 23 (1074)  33 (7)  35 (4)  18 (4)  10 (3)  5 (3)  32 (2)  31 (2)  30 (2)  24 (2) | k = 4 proven composite by full algebraic factors. |
| **17** | 31 | 2, 3 |  | none - proven | 10 (1356)  7 (190)  2 (47)  29 (41)  20 (13)  23 (9)  4 (6)  16 (4)  1 (4)  30 (3) |  |
| **18** | 398 | 5, 13, 19 |  | 18 (33.55M) | 122 (292318)  381 (24108)  291 (2415)  37 (457)  362 (258)  123 (236)  183 (171)  363 (163)  209 (79)  318 (78) |  |
| **19** | 9 | 2, 5 |  | none - proven | 5 (78)  6 (14)  4 (3)  1 (2)  8 (1)  7 (1)  3 (1)  2 (1) |  |
| **20** | 8 | 3, 7 |  | none - proven | 6 (15)  7 (2)  4 (2)  1 (2)  5 (1)  3 (1)  2 (1) |  |
| **21** | 23 | 2, 11 |  | none - proven | 12 (10)  21 (3)  19 (2)  11 (2)  8 (2)  3 (2)  22 (1)  20 (1)  18 (1)  17 (1) |  |
| **22** | 2253 | 5, 23, 97 |  | 22, 1754, 1772, 1862, 2186, 2232 (k = 22 at n=16.77M, other k at n=16.8K) | 1611 (738988)  1908 (355313)  942 (18359)  740 (18137)  1496 (17480)  461 (16620)  953 (5596)  1793 (4121)  1161 (3720)  346 (3180) |  |
| **23** | 5 | 2, 3 |  | none - proven | 4 (342)  1 (4)  3 (3)  2 (1) |  |
| **24** | 30651 | 5, 7, 13, 73, 79 |  | 656, 1099, 1816, 1851, 1864, 2164, 2351, 2529, 2586, 3404, 3526, 3609, 4346, 4606, 4894, 5129, 5316, 5324, 5386, 5889, 5974, 7276, 7746, 7844, 8054, 8091, 8161, 9279, 9304, 9701, 9721, 10026, 10156, 10326, 10531, 11346, 12626, 12969, 12991, 13716, 14006, 14604, 15921, 17334, 17819, 17876, 18006, 18204, 18911, 19031, 19094, 20219, 20676, 20731, 21459, 21849, 22289, 22356, 22479, 23844, 23874, 24784, 25964, 25966, 26279, 27344, 29091, 29349, 29464, 29566, 29601 (k = 22 mod 23 at n=11.3K, other k at n=400K) | 13984 (397259)  3846 (383526)  23981 (360062)  8369 (359371)  3706 (353908)  12799 (353083)  29009 (338099)  28099 (332519)  21526 (329368)  26804 (266195) |  |
| **25** | 79 | 2, 13 |  | 71 (10K) | 61 (3104)  40 (518)  59 (48)  77 (27)  68 (15)  47 (9)  12 (9)  51 (7)  66 (6)  57 (5) |  |
| **26** | 221 | 3, 7, 19, 37 |  | 65, 155 (both at n=1M) | 32 (318071)  217 (11454)  95 (1683)  178 (1154)  138 (827)  157 (308)  175 (276)  211 (98)  149 (87)  197 (71) |  |
| **27** | 13 | 2, 7 | All k = m^3 for all n;  factors to:  (m\*3^n + 1) \*  (m^2\*9^n - m\*3^n + 1) | none - proven | 9 (10)  7 (3)  12 (2)  5 (2)  2 (2)  11 (1)  10 (1)  6 (1)  4 (1)  3 (1) | k = 1 and 8 proven composite by full algebraic factors. |
| **28** | 4554 | 5, 29, 157 |  | 871, 3104, 4552 (k = 3104 at n=25.5K, k = 871 and 4552 at n=1M) | 3394 (427262)  4233 (331135)  2377 (104621)  146 (47316)  1291 (22811)  2203 (13911)  1565 (8607)  1797 (5681)  1043 (5459)  2467 (4956) |  |
| **29** | 4 | 3, 5 |  | none - proven | 3 (2)  1 (2)  2 (1) |  |
| **30** | 867 | 7, 13, 19, 31 |  | 278, 588 (both at n=1M) | 699 (11837)  242 (5064)  659 (4936)  311 (1760)  559 (1654)  557 (1463)  740 (1135)  12 (1023)  83 (644)  293 (361) |  |
| **31** | 239 | 2, 3, 7, 19 |  | 1, 51, 73, 77, 107, 117, 149, 181, 209 (k = 1 at n=524K, other k at n=6K) | 43 (21053)  189 (5570)  191 (1553)  5 (1026)  113 (178)  121 (118)  145 (78)  37 (64)  33 (62)  205 (60) |  |
| **32** | 10 | 3, 11 | All k = m^5 for all n;  factors to:  (m\*2^n + 1) \*  (m^4\*16^n - m^3\*8^n + m^2\*4^n - m\*2^n + 1) | 4 (1.717G) | 9 (13)  7 (4)  5 (3)  2 (3)  8 (1)  6 (1)  3 (1) | k = 1 proven composite by full algebraic factors. |
| **33** | 511 | 2, 17 |  | 67, 203 (both at n=12K) | 36 (23615)  407 (10961)  154 (6846)  319 (5043)  288 (4583)  418 (780)  11 (593)  305 (561)  251 (495)  63 (347) |  |
| **34** | 6 | 5, 7 |  | none - proven | 5 (12)  1 (4)  4 (1)  3 (1)  2 (1) |  |
| **35** | 5 | 2, 3 |  | none - proven | 4 (42)  1 (2)  3 (1)  2 (1) |  |
| **36** | 1886 | 13, 31, 37, 43 |  | 1296, 1814 (k = 1296 at n=134.2M, k = 1814 at n=100K) | 960 (1571)  716 (1554)  526 (698)  1000 (542)  223 (480)  1096 (407)  1570 (352)  667 (302)  1115 (280)  1669 (240) |  |
| **37** | 39 | 2, 19 |  | 37 (524K) | 19 (5310)  18 (461)  17 (12)  36 (9)  35 (6)  33 (6)  3 (6)  31 (5)  32 (4)  11 (4) |  |
| **38** | 14 | 3, 13 |  | 1 (16.77M) | 2 (2729)  9 (21)  4 (10)  8 (7)  10 (4)  7 (4)  3 (3)  13 (2)  12 (1)  11 (1) |  |
| **39** | 9 | 2, 5 |  | none - proven | 6 (2)  5 (2)  1 (2)  8 (1)  7 (1)  4 (1)  3 (1)  2 (1) |  |
| **40** | 47723 | 3, 7, 41, 223 |  | 1169, 1229, 1415, 1600, 2215, 2294, 2338, 2543, 2789, 2951, 2957, 3050, 3281, 3689, 3812, 3935, 4224, 4388, 4468, 4565, 4675, 4742, 4820, 5003, 5042, 5126, 5372, 5944, 6689, 7051, 7092, 7586, 7934, 8255, 8283, 8362, 8363, 8792, 8978, 9090, 9101, 9221, 9224, 9731, 9964, 10187, 10661, 10762, 11112, 11195, 11438, 11645, 11684, 12422, 12668, 12955, 13025, 13193, 13283, 13406, 13445, 13970, 15104, 15263, 15284, 15374, 15579, 15581, 15989, 16235, 16319, 16445, 16481, 16768, 16850, 17465, 17477, 17957, 18146, 18164, 18285, 18365, 18572, 18692, 18695, 18818, 19202, 19213, 19280, 19394, 19884, 20124, 20198, 20267, 20318, 20870, 20894, 20951, 20963, 21032, 21196, 21407, 21895, 22671, 22961, 23123, 23201, 23371, 23741, 23984, 24221, 24437, 24476, 24594, 25667, 26198, 26387, 26815, 26855, 27182, 27389, 27430, 28332, 28496, 28578, 28619, 29045, 29108, 29150, 29291, 29603, 29642, 30236, 30269, 30503, 30505, 30751, 31079, 31088, 31220, 31226, 31489, 31538, 31770, 31928, 32512, 32555, 32637, 32678, 32717, 33065, 33211, 33344, 33662, 33764, 33785, 33929, 34029, 34646, 34709, 34808, 35333, 35375, 35382, 35384, 35417, 35507, 35546, 35552, 35822, 35828, 35837, 35894, 35999, 36101, 36185, 36368, 36824, 37229, 37268, 37577, 37703, 38324, 38828, 38951, 39115, 39230, 39722, 40667, 41411, 41450, 41479, 41696, 41819, 42106, 43174, 43295, 43787, 43830, 43892, 43994, 44238, 44279, 44546, 44732, 44894, 46370, 46698, 46709, 46925, 47272, 47276, 47559, 47684 (all at n=5K) | 14555 (4988)  39119 (4945)  21026 (4919)  20402 (4907)  39525 (4904)  8624 (4892)  15417 (4860)  25501 (4717)  27948 (4710)  5477 (4683) |  |
| **41** | 8 | 3, 7 |  | none - proven | 1 (16)  4 (6)  6 (3)  7 (2)  5 (1)  3 (1)  2 (1) |  |
| **42** | 13372 | 5, 43, 353 |  | 42, 988, 1117, 1421, 3226, 4127, 5503, 6707, 8298, 8601, 9074, 11093, 11717, 11738, 11912, 12256, 13283 (k = 42 at n=16.77M, k = 13283 at n=10K, other k at n=600K) | 8343 (560662)  12001 (312245)  12042 (277646)  4643 (143933)  4297 (142044)  4731 (141968)  3897 (136780)  10009 (132629)  2794 (126595)  8300 (116404) |  |
| **43** | 21 | 2, 11 |  | none - proven | 13 (580)  9 (498)  3 (171)  5 (38)  17 (34)  15 (23)  1 (8)  18 (3)  16 (3)  14 (2) |  |
| **44** | 4 | 3, 5 |  | none - proven | 1 (16)  3 (9)  2 (1) |  |
| **45** | 47 | 2, 23 |  | none - proven | 24 (18522)  15 (55)  42 (36)  3 (28)  35 (22)  8 (8)  30 (5)  38 (3)  23 (3)  20 (3) |  |
| **46** | 881 | 3, 7, 103 |  | 563, 845 (both at n=35K) | 283 (21198)  17 (4920)  140 (2105)  619 (2005)  278 (1788)  347 (1287)  729 (1006)  95 (446)  229 (443)  871 (405) |  |
| **47** | 5 | 2, 3 |  | none - proven | 2 (175)  1 (8)  4 (2)  3 (1) |  |
| **48** | 1219 | 7, 13, 61, 181 |  | 36, 62, 153, 561, 622, 1114, 1168 (all at n=500K) | 937 (309725)  701 (284564)  1077 (216501)  1086 (136352)  1121 (133656)  29 (133042)  841 (84732)  1099 (81106)  359 (35671)  1028 (22619) |  |
| **49** | 31 | 2, 5 |  | none - proven | 24 (165)  21 (62)  22 (39)  11 (26)  16 (10)  29 (9)  9 (3)  26 (2)  20 (2)  15 (2) |  |
| **50** | 16 | 3, 17 |  | 1 (16.77M) | 7 (516)  4 (10)  11 (9)  10 (4)  13 (2)  9 (2)  15 (1)  14 (1)  12 (1)  8 (1) |  |
| **51** | 25 | 2, 13 |  | none - proven | 5 (6)  24 (5)  21 (4)  13 (4)  10 (3)  3 (3)  17 (2)  16 (2)  14 (2)  9 (2) |  |
| **52** | 28674 | 5, 53, 541 |  | 42, 52, 106, 113, 158, 216, 266, 278, 311, 317, 366, 383, 419, 584, 608, 661, 674, 689, 743, 863, 902, 938, 941, 956, 973, 1043, 1100, 1241, 1247, 1292, 1324, 1326, 1376, 1378, 1433, 1463, 1483, 1502, 1538, 1591, 1642, 1658, 1689, 1727, 1730, 1778, 1808, 1907, 2150, 2174, 2297, 2378, 2384, 2386, 2396, 2516, 2570, 2598, 2624, 2632, 2711, 2813, 2894, 2978, 3107, 3114, 3181, 3232, 3254, 3386, 3418, 3426, 3434, 3474, 3497, 3602, 3659, 3671, 3746, 3749, 3767, 3827, 3868, 4007, 4073, 4112, 4133, 4135, 4241, 4292, 4373, 4706, 4804, 4901, 4928, 4967, 4970, 4981, 5087, 5281, 5282, 5343, 5354, 5399, 5405, 5567, 5570, 5573, 5619, 5621, 5624, 5633, 5693, 5711, 5723, 5725, 5776, 5831, 5882, 5909, 5912, 5988, 6002, 6011, 6037, 6044, 6125, 6147, 6149, 6239, 6246, 6331, 6359, 6385, 6536, 6572, 6632, 6654, 6687, 6743, 6767, 6770, 6836, 6891, 6981, 7058, 7089, 7147, 7207, 7237, 7262, 7283, 7313, 7358, 7397, 7400, 7577, 7580, 7586, 7653, 7737, 7739, 7763, 7883, 7990, 7998, 8048, 8054, 8132, 8189, 8255, 8322, 8331, 8392, 8479, 8579, 8638, 8681, 8693, 8723, 8786, 8948, 8973, 8983, 8990, 9083, 9134, 9150, 9242, 9243, 9314, 9329, 9356, 9380, 9421, 9433, 9437, 9542, 9563, 9602, 9635, 9698, 9737, 9848, 9943, 9977, 9988, 10002, 10004, 10013, 10061, 10154, 10172, 10188, 10192, 10246, 10328, 10396, 10411, 10451, 10487, 10493, 10499, 10548, 10586, 10601, 10641, 10652, 10667, 10679, 10739, 10793, 10853, 10861, 10862, 10916, 10917, 10919, 10946, 10971, 10999, 11042, 11078, 11120, 11138, 11146, 11237, 11321, 11391, 11516, 11522, 11553, 11684, 11714, 11747, 11765, 11771, 11798, 11818, 12035, 12062, 12091, 12191, 12197, 12201, 12266, 12391, 12404, 12461, 12471, 12533, 12623, 12721, 12779, 12884, 12918, 12931, 13043, 13088, 13136, 13152, 13171, 13251, 13277, 13310, 13316, 13355, 13362, 13451, 13478, 13491, 13514, 13673, 13697, 13728, 13784, 13799, 13808, 13842, 13922, 13952, 13994, 14129, 14132, 14234, 14256, 14336, 14447, 14583, 14657, 14691, 14786, 14849, 14888, 14906, 14998, 15110, 15123, 15157, 15282, 15422, 15424, 15474, 15545, 15617, 15636, 15637, 15656, 15659, 15687, 15737, 15901, 16046, 16058, 16119, 16133, 16166, 16204, 16219, 16273, 16352, 16442, 16481, 16535, 16559, 16571, 16574, 16607, 16652, 16661, 16738, 16742, 16749, 16802, 16853, 16893, 16961, 17012, 17022, 17027, 17054, 17120, 17165, 17167, 17168, 17247, 17277, 17279, 17342, 17383, 17491, 17543, 17573, 17712, 17723, 17809, 17819, 17996, 18072, 18077, 18233, 18236, 18251, 18328, 18449, 18458, 18526, 18602, 18604, 18632, 18636, 18686, 18724, 18797, 18816, 18857, 18914, 18951, 19043, 19066, 19081, 19094, 19121, 19132, 19157, 19178, 19241, 19319, 19328, 19337, 19352, 19397, 19403, 19451, 19493, 19556, 19592, 19634, 19646, 19721, 19751, 19768, 19872, 19959, 19967, 19980, 19982, 20035, 20163, 20192, 20300, 20351, 20459, 20475, 20487, 20516, 20526, 20624, 20722, 20830, 20840, 20897, 20936, 20975, 20987, 20996, 21041, 21136, 21167, 21212, 21246, 21272, 21347, 21353, 21354, 21359, 21517, 21653, 21701, 21806, 21835, 21851, 21902, 22024, 22053, 22055, 22071, 22169, 22233, 22332, 22418, 22430, 22457, 22479, 22526, 22685, 22701, 22709, 22719, 22727, 22739, 22787, 22791, 23007, 23062, 23222, 23374, 23531, 23558, 23586, 23612, 23641, 23659, 23663, 23705, 23743, 23774, 23805, 23844, 23871, 23886, 23902, 23906, 23929, 23947, 23984, 23987, 24169, 24257, 24273, 24328, 24347, 24374, 24448, 24452, 24456, 24464, 24497, 24547, 24563, 24697, 24708, 24722, 24866, 24911, 25070, 25123, 25176, 25227, 25229, 25236, 25439, 25471, 25492, 25494, 25558, 25616, 25619, 25653, 25704, 25757, 25847, 25865, 25874, 25876, 25932, 25943, 26009, 26067, 26072, 26078, 26128, 26210, 26222, 26261, 26287, 26300, 26322, 26498, 26513, 26548, 26614, 26658, 26660, 26744, 26771, 26813, 26858, 26923, 26966, 27031, 27082, 27122, 27296, 27327, 27479, 27516, 27519, 27527, 27572, 27623, 27642, 27718, 27720, 27743, 27764, 27779, 27837, 27877, 27879, 27983, 27985, 28079, 28142, 28193, 28198, 28208, 28211, 28229, 28277, 28333, 28462, 28493, 28658, 28661 (all at n=1K) | 2474 (995)  20462 (992)  4285 (988)  10883 (985)  12968 (973)  15954 (962)  26722 (955)  4372 (954)  14444 (953)  13656 (953) |  |
| **53** | 7 | 2, 3 |  | 4 (1.8M) | 6 (143)  5 (9)  1 (8)  3 (4)  2 (1) |  |
| **54** | 21 | 5, 11 |  | none - proven | 19 (103)  16 (30)  13 (7)  12 (4)  4 (3)  20 (2)  18 (2)  11 (2)  6 (2)  1 (2) |  |
| **55** | 13 | 2, 7 |  | 1 (524K) | 10 (9)  9 (2)  8 (2)  5 (2)  4 (2)  12 (1)  11 (1)  7 (1)  6 (1)  3 (1) |  |
| **56** | 20 | 3, 19 |  | none - proven | 4 (78)  19 (70)  13 (6)  7 (6)  3 (5)  16 (2)  15 (2)  10 (2)  1 (2)  18 (1) |  |
| **57** | 47 | 2, 5, 13 |  | none - proven | 14 (14955)  39 (74)  27 (44)  46 (20)  30 (14)  31 (7)  38 (5)  25 (5)  16 (5)  6 (5) |  |
| **58** | 488 | 3, 7, 163 |  | 58, 122, 176, 222, 431, 437, 461 (k = 58 at n=16.77M, k = 222 at n=125K, other k at n=14.9K) | 178 (25524)  297 (11508)  266 (9040)  241 (1964)  296 (1892)  393 (1831)  106 (1795)  228 (1603)  20 (1340)  392 (1222) |  |
| **59** | 4 | 3, 5 |  | none - proven | 2 (3)  1 (2)  3 (1) |  |
| **60** | 16957 | 13, 61, 277 |  | 60, 853, 1646, 2075, 4025, 4406, 4441, 5064, 6772, 7262, 7931, 10226, 11406, 12323, 13785, 14958, 15007, 15452, 15676, 16050 (k = 60 at n=16.77M, other k at n=500K) | 14066 (324990)  16014 (227010)  5767 (201439)  12927 (191870)  11441 (180105)  8923 (109088)  13846 (90979)  2497 (88149)  10405 (77541)  6465 (37209) |  |
| **61** | 63 | 2, 31 |  | none - proven | 62 (3698)  43 (2788)  23 (1659)  10 (165)  19 (70)  32 (18)  25 (16)  36 (12)  57 (11)  26 (11) |  |
| **62** | 8 | 3, 7 |  | 1 (16.77M) | 7 (308)  2 (43)  3 (12)  4 (2)  6 (1)  5 (1) |  |
| **63** | 1589 | 2, 5, 397 |  | 1, 83, 101, 103, 113, 143, 185, 223, 237, 267, 307, 309, 335, 343, 367, 381, 391, 411, 425, 467, 471, 487, 509, 549, 587, 603, 637, 643, 645, 673, 677, 681, 687, 689, 701, 789, 807, 821, 825, 827, 881, 903, 937, 951, 963, 983, 989, 1021, 1043, 1047, 1063, 1067, 1103, 1263, 1267, 1283, 1321, 1341, 1401, 1461, 1463, 1467, 1481, 1523, 1553, 1563, 1581 (k = 1 at n=524K, other k at n=2K) | 1108 (12351)  888 (2698)  9 (2162)  1174 (1989)  1201 (1904)  1367 (1861)  1189 (1846)  1027 (1693)  581 (1596)  1433 (1554) |  |
| **64** | 14 | 5, 13 | All k = m^3 for all n;  factors to:  (m\*4^n + 1) \*  (m^2\*16^n - m\*4^n + 1) | none - proven | 11 (3222)  13 (2)  6 (2)  12 (1)  10 (1)  9 (1)  7 (1)  5 (1)  4 (1)  3 (1) | k = 1 and 8 proven composite by full algebraic factors. |
| **65** | 10 | 3, 11 |  | none - proven | 6 (5)  7 (2)  4 (2)  3 (2)  1 (2)  9 (1)  8 (1)  5 (1)  2 (1) |  |
| **66** | 21314443 | 7, 17, 37, 67, 73, 4357 |  | 269, 470, 537, 1198, 1408, 1449, 2076, 2257, 2464, 2605, 2614, 2624, 2815, 3284, 3899, 4153, 4155, 4175, 4356, 4689, 4769, 4820, 4883, 5024, 5200, 5334, 5361, 5442, 5765, 5805, 5857, 6031, 6289, 6634, 6835, 7216, 7374, 7818, 8024, 8304, 9312 (for k <= 10K) (all at n=1K) | 1511 (999)  1674 (863)  5269 (831)  4490 (774)  6969 (764)  2014 (758)  6105 (658)  7285 (645)  3149 (627)  7669 (616) |  |
| **67** | 26 | 3, 7, 31 |  | 1, 17, 21 (k = 1 at n=524K, other k at n=10K) | 6 (4532)  11 (209)  12 (135)  7 (135)  19 (21)  5 (6)  2 (6)  22 (3)  16 (3)  25 (2) |  |
| **68** | 22 | 3, 23 |  | 1, 17 (k = 1 at n=16.77M, k = 17 at n=1M) | 12 (656921)  11 (3947)  8 (319)  16 (36)  5 (29)  13 (26)  19 (6)  10 (6)  4 (6)  18 (2) |  |
| **69** | 6 | 5, 7 |  | none - proven | 3 (2)  1 (2)  5 (1)  4 (1)  2 (1) |  |
| **70** | 11077 | 13, 29, 71 |  | 70, 89, 178, 212, 283, 285, 434, 545, 581, 629, 881, 1300, 1373, 1436, 1490, 1559, 1565, 1694, 1871, 1916, 1946, 1955, 2129, 2176, 2351, 2354, 2379, 2419, 2705, 2756, 3154, 3317, 3329, 3336, 3362, 3407, 3452, 3530, 3647, 3762, 3764, 3929, 3944, 4025, 4061, 4119, 4166, 4188, 4193, 4250, 4331, 4351, 4454, 4913, 5145, 5169, 5204, 5231, 5348, 5429, 5540, 5594, 5608, 5609, 5798, 5857, 5894, 5953, 5975, 6133, 6167, 6218, 6410, 6518, 6530, 6582, 6743, 7145, 7325, 7365, 7552, 7578, 7691, 7736, 7811, 7907, 7974, 7994, 8003, 8015, 8045, 8153, 8159, 8201, 8234, 8306, 8348, 8351, 8377, 8406, 8423, 8465, 8477, 8637, 8907, 8945, 9231, 9268, 9323, 9428, 9471, 9515, 9586, 9693, 9712, 9751, 9758, 10009, 10051, 10089, 10193, 10271, 10291, 10399, 10438, 10544, 10574, 10718, 10997, 11003 (all at n=1K) | 3479 (998)  7345 (994)  10793 (976)  4155 (970)  1040 (965)  4343 (936)  2471 (936)  5578 (932)  4208 (926)  2877 (907) |  |
| **71** | 5 | 2, 3 |  | none - proven | 4 (22)  2 (3)  1 (2)  3 (1) |  |
| **72** | 731 | 5, 61, 73 |  | 72 (16.77M) | 493 (480933)  647 (60536)  489 (20201)  559 (9626)  395 (8171)  444 (6071)  499 (2998)  292 (2779)  649 (2658)  521 (1208) |  |
| **73** | 47 | 2, 5, 13 |  | none - proven (with probable primes that have not been certified: k = 14) | 14 (21369)  21 (1531)  39 (350)  16 (40)  8 (28)  13 (23)  25 (10)  17 (9)  36 (7)  38 (6) |  |
| **74** | 4 | 3, 5 |  | none - proven | 1 (2)  3 (1)  2 (1) |  |
| **75** | 37 | 2, 19 |  | none - proven | 11 (3071)  28 (129)  17 (128)  18 (57)  12 (57)  5 (48)  1 (32)  33 (18)  35 (11)  9 (6) |  |
| **76** | 34 | 7, 11 |  | none - proven | 29 (84)  22 (16)  1 (16)  23 (12)  19 (6)  15 (6)  33 (4)  8 (4)  20 (3)  13 (3) |  |
| **77** | 7 | 2, 3 |  | 1 (524K) | 4 (6098)  2 (3)  3 (2)  6 (1)  5 (1) |  |
| **78** | 96144 | 5, 79, 1217 |  | 78, 1143, 2371, 3317, 3513, 4346, 4820, 4897, 5136, 5294, 5531, 5686, 5862, 6103, 6353, 6859, 7188, 7594, 8373, 9558, 9652, 9694, 9701, 9953, 10348, 10723, 11003, 11219, 12244, 12251, 13353, 13508, 13768, 14566, 14832, 15126, 15777, 15899, 16071, 16273, 16591, 17588, 17761, 18248, 18776, 19501, 19828, 19931, 20146, 20206, 20754, 21171, 21284, 21453, 21489, 21884, 21972, 22279, 22662, 23337, 23341, 23953, 24254, 24672, 24877, 24886, 24912, 25044, 25171, 25199, 26069, 26212, 26515, 26592, 27059, 27124, 27537, 27663, 28202, 28423, 28518, 28597, 29303, 29322, 29497, 29784, 30572, 30967, 31030, 32073, 32633, 33094, 33193, 33318, 33732, 34208, 34522, 34528, 34712, 34998, 35244, 35433, 35628, 35709, 36014, 36497, 37068, 37456, 37773, 37795, 37842, 38009, 38393, 38401, 39724, 40361, 40844, 41239, 41271, 41634, 42671, 43214, 43493, 43609, 43693, 43770, 44428, 44631, 45268, 45345, 45352, 45582, 45584, 45779, 46213, 46374, 46927, 47053, 48012, 48113, 48173, 48187, 48824, 49139, 49149, 49482, 50441, 51148, 51428, 51501, 51981, 52238, 52541, 52744, 53503, 53703, 53721, 54263, 54273, 54438, 54669, 54942, 55026, 56091, 56199, 57276, 57303, 57694, 58409, 58582, 59373, 59611, 60513, 60906, 60987, 61417, 61648, 61777, 62033, 62567, 62663, 62964, 63596, 63666, 64542, 64712, 65253, 65727, 65887, 67070, 67591, 67941, 68011, 68053, 68697, 69173, 70943, 70982, 71168, 71203, 71609, 71730, 71952, 72225, 73943, 74051, 74249, 74367, 74733, 75019, 75492, 76394, 77182, 77209, 77573, 77972, 78826, 79001, 79127, 79749, 79949, 80046, 80263, 80343, 80737, 80739, 80897, 81731, 81864, 82556, 83419, 83502, 83978, 84013, 84818, 85133, 85714, 86267, 86281, 86371, 86503, 86687, 87016, 87156, 87328, 87559, 87614, 87691, 87821, 88321, 88479, 88619, 89039, 89214, 89352, 89429, 89836, 90481, 91009, 91125, 91496, 92826, 93587, 93624, 93722, 93774, 93873, 93981, 94114, 94758, 95354, 95670 (k = 78 at n=16.77M, k = 6 mod 7 and k = 10 mod 11 at n=1K, other k at n=100K) | 31738 (98568)  83107 (95785)  25281 (83932)  22344 (83678)  12325 (83516)  78211 (82952)  74928 (80731)  34346 (78373)  60908 (70199)  46424 (66623) |  |
| **79** | 9 | 2, 5 |  | none - proven | 3 (875)  5 (162)  6 (2)  1 (2)  8 (1)  7 (1)  4 (1)  2 (1) |  |
| **80** | 1039 | 3, 7, 13, 43, 173 |  | 86, 92, 166, 370, 393, 472, 556, 623, 692, 778, 818, 947, 968 (k = 947 at n=4K, other k at n=500K) | 628 (491322)  295 (404886)  326 (398799) 188 (142291)  433 (121106)  770 (107149)  857 (106007)  787 (48156)  1024 (46306)  233 (36917) |  |
| **81** | 575 | 2, 41 | All k=4\*q^4 for all n:  let k=4\*q^4  and let m=q\*3^n; factors to:  (2\*m^2 + 2m + 1) \*  (2\*m^2 - 2m + 1) | 239, 335, 514 (all at n=5K) | 558 (51992)  311 (7834)  75 (3309)  569 (2937)  439 (2097)  284 (1455)  41 (1223)  389 (871)  34 (734)  317 (518) | k = 4, 64, and 324 proven composite by full algebraic factors. |
| **82** | 19587 | 5, 7, 13, 37, 83 |  | 74, 122, 167, 470, 839, 848, 1121, 1226, 1251, 1319, 1327, 1376, 1427, 1433, 1493, 1514, 1559, 1716, 1733, 1798, 1908, 2024, 2066, 2159, 2251, 2339, 2352, 2461, 2491, 2708, 2939, 2989, 3041, 3236, 3239, 3332, 3377, 3474, 3572, 3593, 3641, 3656, 3746, 3896, 3962, 4133, 4142, 4151, 4232, 4379, 4384, 4454, 4542, 4898, 5064, 5251, 5279, 5396, 5477, 5483, 5516, 5612, 5703, 5721, 5747, 5867, 5893, 5975, 6059, 6226, 6497, 6641, 6761, 6764, 6912, 6953, 7127, 7160, 7201, 7266, 7541, 7718, 7856, 7884, 7969, 7982, 8135, 8301, 8384, 8467, 8532, 8609, 8657, 8742, 8797, 8909, 9038, 9169, 9335, 9380, 9419, 9437, 9461, 9476, 9638, 9776, 9788, 9812, 9836, 9842, 9851, 9911, 9941, 9954, 10049, 10127, 10154, 10304, 10448, 10553, 10577, 10586, 10802, 10958, 11080, 11087, 11177, 11408, 11612, 11621, 11666, 11702, 11704, 11761, 11783, 11834, 11957, 11963, 11984, 12008, 12036, 12119, 12347, 12451, 12491, 12532, 12548, 12554, 12638, 12737, 12744, 12856, 12866, 12938, 12947, 12949, 13121, 13246, 13268, 13283, 13343, 13607, 13613, 13777, 14192, 14473, 14609, 14621, 14639, 14676, 14681, 14692, 14873, 14941, 14984, 15032, 15122, 15146, 15203, 15271, 15296, 15356, 15551, 15854, 15869, 15937, 15953, 16088, 16133, 16267, 16269, 16423, 16433, 16442, 16502, 16601, 16682, 16733, 16811, 16847, 17029, 17078, 17112, 17174, 17177, 17369, 17393, 17798, 17813, 17846, 17921, 18332, 18342, 18457, 18548, 18566, 18626, 18944, 18965, 18971, 19061, 19181, 19421 (k = 2 mod 3 at n=1K, other k at n=100K) | 5652 (96054)  7288 (94205)  5101 (88245)  5977 (85004)  9676 (84109)  17692 (82887)  17091 (82407)  19134 (82154)  18168 (71000)  19098 (69654) |  |
| **83** | 5 | 2, 3 |  | 1, 3 (k = 1 at n=524K, k = 3 at n=8K) | 4 (5870)  2 (1) |  |
| **84** | 16 | 5, 17 |  | none - proven | 14 (47)  15 (6)  10 (5)  2 (4)  11 (2)  7 (2)  6 (2)  3 (2)  1 (2)  13 (1) |  |
| **85** | 87 | 2, 43 |  | none - proven | 70 (1586)  65 (125)  43 (62)  20 (57)  68 (12)  37 (12)  38 (11)  73 (7)  34 (7)  83 (6) |  |
| **86** | 28 | 3, 29 |  | 1, 8 (k = 1 at n=16.77M, k = 8 at n=1M) | 6 (40)  24 (23)  17 (17)  7 (12)  19 (6)  4 (6)  27 (4)  25 (2)  22 (2)  21 (2) |  |
| **87** | 21 | 2, 11 |  | none - proven | 12 (1214)  8 (112)  17 (16)  1 (16)  7 (7)  5 (6)  16 (4)  10 (3)  14 (2)  13 (2) |  |
| **88** | 26 | 3, 7, 19, 31 |  | none - proven | 8 (1094)  14 (83)  12 (9)  6 (7)  3 (4)  23 (3)  21 (3)  11 (3)  25 (2)  22 (2) |  |
| **89** | 4 | 3, 5 |  | 1 (524K) | 3 (1)  2 (1) |  |
| **90** | 27 | 7, 13 |  | none - proven | 14 (14)  8 (14)  22 (6)  19 (6)  5 (6)  16 (4)  12 (3)  23 (2)  21 (2)  15 (2) |  |
| **91** | 45 | 2, 23 |  | 1 (524K) | 33 (52)  35 (45)  9 (36)  7 (17)  37 (12)  36 (9)  29 (8)  43 (7)  41 (6)  16 (6) |  |
| **92** | 32 | 3, 31 |  | 1 (16.77M) | 31 (416)  25 (308)  8 (109)  17 (59)  29 (47)  24 (38)  10 (24)  16 (12)  7 (6)  23 (5) |  |
| **93** | 95 | 2, 47 |  | 62, 67, 87, 93 (k = 62 at n=100K, k = 93 and n=524K, other k at n=8K) | 19 (4362)  36 (3936)  43 (2994)  31 (527)  6 (520)  3 (156)  79 (69)  71 (41)  63 (31)  18 (24) |  |
| **94** | 39 | 5, 19 |  | none - proven | 17 (581)  9 (263)  11 (90)  31 (54)  2 (51)  16 (26)  23 (22)  34 (19)  30 (12)  38 (11) |  |
| **95** | 5 | 2, 3 |  | none - proven | 3 (9)  4 (6)  1 (2)  2 (1) |  |
| **96** | 68869 | 13, 97, 709 |  | 194, 939, 969, 994, 1169, 1177, 1262, 1514, 1844, 2146, 2424, 2545, 2868, 2952, 3028, 3364, 3624, 3699, 3784, 4019, 4164, 4239, 4549, 5140, 5239, 5262, 5764, 5959, 6009, 6074, 6304, 6389, 6569, 6668, 6671, 6769, 6882, 6934, 7132, 7246, 7312, 7539, 7569, 8009, 8069, 8226, 8634, 8796, 9020, 9064, 9309, 9489, 9589, 9619, 9799, 10089, 10139, 10574, 10669, 10739, 10844, 10849, 10939, 11154, 11159, 11361, 11549, 11634, 11659, 11738, 11974, 12029, 12054, 12417, 12706, 12999, 13044, 13519, 13773, 13899, 14169, 14279, 14299, 14494, 14646, 15194, 15208, 15228, 15448, 16073, 16279, 16349, 16799, 17009, 17029, 17264, 17362, 17517, 17564, 17909, 18189, 18231, 18254, 18916, 19109, 19254, 19289, 19304, 19683, 19884, 19934, 20064, 20324, 20369, 20494, 20584, 20599, 20733, 21194, 21234, 21679, 22309, 22419, 22569, 22604, 22699, 22999, 23174, 23629, 24015, 24049, 24259, 24490, 24724, 25459, 25575, 25829, 25995, 26229, 26379, 26424, 26577, 26846, 26899, 26941, 27219, 27299, 27334, 27514, 27644, 27682, 27849, 28939, 29039, 29278, 29411, 29574, 30360, 30459, 30484, 30509, 30689, 30779, 31461, 31621, 31979, 32138, 32239, 32300, 32319, 32369, 32384, 32432, 32609, 32664, 32714, 33034, 33175, 33229, 34119, 34267, 34469, 34744, 35071, 35296, 35309, 35404, 35794, 36304, 36824, 36834, 37129, 37829, 38134, 38219, 38546, 38609, 38739, 39164, 39187, 39309, 39386, 39719, 39777, 39983, 40014, 40724, 41339, 41614, 41674, 41709, 41779, 41806, 41905, 42004, 42179, 42199, 42291, 42374, 42394, 42444, 42629, 42901, 42954, 42979, 43194, 43389, 43494, 43739, 43909, 43914, 44136, 44384, 44539, 44611, 44634, 45009, 45589, 45774, 46134, 46214, 46344, 46409, 46444, 46658, 46684, 47139, 47143, 47164, 47238, 47259, 47344, 47644, 48010, 48214, 48307, 48404, 48479, 48504, 48582, 48744, 48749, 48914, 49017, 49249, 49859, 50079, 50194, 50224, 50387, 50549, 50709, 50929, 51099, 51159, 51399, 51414, 51797, 51827, 52019, 52034, 52209, 53004, 53079, 53465, 53519, 53624, 54016, 54254, 54509, 54994, 55049, 55774, 55959, 56044, 56229, 56719, 56854, 56919, 56939, 57037, 57114, 57264, 57520, 57524, 57968, 58199, 58215, 58356, 58644, 59189, 59519, 59654, 59684, 59799, 59945, 59947, 60014, 60194, 60269, 60464, 60624, 60917, 61014, 61034, 61384, 61524, 61699, 61773, 62024, 62774, 62884, 62954, 63029, 63439, 63504, 63509, 63799, 63809, 63939, 64454, 64484, 64644, 64700, 64789, 64871, 64982, 65019, 65089, 65164, 65229, 65239, 65379, 65399, 65573, 65606, 65668, 65749, 65864, 66039, 66096, 66119, 66349, 66559, 66664, 66734, 66749, 66929, 67159, 67174, 67373, 67976, 68004, 68169, 68192, 68274, 68339, 68384, 68444, 68532, 68752, 68774 (k = 4 mod 5 and k = 18 mod 19 at n=1K, other k at n=100K) | 14825 (91707)  64312 (89580)  59132 (85620)  41452 (85565)  32762 (81344)  21533 (81235)  26773 (74392)  13872 (73620)  4461 (73443)  16780 (72065) |  |
| **97** | 127 | 2, 7 |  | 1, 27, 43, 62, 83, 116, 120, 123 (k = 1 at n=524K, k = 120 at n=100K, other k at n=2K) | 64 (7474)  22 (2182)  122 (660)  68 (593)  26 (224)  87 (167)  24 (158)  113 (104)  41 (89)  17 (64) |  |
| **98** | 10 | 3, 11 |  | 1 (16.77M) | 4 (294)  8 (119)  6 (32)  7 (8)  3 (2)  9 (1)  5 (1)  2 (1) |  |
| **99** | 9 | 2, 5 |  | 1 (524K) | 5 (14)  8 (10)  6 (6)  7 (1)  4 (1)  3 (1)  2 (1) |  |
| **100** | 62 | 3, 7, 13 |  | none - proven | 31 (168)  38 (29)  59 (24)  34 (13)  36 (8)  17 (6)  52 (5)  3 (5)  60 (4)  46 (4) |  |
| **101** | 7 | 2, 3 |  | none - proven | 2 (192275)  3 (22)  5 (3)  4 (2)  1 (2)  6 (1) |  |
| **102** | 293 | 7, 19, 79 |  | 122, 178, 236 (all at n=300K) | 46 (50451)  278 (10941)  94 (6421)  12 (2739)  73 (2040)  131 (1112)  202 (610)  56 (499)  48 (305)  271 (300) |  |
| **103** | 25 | 2, 13 |  | 7 (8K) | 13 (7010)  20 (476)  11 (81)  23 (51)  14 (34)  21 (16)  5 (16)  2 (8)  8 (7)  1 (4) |  |
| **104** | 4 | 3, 5 |  | 1 (16.77M) | 2 (1233)  3 (1) |  |
| **105** | 319 | 2, 53 |  | none - proven (with probable primes that have not been certified: k = 191) | 191 (5045)  36 (675)  39 (348)  264 (275)  183 (210)  150 (193)  80 (177)  164 (146)  167 (140)  204 (105) |  |
| **106** | 2387 | 3, 19, 199 |  | 69, 110, 164, 259, 412, 449, 635, 748, 812, 929, 1088, 1190, 1429, 1511, 1607, 1628, 1823, 1925, 1985, 2018, 2075, 2177, 2189, 2216, 2279 (all at n=2K) | 1559 (1975)  436 (1949)  679 (1818)  198 (1699)  2119 (1685)  1160 (1564)  2036 (1312)  887 (1307)  1703 (1305)  1835 (1303) |  |
| **107** | 5 | 2, 3 |  | 1 (524K) | 4 (32586)  3 (165)  2 (3) |  |
| **108** | 26270 | 7, 13, 109, 127 |  | 108, 127, 156, 211, 217, 653, 998, 1267, 1271, 1854, 2252, 2393, 2399, 2724, 2842, 2915, 2942, 2976, 3098, 3563, 3571, 3925, 3938, 4162, 4311, 4391, 4468, 4623, 4699, 5013, 5117, 5251, 5778, 5794, 5849, 5924, 5994, 6686, 7211, 7478, 8401, 8623, 8642, 8828, 9127, 9482, 9578, 9941, 10188, 10202, 10245, 10574, 10689, 10973, 11008, 11028, 11321, 11335, 11703, 11833, 11909, 12172, 12209, 12427, 12534, 13081, 13299, 13316, 13844, 13861, 14044, 14134, 14691, 14932, 15207, 15638, 15912, 15913, 15926, 16042, 16122, 16240, 16569, 16896, 17267, 17616, 18319, 18638, 19098, 19158, 19294, 19318, 19839, 19948, 19966, 20303, 20687, 20929, 21181, 21262, 21511, 21532, 21581, 21818, 21908, 22008, 22182, 22194, 22259, 22266, 22562, 22706, 23066, 23327, 23543, 23838, 24078, 24088, 24103, 24529, 24756, 24767, 24853, 25062, 25068, 25071, 25319, 25546, 25607, 25763, 25973, 26234, 26256 (k = 108 at n=16.77M, other k at n=100K) | 7612 (99261)  7304 (94930)  15874 (94153)  8034 (93577)  2874 (91402)  20666 (91335)  7631 (90728)  9187 (90213)  6759 (89530)  21101 (88027) |  |
| **109** | 19 | 2, 5 |  | 1 (524K) | 3 (6)  4 (3)  18 (2)  16 (2)  12 (2)  11 (2)  6 (2)  5 (2)  17 (1)  15 (1) |  |
| **110** | 38 | 3, 37 |  | none - proven | 20 (933)  34 (356)  11 (161)  13 (124)  19 (66)  25 (58)  2 (51)  22 (42)  28 (12)  18 (11) |  |
| **111** | 13 | 2, 7 |  | none - proven | 8 (62)  1 (16)  9 (8)  11 (5)  6 (3)  12 (2)  5 (2)  10 (1)  7 (1)  4 (1) |  |
| **112** | 2261 | 5, 13, 113 |  | 209, 269, 467, 941, 1292, 1412, 1463, 1499, 1517, 1604, 1613, 1664, 1696, 1937 (k = 1696 at n=1M, other k at n=6.9K) | 1780 (62794)  547 (8124)  953 (6802)  677 (5723)  1920 (5333)  2082 (5308)  1712 (4836)  813 (4616)  8 (4526)  1217 (3872) |  |
| **113** | 20 | 3, 19 |  | 17 (8K) | 4 (2958)  13 (1336)  19 (50)  18 (47)  8 (47)  16 (40)  12 (4)  3 (4)  1 (4)  15 (2) |  |
| **114** | 24 | 5, 23 |  | none - proven | 1 (32)  12 (15)  3 (12)  22 (11)  11 (10)  9 (5)  16 (4)  23 (3)  19 (3)  15 (3) |  |
| **115** | 57 | 2, 29 |  | 17, 47 (both at n=8K) | 30 (47376)  50 (798)  38 (94)  46 (79)  23 (51)  5 (44)  53 (38)  40 (38)  49 (14)  37 (12) |  |
| **116** | 14 | 3, 13 |  | none - proven | 12 (47)  9 (8)  4 (6)  10 (4)  7 (4)  5 (3)  13 (2)  6 (2)  1 (2)  11 (1) |  |
| **117** | 119 | 2, 59 |  | 59, 117 (k = 59 at n=8K, k = 117 at n=524K) | 58 (460033)  75 (1428)  11 (1164)  77 (311)  2 (286)  81 (264)  47 (227)  67 (182)  4 (101)  51 (76) |  |
| **118** | 50 | 7, 17 |  | 48 (740K) | 43 (106)  36 (96)  18 (80)  33 (67)  3 (46)  15 (22)  29 (10)  21 (7)  35 (6)  46 (5) |  |
| **119** | 4 | 3, 5 |  | none - proven | 1 (4)  3 (1)  2 (1) |  |
| **120** | 374876369 | 11, 13, 1117, 14281 |  | 56, 89, 208, 219, 307, 309, 426, 540, 560, 694, 714, 727, 991, 1024, 1167, 1616, 1658, 1662, 1689, 1833, 1946, 1969, 1970, 2023, 2078, 2157, 2223, 2279, 2377, 2395, 2509, 2519, 2881, 3161, 3257, 3301, 3321, 3345, 3387, 3510, 3561, 3598, 3607, 3774, 3805, 3814, 3827, 3860, 3893, 3950, 4212, 4333, 4367, 4456, 4610, 4724, 4762, 4852, 4993, 5069, 5191, 5347, 5433, 5543, 5553, 5665, 5763, 5875, 5894, 5928, 6029, 6084, 6447, 6478, 6502, 6715, 6718, 6984, 7097, 7195, 7248, 7284, 7379, 7589, 7998, 8051, 8161, 8189, 8293, 8304, 8359, 8382, 8427, 8514, 8636, 8669, 8678, 8693, 8876, 8931, 8933, 8957, 9041, 9043, 9058, 9109, 9140, 9195, 9318, 9351, 9494, 9513, 9637, 9721, 9890 (for k <= 10K) (all at n=1K) | 8389 (969)  6546 (954)  3195 (951)  3466 (908)  7479 (899)  3359 (897)  4437 (870)  8584 (843)  6382 (803)  738 (790) |  |
| **121** | 27 | 7, 19, 37 |  | none - proven | 23 (102)  24 (72)  7 (6)  17 (5)  10 (5)  2 (5)  25 (4)  21 (4)  19 (4)  16 (4) |  |
| **122** | 40 | 3, 41 |  | 1, 34 (k = 1 at n=16.77M, k = 34 at n=1M) | 37 (1622)  31 (1236)  16 (764)  2 (755)  25 (674)  23 (389)  17 (371)  4 (358)  5 (135)  28 (108) |  |
| **123** | 55 | 2, 17, 89 |  | 1, 3, 41 (k = 1 at n=524K, other k at n=8K) | 19 (59)  38 (42)  47 (29)  13 (28)  34 (19)  28 (19)  8 (16)  54 (15)  15 (15)  53 (14) |  |
| **124** | 31001 | 3, 5, 7, 5167 |  | 54, 61, 76, 83, 89, 96, 114, 121, 146, 171, 206, 209, 221, 239, 251, 344, 362, 376, 381, 386, 411, 416, 431, 446, 449, 516, 519, 526, 530, 576, 581, 601, 635, 646, 647, 656, 661, 669, 670, 676, 684, 731, 766, 794, 804, 809, 831, 836, 841, 872, 896, 911, 971, 976, 1019, 1031, 1051, 1054, 1076, 1111, 1124, 1129, 1136, 1166, 1190, 1229, 1251, 1254, 1259, 1264, 1284, 1298, 1324, 1326, 1336, 1369, 1421, 1446, 1460, 1461, 1471, 1474, 1477, 1499, 1519, 1535, 1536, 1551, 1569, 1586, 1591, 1601, 1604, 1647, 1657, 1676, 1686, 1700, 1721, 1727, 1734, 1741, 1779, 1801, 1814, 1829, 1844, 1864, 1910, 1955, 2021, 2034, 2036, 2045, 2055, 2067, 2069, 2096, 2097, 2109, 2114, 2129, 2159, 2163, 2179, 2216, 2234, 2266, 2306, 2316, 2354, 2374, 2375, 2406, 2414, 2429, 2436, 2446, 2462, 2504, 2507, 2539, 2559, 2561, 2565, 2621, 2639, 2646, 2651, 2716, 2726, 2734, 2799, 2821, 2834, 2840, 2844, 2861, 2864, 2874, 2901, 2906, 2934, 2981, 2999, 3019, 3032, 3041, 3049, 3053, 3071, 3144, 3161, 3164, 3181, 3229, 3236, 3242, 3251, 3281, 3285, 3296, 3299, 3316, 3329, 3351, 3405, 3442, 3470, 3471, 3491, 3494, 3533, 3554, 3561, 3574, 3631, 3659, 3674, 3684, 3714, 3726, 3736, 3737, 3758, 3779, 3806, 3824, 3854, 3869, 3881, 3890, 3911, 3916, 3921, 3941, 3961, 3981, 3986, 3994, 4021, 4049, 4086, 4089, 4124, 4127, 4131, 4153, 4162, 4191, 4196, 4226, 4231, 4254, 4297, 4306, 4314, 4352, 4375, 4388, 4406, 4414, 4421, 4454, 4476, 4489, 4500, 4506, 4520, 4521, 4529, 4541, 4546, 4589, 4594, 4604, 4629, 4719, 4739, 4751, 4764, 4769, 4799, 4849, 4891, 4910, 4926, 4936, 4952, 4961, 4964, 4973, 4974, 5001, 5041, 5048, 5049, 5108, 5114, 5121, 5149, 5154, 5189, 5191, 5231, 5244, 5279, 5289, 5300, 5316, 5321, 5326, 5364, 5366, 5369, 5375, 5381, 5384, 5414, 5440, 5462, 5474, 5481, 5489, 5519, 5543, 5551, 5579, 5581, 5596, 5651, 5663, 5681, 5696, 5697, 5701, 5721, 5723, 5738, 5744, 5771, 5781, 5799, 5801, 5816, 5819, 5825, 5839, 5840, 5851, 5876, 5884, 5909, 5919, 5939, 5951, 5976, 5981, 6024, 6026, 6036, 6041, 6046, 6059, 6099, 6146, 6151, 6161, 6164, 6166, 6196, 6201, 6211, 6219, 6224, 6241, 6269, 6296, 6310, 6323, 6329, 6366, 6383, 6386, 6394, 6401, 6409, 6410, 6411, 6416, 6486, 6494, 6496, 6511, 6514, 6536, 6539, 6559, 6596, 6620, 6621, 6644, 6646, 6647, 6654, 6659, 6665, 6686, 6689, 6691, 6712, 6729, 6731, 6746, 6749, 6751, 6761, 6789, 6794, 6806, 6821, 6864, 6881, 6891, 6904, 6908, 6926, 6949, 6956, 6959, 6962, 6971, 7004, 7006, 7016, 7034, 7036, 7071, 7074, 7079, 7081, 7146, 7169, 7204, 7216, 7227, 7239, 7259, 7269, 7271, 7276, 7301, 7319, 7324, 7331, 7359, 7369, 7376, 7391, 7424, 7439, 7446, 7451, 7454, 7472, 7484, 7486, 7499, 7523, 7544, 7559, 7565, 7586, 7601, 7609, 7639, 7656, 7664, 7666, 7671, 7691, 7739, 7744, 7761, 7796, 7801, 7831, 7851, 7868, 7881, 7886, 7931, 7949, 7979, 7981, 8014, 8017, 8034, 8042, 8054, 8114, 8141, 8146, 8192, 8213, 8219, 8221, 8231, 8274, 8279, 8291, 8296, 8321, 8323, 8351, 8354, 8381, 8396, 8417, 8423, 8424, 8429, 8516, 8519, 8526, 8531, 8532, 8579, 8634, 8641, 8651, 8666, 8681, 8711, 8714, 8741, 8771, 8776, 8780, 8786, 8829, 8831, 8876, 8916, 8921, 8930, 8936, 8939, 8966, 8978, 8982, 9006, 9024, 9026, 9038, 9069, 9099, 9106, 9118, 9138, 9161, 9166, 9173, 9187, 9209, 9214, 9216, 9226, 9244, 9261, 9267, 9269, 9286, 9302, 9314, 9319, 9411, 9479, 9483, 9509, 9521, 9536, 9594, 9596, 9598, 9599, 9641, 9651, 9681, 9687, 9743, 9754, 9785, 9791, 9831, 9836, 9865, 9866, 9901, 9911, 9914, 9949, 9971 (for k <= 10K) (all at n=1K) | 1646 (998)  8094 (997)  1886 (996)  1926 (994)  2987 (985)  7193 (981)  3276 (974)  6974 (973)  6951 (966)  2801 (960) |  |
| **125** | 7 | 2, 3 | All k = m^3 for all n;  factors to:  (m\*5^n + 1) \*  (m^2\*25^n - m\*5^n + 1) | none - proven | 4 (2)  3 (2)  6 (1)  5 (1)  2 (1) | k = 1 proven composite by full algebraic factors. |
| **126** | 766700 | 13, 19, 127, 829 |  | 259, 1084, 1117, 1154, 2708, 2922, 3735, 3982, 5093, 5099, 5392, 5529, 5587, 6059, 6478, 6772, 7817, 8150, 8304, 8659, 8759, 8779, 8829, 9268, 9429, 9474, 9624, 10072, 10540, 11008, 11429, 12094, 12414, 12750, 12757, 12799, 12900, 13111, 13129, 13264, 13274, 13309, 14299, 14390, 14538, 14598, 15402, 15454, 15781, 15876, 15883, 16312, 17300, 18119, 18394, 18594, 18795, 19421, 19479, 19484, 19499, 19559, 19894, 20326, 20394, 20609, 20914, 21083, 21369, 21679, 21694, 21999, 22582, 24023, 24119, 24543, 24764, 25399, 25624, 25739, 25757, 25913, 26374, 26441, 27179, 27884, 27948, 28222, 28374, 28602, 28729, 29590 (for k <= 30K) (k = 4 mod 5 at n=1K, other k at n=25K) | 26532 (23264)  27765 (22565)  15493 (22097)  25722 (20095)  29405 (19897)  28188 (17368)  25575 (17359)  26036 (15264)  27433 (14598)  12965 (14155) |  |
| **127** | 6343 | 2, 5, 17, 137 |  | 1, 37, 67, 103, 121, 134, 138, 139, 141, 153, 172, 177, 189, 201, 205, 215, 223, 237, 247, 263, 267, 301, 311, 343, 367, 381, 383, 387, 398, 409, 413, 425, 447, 452, 465, 469, 474, 487, 495, 525, 527, 529, 543, 569, 582, 601, 629, 645, 647, 649, 657, 659, 673, 681, 691, 701, 707, 727, 733, 763, 781, 790, 797, 807, 809, 818, 819, 837, 847, 849, 887, 895, 901, 903, 907, 909, 925, 927, 941, 954, 1011, 1021, 1023, 1043, 1075, 1079, 1103, 1109, 1121, 1123, 1147, 1161, 1165, 1167, 1169, 1173, 1193, 1199, 1201, 1229, 1232, 1237, 1239, 1243, 1244, 1261, 1303, 1309, 1322, 1329, 1343, 1351, 1357, 1362, 1379, 1381, 1383, 1403, 1417, 1423, 1425, 1427, 1431, 1439, 1441, 1461, 1463, 1466, 1472, 1483, 1487, 1494, 1515, 1543, 1544, 1547, 1549, 1553, 1557, 1565, 1574, 1581, 1583, 1603, 1607, 1615, 1621, 1641, 1649, 1686, 1691, 1719, 1723, 1741, 1742, 1747, 1753, 1754, 1765, 1783, 1785, 1793, 1801, 1808, 1815, 1827, 1841, 1849, 1861, 1875, 1887, 1917, 1921, 1954, 1961, 1981, 1987, 1997, 2001, 2022, 2027, 2041, 2055, 2083, 2089, 2109, 2123, 2147, 2152, 2156, 2167, 2177, 2181, 2189, 2211, 2229, 2235, 2241, 2261, 2263, 2265, 2285, 2287, 2330, 2335, 2336, 2341, 2375, 2401, 2403, 2409, 2429, 2441, 2461, 2521, 2523, 2531, 2537, 2551, 2603, 2607, 2625, 2627, 2636, 2649, 2657, 2661, 2687, 2701, 2721, 2729, 2741, 2744, 2749, 2778, 2801, 2803, 2809, 2847, 2861, 2863, 2867, 2869, 2887, 2894, 2907, 2908, 2909, 2915, 2921, 2929, 2949, 2961, 2963, 2977, 2981, 2987, 2988, 2993, 3001, 3005, 3041, 3045, 3061, 3069, 3089, 3093, 3095, 3099, 3107, 3121, 3129, 3133, 3141, 3143, 3169, 3181, 3199, 3209, 3221, 3241, 3243, 3276, 3283, 3297, 3303, 3309, 3313, 3325, 3327, 3329, 3345, 3363, 3377, 3381, 3392, 3401, 3407, 3419, 3421, 3449, 3455, 3461, 3489, 3501, 3521, 3526, 3527, 3533, 3543, 3545, 3549, 3563, 3603, 3641, 3646, 3647, 3703, 3741, 3743, 3747, 3763, 3779, 3790, 3807, 3811, 3812, 3815, 3821, 3823, 3829, 3896, 3923, 3929, 3947, 3981, 3986, 3987, 3995, 3996, 4001, 4007, 4021, 4029, 4031, 4039, 4045, 4063, 4073, 4079, 4081, 4087, 4112, 4125, 4135, 4157, 4164, 4167, 4181, 4185, 4193, 4201, 4207, 4229, 4241, 4247, 4261, 4281, 4289, 4309, 4323, 4327, 4329, 4339, 4364, 4373, 4381, 4382, 4385, 4416, 4421, 4437, 4447, 4455, 4469, 4481, 4503, 4517, 4521, 4527, 4531, 4547, 4573, 4587, 4609, 4614, 4617, 4643, 4645, 4667, 4677, 4684, 4701, 4705, 4742, 4761, 4781, 4809, 4819, 4823, 4829, 4849, 4867, 4887, 4891, 4896, 4909, 4957, 4968, 4969, 4975, 4987, 4995, 5005, 5009, 5016, 5023, 5025, 5041, 5057, 5061, 5067, 5069, 5091, 5101, 5119, 5123, 5149, 5165, 5172, 5187, 5189, 5201, 5205, 5226, 5238, 5247, 5249, 5267, 5273, 5283, 5321, 5327, 5331, 5343, 5347, 5363, 5368, 5379, 5381, 5387, 5391, 5399, 5415, 5429, 5435, 5441, 5443, 5457, 5461, 5469, 5477, 5485, 5487, 5488, 5503, 5507, 5529, 5531, 5534, 5543, 5547, 5549, 5563, 5577, 5583, 5589, 5606, 5609, 5615, 5618, 5619, 5622, 5623, 5627, 5638, 5665, 5668, 5674, 5678, 5687, 5697, 5701, 5707, 5713, 5721, 5723, 5735, 5747, 5761, 5767, 5799, 5807, 5813, 5823, 5837, 5841, 5859, 5861, 5863, 5867, 5887, 5888, 5903, 5923, 5929, 5941, 5955, 5957, 5966, 5981, 5996, 6015, 6021, 6041, 6047, 6048, 6057, 6081, 6085, 6087, 6111, 6114, 6121, 6149, 6209, 6221, 6231, 6237, 6245, 6261, 6269, 6275, 6277 (all at n=1K) | 2163 (985)  2837 (982)  6065 (980)  2479 (975)  3525 (972)  365 (968)  5541 (964)  5654 (963)  6129 (950)  2267 (947) |  |
| **128** | 44 | 3, 43 | All k = m^7 for all n;  factors to:  (m\*2^n + 1) \*  (m^6\*64^n - m^5\*32^n + m^4\*16^n - m^3\*8^n + m^2\*4^n - m\*2^n + 1) | 16, 40 (k = 16 at n=4.908G, k = 40 at n=1.2857M) | 41 (39271)  42 (13001)  20 (473)  28 (322)  38 (291)  19 (178)  25 (64)  3 (27)  17 (21)  31 (20) | k = 1 proven composite by full algebraic factors.  k = 8 and 32 have no possible prime. |
| **256** | 38 | 3, 7, 13 | All k=4\*q^4 for all n:  let k=4\*q^4  and let m=q\*4^n; factors to:  (2\*m^2 + 2m + 1) \*  (2\*m^2 - 2m + 1) | none - proven (with probable primes that have not been certified: k = 11) | 11 (5702)  23 (537)  20 (20)  7 (15)  22 (10)  25 (8)  15 (6)  36 (5)  6 (5)  28 (3) | k = 4 proven composite by full algebraic factors. |
| **512** | 18 | 5, 13, 19 | All k = m^3 for all n;  factors to:  (m\*8^n + 1) \*  (m^2\*64^n - m\*8^n + 1) | 2, 4, 5, 16 (k = 2 at n=2.001P, k = 4 at n=62.54T, k = 5 at n=1M, k = 16 at n=1.954T) | 12 (23)  14 (21)  7 (20)  11 (9)  9 (7)  10 (6)  17 (3)  13 (2)  3 (2)  15 (1) | k = 1 and 8 proven composite by full algebraic factors. |
| **1024** | 81 | 5, 41 | All k = m^5 for all n;  factors to:  (m\*4^n + 1) \*  (m^4\*256^n - m^3\*64^n + m^2\*16^n - m\*4^n + 1) | 4, 16, 29, 38, 56 (k = 4 at n=858.9M, k = 16 at n=1.717G, other k at n=3K) | 44 (1933)  41 (350)  9 (323)  51 (266)  14 (221)  33 (142)  48 (53)  11 (46)  54 (37)  10 (36) | k = 1 and 32 proven composite by full algebraic factors. |