Dozenal Home Primes

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Introduction

The Home Prime Conjecture represents a very neat problem encompassing the interface of mathematics and technology. This problem first sparked a great deal of interest in 11Χ5; **(1997.)** with a feature article in *The Journal of Recreational Mathematics* by Jeffrey Heleen entitled "Family Numbers: Constructing Primes by Prime Factor Splitting." The iterative process is quite simple. Consider any composite integer and resolve this integer into its prime factorization. Concatenate the factors in order of increasing magnitude and factor the new integer that is formed. Repeat the process. The HOME PRIME CONJECTURE asserts that eventually a prime number will be obtained which is the *Home Prime* (HP) of the original composite integer. To cite an example, consider the decimal integer **10**. The repeated factorizations and concatenations result in the eventual prime **773**, which is the Home Prime of **10**. The steps are furnished below:

$$
\begin{aligned}
\mathbf{10} &= (\mathbf{2})(\mathbf{5}) \rightarrow \mathbf{25} \\
&= (\mathbf{5})(\mathbf{5}) \rightarrow \mathbf{55} \\
&= (\mathbf{5})(\mathbf{11}) \rightarrow \mathbf{511} \\
&= (\mathbf{7})(\mathbf{73}) \rightarrow \mathbf{773}, \text{ a PRIME} \\
\text{and so HP}[\mathbf{10}] &= \mathbf{773} \text{ in } \mathbf{4} \text{ steps.}
\end{aligned}
$$

More compactly, one may write

$$\text{HP}[\mathbf{10}] \rightarrow (\mathbf{2})(\mathbf{5}) \rightarrow (\mathbf{5})(\mathbf{5}) \rightarrow (\mathbf{5})(\mathbf{11}) \rightarrow (\mathbf{7})(\mathbf{73}) \rightarrow \text{PRIME } \mathbf{773}\ (\mathbf{4})$$

in base dek where the last (4) indicates the number of steps needed for **10** to reach its Home Prime. Note that Home Primes are base-dependent in the sense that families of integers in the repeated factoring and concatenation process in one number base are generally not in the same family in a different number base. For example, in base ten, HP(**10**) = **773** while in dozenal, HP(Χ;) = 25;. Similarly decimally, HP(**12**) = **223** while in dozenal, HP(10;) = 3357;. Here decimal numerals are in **bold face** to distinguish them from their duodecimal counterparts.

While many composite integers have their Home Primes generated in a few steps, the Home Prime for the decimal integer **49** (and subsequently the integers **77** and **711** which belong to the same family in the repeated concatenation process) remains unresolved after more than one hundred steps. This is due to the inability for even the most sophisticated technology to factor very large integers which is an NP hard problem. (For information on the complexity of algorithms which encompasses algorithmic procedures that can be performed in polynomial time versus those that are intractable, the reader is referred to the on-line mathematics encyclopedia Mathworld as reference 2 in the appended bibliography. Proceed in the alphabetical index to NP Problems.) The factoring algorithm is contingent upon the second largest prime factor when factoring a composite integer. If this second largest prime factor has many digits, the search may become stalled at that stage of the process. In my paper, I extend this classic Home Prime problem to the duodecimal base using the MATHEMATICA Program to generate the Home Primes for every one of the 91; composite integers save 26; and 6X; among the first gross of integers. Unfortunately the Home Primes for 26; and 6X; are stalled in trying to respectively factor an 85; digit duodecimal and **109** digit decimal composite integer after 55; iterations. I am currently using MATHEMATICA to potentially secure the common Home Prime for these two composite integers and this is a work in progress. In addition, a rechecking of my work for 54; and 68; indicates that the Home Primes have yet to be found for these composite integers as well. After 49; iterations for the integer 54; we are led to a 83; digit composite duodecimal integer (**107** Digits decimally) such that factoring is extremely difficult. Similarly, after 57; iterations for the integer 68;, we encounter a 79; digit composite duodecimal integer (**100** digits decimally) for which factoring is seemingly intractable. These "forbidden four" represent the only integers for which I have yet to secure the Home Prime. This is in contrast to the decimal base where the integers **49** and **77** in the range **1–100** are such that the Home Prime Conjecture remains unresolved.

Our initial goal is to secure the Home Prime for a duodecimal integer. Let us consider the integer 20;. Our repeated factorings and concatenations are as follows:

HP[20] → (2)(2)(2)(3) → (3)(3)(2XƐ) → (17)(37)(6Ɛ) → (61)(320Ɛ) → (107)(59X5)
→ PRIME 1 075 9X5 (5)

Hence 10759X5 is the Home Prime of 20 achieved in five steps.

Let us contrast this with the Home Prime for the integer **24** in base ten. The iterations are displayed below:

HP[**24**] → (**2**)(**2**)(**2**)(**3**) → (**3**)(**3**)(**13**)(**19**) → PRIME **331319** (**2**)

Note decimally that **331319** (i.e. 13Ɛ89Ɛ;) is the Home Prime of **24** obtained in two steps.

It should similarly be noted that the numeral 6X; in base duo has a seemingly intractable composite integer to factor with regards to securing its Home Prime during step 59; in base twelve. In contrast, the Home Prime is reached in one step when taken as a decimal numeral:

HP[**82**] → (**2**)(**41**) → PRIME **241** (**1**)

In a like manner, when 49 in base ten is taken as the duodecimal numeral 41; the repeated concatenation in securing the Home Prime is delightfully easy. We illustrate the steps below:

HP[41] → (7)(7) → (7)(11) → PRIME 711 (2)

Thus 711; is the Home Prime of 41; achieved in just two steps.

We next demonstrate all the Home Primes for the composite integers no greater than one gross with the exceptions of 54;, 68; and 26; and 6X; which belong to the same family. For the latter integers, the iterations including the step where the process is stalled is duly noted. All integers are duodecimal unless otherwise indicated. At times, a large factor continues to a second line. In such a case, we read the entire integer in parentheses as a factor. For example, in the concatenations related to the integer 26; the last factor in iteration 51; which is

→ (5)(2165360 40Ɛ)(7Ɛ80290X182750Ɛ223Ɛ532X41X7Ɛ1Ɛ30X276712946XX738X7414036-
17605606189242970 64Ɛ180324775)

reads:

7Ɛ80290X182750Ɛ223Ɛ532X41X7Ɛ1Ɛ30X276712946XX738X741403617605606189242970 64Ɛ180324775.

Continued on page 15;

Dozenal Home Primes for Integers up to One Gross

Int	Ct	Home Prime
1	—	—
2	0	2
3	0	3
4	3	737
5	0	5
6	Ɛ	18Ɛ194713227Ɛ
7	0	7
8	2	2111
9	3	575
χ	1	25
Ɛ	0	Ɛ
10	2	3357
11	0	11
12	1	27
13	1	35
14	14	*—See Extended Table Below—*
15	0	15
16	2	391
17	0	17
18	1	225
19	1	37
1χ	2	57
1Ɛ	0	1Ɛ
20	5	10759χ5
21	2	511
22	2	737
23	χ	18Ɛ194713227Ɛ
24	2	Ɛ25
25	0	25
26	*	*—In Progress—*
27	0	27
28	4	7655143Ɛ
29	1	3Ɛ
2χ	4	5237
2Ɛ	1	57
30	3	251345
31	0	31
32	1	217
33	2	575
34	9	8Ɛ57733χ7Ɛ;
35	0	35
36	1	237
37	0	37
38	2	1517
39	2	Ɛ37
3χ	1	21Ɛ
3Ɛ	0	3Ɛ
40	2	33Ɛ321
41	2	711
42	1	255
43	1	315
44	4	22177Ɛ
45	0	45
46	24	*—See Extended Table Below—*
47	1	5Ɛ
48	6	313Ɛ8χƐ5
49	4	χƐ5ƐƐ
4χ	1	225
4Ɛ	0	4Ɛ
50	2	5531
51	0	51
52	2	Ɛ25
53	4	517χ7
54	*	*—In Progress—*
55	1	511
56	1	557
57	0	57
58	1	2215
59	2	5711
5χ	7	1775591
5Ɛ	0	5Ɛ
60	2	3572ƐƐ

Extended Table

Int	Ct	Home Prime
14	14	1Ɛ59χ6773607573390475 35Ɛ15081Ɛ
46	24	3Ɛ175313542χ54749131918477Ɛ0893050181

Dozenal Home Primes for Integers up to One Gross

Int	Ct	Home Prime	Int	Ct	Home Prime
61	0	61	91	0	91
62	6	553533	92	1	25↋
63	↋	1254571591	93	3	5537
64	2	455↋	94	1	22227
65	2	517	95	0	95
66	8	181↋681591	96	1	2317
67	0	67	97	1	51↋
68	*	—*In Progress*—	98	9	8↋57733↊7↋
69	3	435971	99	7	916928↋
6↊	*	—*In Progress*—	9↊	1	24↋
6↋	0	6↋	9↋	10	51↋5↋312349295
70	2	7391	↊0	11	229714587↋0↊584↋
71	3	11↊7	↊1	2	↋11
72	1	237	↊2	1	251
73	1	325	↊3	2	↋37
74	1	222↋	↊4	6	313↋8↊↋5
75	0	75	↊5	4	53↊2↋
76	1	2335	↊6	1	2337
77	1	711	↊7	0	↊7
78	1	221↋	↊8	2	246↋2↊3↋
79	1	327	↊9	4	517↊7
7↊	2	557	↊↊	5	672↋↋
7↋	1	517	↊↋	0	↊↋
80	10	118135891408816007	↋0	2	15167
81	0	81	↋1	2	1167
82	1	277	↋2	7	1775591
83	1	33↋	↋3	1	3335
84	3	71↊6↋	↋4	1	22215
85	0	85	↋5	0	↋5
86	3	5255↋	↋6	1	231↋
87	0	87	↋7	0	↋7
88	3	77797	↋8	2	3187
89	1	357	↋9	1	33↋
8↊	17	11↋422925562↊983↊5027	↋↊	1	25↋
8↋	0	8↋	↋↋	1	↋11
90	4	57↊1097	100	8	1712221596815

This table lists each duodecimal integer "Int" in red, up to one gross, the Count ("Ct", number of steps) in the second column needed to achieve its corresponding Home Prime in the third column. Note that any prime requires zero steps to reach the Home Prime, namely itself. Visit http://www.Dozenal.org/adjunct/db4b211.pdf to review any new iterations in the process for each of these integers. This document will be updated with regards to 26;, 54;, 68;, and 6↊; if and when we obtain more fruitful results, allowing interested readers to peruse them at leisure.

It is of interest to note that the mapping of a duodecimal integer into its Home Prime is not one-to-one in the sense that different duodecimal integers can possess identical Home Primes and hence belong to the same family. The following is a list of duodecimal integers less than one gross that have the same Home Prime:

4 and 22 → HP = 737	21 and 55 → HP = 511
6 and 23 → HP = 18Ɛ194713227Ɛ	41 and 77 → HP = 711
9 and 33 → HP = 575	5X and Ɛ2 → HP = 11775591
1X and 2Ɛ → HP = 57	65 and 7Ɛ → HP = 517

X1 and ƐƐ → HP = Ɛ11

Pseudocode

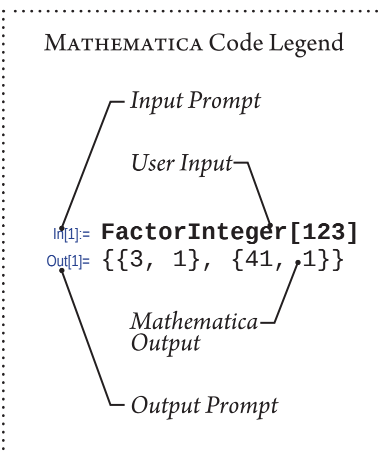
We next furnish an illustration of pseudocode to furnish the Home Prime of a composite integer as well as discuss the role a CAS (Computer Algebra System) program such as MATHEMATICA handles the task. The CAS program MATHEMATICA, a copyright of Wolfram Research, Inc. enabled me to conduct my searches. In the program, the commands **`IntegerDigits[]`** (to convert a decimal numeral to another base) and **`FromDigits[]`**(to covert a numeral in a different base to base ten) are utilized as well as **`FactorInteger[]`** to resolve an integer into its standard prime factored form. A sample problem follows below in which we secure the Home Prime in Base Twelve for the duodecimal integer X3 (**123**). We note that since the computer does not perform duodecimal arithmetic, it necessitates one to keep moving back and forth between duodecimals and decimals. The following is an example of pseudocode to secure the Home Prime of X3:

STEP 1: Express X3 in decimal	→ **123**
STEP 2: Factor **123**	→ **(3)(41)**
STEP 3: Express the factors in duodecimal	→ (3)(35)
STEP 4: Express 335 in decimal	→ **473**
STEP 5: Factor **473**	→ **(11)(43)**
STEP 6: Express the factors in duodecimal	→ (Ɛ)(37)
STEP 7: Express Ɛ37 in decimal	→ **1627**
STEP 8: Factor **1627**	→ **1627** IS PRIME

Therefore, HP(X3) = Ɛ37

In MATHEMATICA, the code is as follows:

```
In[1]:= FactorInteger[123]
Out[1]= {{3, 1}, {41, 1}}

In[2]:= IntegerDigits[{3, 41}, 12]
Out[2]= {{3}, {3, 5}}

In[3]:= FromDigits[{3, 3, 5}, 12]
Out[3]= 473

In[4]:= FactorInteger[473]
Out[4]= {{11, 1}, {43, 1}}

In[5]:= IntegerDigits[{11, 43}, 12]
Out[5]= {{11}, {3, 7}}

In[6]:= FromDigits[{11, 3, 7}, 12]
Out[6]= 1627

In[7]:= FactorInteger[1627]
Out[7]= {{1627, 1}}
```



Mathworld, a Wolfram Resource managed by Dr. Eric Weisstein of Wolfram Research, Inc. is an excellent source for everything mathematical and scientific, including a paragraph on our society found under the letter "D" obtainable in the alphabetical index on their website, www.mathworld.wolfram.com. Under the letter "H" is Home Prime which accesses a neat article devoted to this mathematical recreation. Contributors to Mathworld are Dr. Eric Weisstein as well as numerous mathematicians throughout the world. While Home Primes in bases up to ten have been investigated, there is nothing dealing with bases higher than ten which led me to initiate my research. I would be grateful if anyone can eventually factor the large composite integer that has stalled my search in securing the common duodecimal Home Prime for the duodecimal integers 26; and 6Ӿ; as they both belong to the same family.

REFERENCES:

1. Heleen, Jeffrey, "Family Numbers: Constructing Primes by Prime Factor Splitting", *The Journal of Recreational Mathematics*, 24; (**28.**), P. 98;-9Ɛ; (P. **116.–119.**), 11Ӿ4–Ӿ5; (**1996–97.**)
2. Mathworld—A Wolfram Resource, Wolfram Research, Inc., Champaign, IL. 11Ɛ6; (**2010.**)
3. "Home Prime", retrievable in November 11Ɛ6; (**2010.**) at http://mathworld.wolfram.com/HomePrime.html
4. "Duodecimal", retrievable in November 11Ɛ6; (**2010.**) at http://mathworld.wolfram.com/Duodecimal.html

Iterations of The Home Primes for all composite integers through 100; (144.):

4 → (2)(2) → (2)(11) → (7)(37) → PRIME 737 (3).

6 → (2)(3) → (3)(3)(3) → (3)(111) → (7)(7)(91) → (61)(131) → (5)(5)(27)(117)
→ (1Ɛ)(91)(38Ɛ5) → (431)(56Ɛ85) → (7)(7)(7)(15)(3Ɛ)(3Ӿ5)
→ (3Ɛ)(1Ɛ4762657) → (18Ɛ)(1947)(13227Ɛ) → PRIME 18Ɛ194713227Ɛ (Ɛ).

8 → (2)(2)(2) → (2)(111) → PRIME 2111 (2).

9 → (3)(3) → (3)(11) → (5)(75) → PRIME 575 (3).

Ӿ → (2)(5) → PRIME 25 (1).

10 → (2)(2)(3) → (3)(3)(5)(7) → PRIME 3357 (2).

12 → (2)(7) → PRIME 27 (1).

13 → (3)(5) → PRIME 35 (1).

14 → (2)(2)(2)(2) → (2)(5)(11)(25) → (5)(15)(3Ɛ)(107) → (Ɛ)(37)(241)(7ƐƐ)
→ (5)(231532897) → (1Ɛ)(111)(2596375) → (117)(225)(437)(21Ӿ51)
→ (5)(2877833152935) → (7)(8Ɛ62990542 13Ɛ) → (5)(11)(17)(41ӾƐ)(2733379Ɛ)
→ (2047Ӿ41)(2608Ӿ04ӾӾ1Ɛ) → (7)(7)(7)(25)(1521)(9775)(382Ɛ345)
→ (7)(51)(251)(108Ɛ49586ƐӾ3718Ɛ) → (11)(12Ɛ)(4085)(14377578Ɛ4729275)
→ (5)(5)(1Ɛ)(27)(2897)(166Ɛ2ƐӾ85)(37290391Ɛ)
→ (1Ɛ5)(9Ӿ677)(360757)(3390475)(35Ɛ15081Ɛ)
→ PRIME 1Ɛ59Ӿ6773607573390475 35Ɛ15081Ɛ (14).

16 → (2)(3)(3) → (3)(91) → PRIME 391 (2).

18 → (2)(2)(5) → PRIME 225 (1).

19 → (3)(7) → PRIME 37 (1).

1↊ → (2)(↋) → (5)(7) → PRIME 57 (2).

20 → (2)(2)(2)(3) → (3)(3)(2↊↋) → (17)(37)(6↋) → (61)(320↋) → (107)(59↊5)
→ PRIME 10759↊5 (5).

21 → (5)(5) → (5)(11) → PRIME 511 (2).

22 → (2)(11) → (7)(37) → PRIME 737 (2).

23 → (3)(3)(3) → (3)(111) → (7)(7)(91) → (61)(131) → (5)(5)(27)(117)
→ (1↋)(91)(38↋5) → (431)(56↋85) → (7)(7)(7)(15)(3↋)(3↊5)
→ (3↋)(1↋4762657) → (18↋)(1947)(13227↋) → PRIME 18↋194713227↋ (↊).

24 → (2)(2)(7) → (↋)(25) → PRIME ↋25 (2).

26 → (2)(3)(5) → (7)(3↋) → (5)(157) → (45)(11↋) → (↋)(17)(307) → (61)(19↋67)
→ (457)(14471) → (5)(↋)(↋83957) → (195)(343↋2↋) → (7)(15)(21↋3↋71)
→ (7)(15)(905)(↋5387) → (215↋)(342↊0995) → (1↋)(4↋)(4401)(75↊85)
→ (35)(67)(105↊745897) → (↋)(393↋006504↊75) → (1↊7)(60192638↊35↋)
→ (6995)(33↊05453↋07) → (4↋427)(146524↋6↋↊1)
→ (5)(↊9↋5)(11925)(↋570355) → (23147↋)(27418↊0↋6927)
→ (739↋5)(↋↊07↋)(390962↊1) → (5)(11)(4↋)(2337)(228045)(79↋225)
→ (125)(32765)(139790691386085) → (7)(11)(11)(255)(7477)(11↋8↊774↋16281)
→ (1796↋)(↊11↊1)(513747↋72687↋266↋) → (8↋64071)(2261↋↋791↋036970651↋)
→ (4↋)(95)(12497963↋7)(1↋28383648↋957↋)
→ (7)(85)(1021591656862↊5551452779831)
→ (5)(4071)(146↋5)(5↋4↋↋)(67↋4650626343390↋)
→ (17)(33↋)(12↊1)(173297)(78↊2171)(95↋782↊311481)
→ (5)(13↋)(35↋)(6↋354327)(153219311↊31030156934↋)
→ (5)(5)(15)(↋5)(↋↋4894137↋27671↋)(19↋250↋3589518551)
→ (6↋)(65977)(3271↋2↋01)(550258↋87↊930150432427↊5)
→ (5)(141)(735)(18650↊4↊509106↋888487228569l3839↊15)
→ (17)(9↋3↋)(31↋251)(2↊↋06791)(50↋↊9423148↊9989↋6714151)
→ (325)(511)(3↊↊659967176↋↊21)(38↊2898308495↊↋509652↊5)
→ (27)(617)(3↊2↋)(14893↋)(20317↋↊3557↋6↋)(282162687554↋900387)
→ (7)(81)(6823↊250572080644↊05597↊8881482↊3071988↊2↋501)
→ (3479↋2↋09052↋)(232417↋39330033↊177396664↊97↋309↋48↋)
→ (5)(5)(51)(202869↋)(1↊99764↋51256↋1299↊35↊8201854527489↋↊761)
→ (507)(214↋5)(1590282717)(417812↋0↊02↋0852↊229186↊49960588↊25)
→ (66↋18854910554525)(92682694839↊31490082873↋↊8306↋72↊101)
→ (81)(13↋)(7↋711)(3039114↊↋54↋063514↊55↋)(37↋86↋274↊2↊0↊44493↋↋11)
→ (45389↋)(19↊383↋↋603↋13247↊001767↋8997343951↊805374↊7↋↊120↋)
→ (5)(45)(1245)(1947)(18265094877)(808↋0↋1425407153464489↋2↋864331259957)
→ (3↋)(228↋45)(29↋8↊15↋↋↋5)(↊↊↊764557447)(858↋5416224↊5)(4085088241↊↊↋1↊17)
→ (11)(31)(4↋)(557)(721)(1↊23↋)(351↊8↋↋90623↋188741)
(17↋6814844226↊09↊1↊↋502397071)
→ (15)(29684643↋)(1934956871)(18545357↊74130↊018↋7)
(113588↋809↋53↊1778389956591)
→ (11)(2↋67)(9616840617697)(2049214414373850↊1485↊035)
(33↋↊5↋↋↊↋69↊743571↊↊6↊75↊5)
→ (427)(1921)(↋78877)(308↋3241)(1↊↋95156↋1371677)
(390↊2454↊93525593↊19↋2671↊0↊5509↋6↋)
→ (113512051)
(3984↊1↋↊014518↋8↋25873741186395203↋50↊791534980↊112180553801↋↋↋↋)
→ (5)(177↊9↊9↊28070901)(242↋6513459202439↋↊037)
(83280598↊6↊95245↋57603742341785↊461)
→ (7)(1↋)(771)(↊45)(4↊91)

(1872899089Ɛ11X95XƐƐƐ72390189580Ɛ8522530723ƐƐ14X0384Ɛ1Ɛ55802Ɛ0Ɛ1)
→ (1X617427)(19X0477Ɛ5X050541791)
(21226Ɛ12X739941XX9701976X210599534976702Ɛ27194X6387)
→ (51)(1Ɛ7)(531)(617)(59Ɛ6Ɛ)(Ɛ18Ɛ85545)
(1X380301148111844636012444468 73X04056Ɛ328X24265078X6621)
→ (5Ɛ)(8Ɛ)(12Ɛ)(1Ɛ0Ɛ1)(Ɛ4061360X4Ɛ18162Ɛ67)
(61Ɛ0X95718Ɛ4436Ɛ885375029Ɛ48025576X95X09Ɛ2709001365)
→ (7)(1011)(8235)(734887)(709781X7)(46Ɛ13053650ƐƐƐX61)
(913Ɛ153407X260129393Ɛ78277132102740119887367)
→ (497)(68Ɛ5XXX34555333676768XX4Ɛ9X515817)
(276152ƐXX03275211X1XX60690130ƐX922023543622XƐ5947)
→ (17)(111)(16Ɛ)(3Ɛ7)(5Ɛ91)(7841)(1328590Ɛ)(X4X733727560X593420765)
(13233138213Ɛ97571Ɛ20X479ƐƐ37868X082682 84Ɛ)
→ (45)(603601756X5)(42ƐƐ216Ɛ347Ɛ136765997)
(203918584793Ɛ4890504877Ɛ4116423Ɛ92180337610X634717944 22Ɛ5)
→ (1Ɛ)(131)(X35)(8XƐ19X41028X38Ɛ5Ɛ)
(2XX8X47234Ɛ85Ɛ615X94Ɛ4579162578755 4X1781072531Ɛ1XX412176Ɛ8781X986X91)
→ (709Ɛ347)(21196575)(1X9ƐƐ0850000 50Ɛ8Ɛ6191)
(9X040X763675Ɛ87104857600596463415 5ƐX15X55284732Ɛ441Ɛ2172ƐƐ)
→ (5)(216536040Ɛ)(7Ɛ80290X182750Ɛ223Ɛ532X41X7Ɛ1Ɛ30X276712946XX738X7414036-
17605606189242970 64Ɛ180324775)
→ (7)(277)(4XƐ45Ɛ7)(14240XX1)(XƐ1XX9208Ɛ127)(2415806Ɛ001275ƐƐ)
(2X393611123X992597910ƐXƐ32X14Ɛ748368675X5276274127)
→ (17)(255)(Ɛ7X7)(122X1ƐƐƐXƐ)(909Ɛ959944 94Ɛ)(6Ɛ910Ɛ31Ɛ51051706Ɛ)
(3808141ƐƐ4074627557X761295X494049Ɛ041053161598399X1)
→ COMPOSITE 17255Ɛ7X7122X1ƐƐƐXƐ909Ɛ959944 94Ɛ6Ɛ910Ɛ31Ɛ51051706Ɛ3808141ƐƐ4-
074627557X761295X494049Ɛ041053161598399X1 (54).

28 → (2)(2)(2)(2)(2) → (2)(11111) → (5)(15)(3661) → (7)(655)(143Ɛ) → PRIME 765 5143Ɛ (4).

29 → (3)(Ɛ) → PRIME 3Ɛ (1).

2X → (2)(15) → (5)(51) → (Ɛ)(5Ɛ) → (5)(237) → PRIME 5237 (4).

2Ɛ → (5)(7) → PRIME 57 (1).

30 → (2)(2)(3)(3) → (3)(11)(81) → (25)(1345) → PRIME 251345 (3).

32 → (2)(17) → PRIME 217 (1).

33 → (3)(11) → (5)(75) → PRIME 575 (2).

34 → (2)(2)(2)(5) → (7)(7)(7)(Ɛ) → (57)(145) → (Ɛ)(11)(577) → (X87)(1051)
→ (186Ɛ)(62ƐƐ) → (17)(841)(1685) → (11XƐ)(14ƐX87) → (8Ɛ)(577)(33X7Ɛ)
→ PRIME 8Ɛ57733X7Ɛ (9).

36 → (2)(3)(7) → PRIME 237 (1).

38 → (2)(2)(Ɛ) → (15)(17) → PRIME 1517 (2).

39 → (3)(3)(5) → (Ɛ)(37) → PRIME Ɛ37 (2).

3X → (2)(1Ɛ) → PRIME 21Ɛ (1).

40 → (2)(2)(2)(2)(3) → (3)(3)(Ɛ)(321) → PRIME 33Ɛ321 (2).

41 → (7)(7) → (7)(11) → PRIME 711 (2).

42 → (2)(5)(5) → PRIME 255 (1).

43 → (3)(15) → PRIME 315 (1).

44 → (2)(2)(11) → (11)(15)(15) → (147)(95Ɛ) → (221)(77Ɛ) → PRIME 22177Ɛ (4).

46 → (2)(3)(3)(3) → (3)(7)(Ɛ)(15) → (5)(15)(17)(3Ɛ) → (5)(Ɛ)(17)(856Ɛ)
→ (5)(5)(2X18Ɛ8Ɛ) → (31)(191X8ƐƐƐ) → (5)(37)(117)(1X417) → (5)(5)(26635104Ɛ7)
→ (7)(Ɛ)(1Ɛ)(61)(X562021) → (63997)(1308Ɛ4617)
→ (7)(7)(7)(37)(7X1)(11719047) → (5)(95)(1Ɛ4214945067Ɛ7)
→ (175)(129725)(2X95ƐX1467) → (6Ɛ597)(2960Ɛ360965631)
→ (5)(7)(X4Ɛ)(5835)(113X1)(5282945) → (619075)(Ɛ387XƐƐ)(Ɛ870X22Ɛ)
→ (11)(11)(52X1639510862Ɛ6654Ɛ) → (7)(145)(21X85)(4588425)(1846Ɛ37X1)
→ (5)(47XX671)(37Ɛ892X3X65X055X55) → (7)(57)(785)(927042Ɛ57)(343445334097)
→ (5)(15Ɛ165Ɛ53980711557X5830801Ɛ) → (14Ɛ5)(2395)(169743X1341466X6017X7Ɛ)
→ (8966964Ɛ315)(1Ɛ16694943803478227)
→ (545)(5XƐ47)(27X9X5)(13017343292450X3X1)
→ (1338Ɛ)(18Ɛ5891)(24Ɛ143800X255X9727241Ɛ)
→ (25)(87)(111)(8762Ɛ141)(Ɛ375223038045 8X27321)
→ (25)(35)(61)(Ɛ527)(7549ƐX2813197219X47X9Ɛ3257)
→ (3Ɛ)(175313542X5)(474913191847 7Ɛ0893050181)
→ prime 3Ɛ175313542X5474913191847 7Ɛ0893050181 (24).

47 → (5)(Ɛ) → prime 5Ɛ (1).

48 → (2)(2)(2)(7) → (5)(5)(107) → (3Ɛ)(1475) → (5)(31)(3081) → (8Ɛ7)(7057)
→ (31)(3Ɛ)(8XƐ5) → prime 313Ɛ8XƐ5 (6).

49 → (3)(17) → (Ɛ)(35) → (5)(5)(5)(11) → (XƐ)(5ƐƐ) → prime XƐ5ƐƐ (4).

4X → (2)(25) → prime 225 (1).

50 → (2)(2)(3)(5) → (5)(531) → prime 5531 (2).

52 → (2)(27) → (Ɛ)(25) → prime Ɛ25 (2).

53 → (3)(3)(7) → (5)(5)(17) → (6Ɛ)(95) → (5)(17)(X7) → prime 517X7 (4).

54 → (2)(2)(2)(2)(2)(2) → (2)(7)(11)(17)(111) → (11)(29Ɛ0189Ɛ) → (3Ɛ)(2X510361)
→ (82Ɛ)(X77)(6575) → (7)(15)(17)(637X371) → (27)(87)(347)(1180637)
→ (5)(61)(Ɛ31)(11409Ɛ04Ɛ) → (7)(11)(X27)(28607)(394X35)
→ (11)(17Ɛ)(3Ɛ4396X0172Ɛ97) → (85)(17073Ɛ)(Ɛ97106838X1)
→ (3X67)(64ƐX1)(40922607627) → (15)(95)(2X865)(XƐ455Ɛ)(13X5051)
→ (7)(131)(511)(57X55)(X13Ɛ891658Ɛ) → (4XX2225)(7ƐX46Ɛ1)(22146Ɛ9237)
→ (5)(Ɛ)(37)(61241)(1666ƐƐ)(46887X633Ɛ5) → (577)(14ƐX3Ɛ5)(8Ɛ39183X481XƐ5717)
→ (15)(5Ɛ)(19X71)(2897Ɛ)(174Ɛ35Ɛ7ƐƐ74097Ɛ)
→ (75)(13Ɛ)(34Ɛ9325)(62Ɛ9989013630X5ƐƐ91)
→ (669225)(116XƐ6951096371623Ɛ6527395)
→ (7)(Ɛ)(61)(705)(42Ɛ467)(76211842Ɛ)(13651741XX91)
→ (7)(8Ɛ)(164426X1Ɛ30539106219Ɛ69Ɛ5Ɛ1Ɛ1795)
→ (35)(5ƐƐ095)(3103481)(Ɛ187931)(1700Ɛ8229168Ɛ45)
→ (11)(81)(293435)(1129X7014X31)(16712629Ɛ133XXƐ051)
→ (5)(5)(51)(1Ɛ97267)(123227028668Ɛ)(66X4854482357X3Ɛ85)
→ (11)(6738790715)(917998278006461 85X52441821Ɛ27X1)
→ (15)(90Ɛ)(4384047)(X725320104Ɛ0Ɛ)(33X6711654XƐ766025Ɛ)
→ (6X7)(2010Ɛ)(76027Ɛ92687ƐX527)(208099011950Ɛ671X2931)
→ (Ɛ)(15)(105)(1727)(377945706302Ɛ)(X67902Ɛ3Ɛ9X4842X974411567)
→ (8Ɛ)(X3018X928X0699689Ɛ98661)(1562448985151Ɛ81Ɛ0617785)
→ (5)(84809Ɛ)(26X3080ƐXƐ6134Ɛ31X612Ɛ2Ɛ848Ɛ809XƐX58955689Ɛ)
→ (75)(XƐ)(655)(16Ɛ25)(93772491)(134Ɛ77615X4984X2XX379961445990X5)
→ (25)(4Ɛ)(949656 55Ɛ)(3X13Ɛ101397175 43Ɛ)(2620547X06Ɛ6Ɛ14Ɛ70Ɛ8834Ɛ)
→ (11)(91)(6827)(10Ɛ639X75)(4Ɛ757336492 63Ɛ506499058 62Ɛ5139301X68ƐƐ1)
→ (95)(665)(8X5137)(80X3Ɛ9Ɛ)(Ɛ01X197)(5X6Ɛ9X4706805Ɛ446Ɛ80Ɛ8Ɛ774Ɛ58ƐƐ)
→ (5)(22Ɛ4423468203ƐX7)(X142X9267Ɛ356465533297X13386704869X22351)
→ (17)(35)(420455)(23Ɛ211035)(59X298X29X187305)(253Ɛ80XX31Ɛ294Ɛ335X8Ɛ7617)

→ (5)(16Ɛ5)(270X58697470X17)(Ɛ39Ɛ974XX6Ɛ50264X7394082001015544I5Ɛ58631)
→ (27)(31)(Ɛ0XƐ)(2875Ɛ971)(408658Ɛ91287707)(230ƐX66745618787)
(40513771312927315)
→ (5)(Ɛ)(11)(4Ɛ1)(75071)(13571Ɛ75Ɛ)(13680574ƐX912387)
(12X292Ɛ8704351828105262XƐƐ069Ɛ7)
→ (31)(1174Ɛ)(6Ɛ1Ɛ0643Ɛ)(3Ɛ29139337227876249XƐ)
(8Ɛ331432106Ɛ1756898243634Ɛ863XƐ15)
→ (Ɛ)(35)(285)(3ƐƐ89Ɛ)(5213699Ɛ)(86472X6Ɛ54X36X4XƐ288797)
(36XƐ358871519X5578862162X8Ɛ71)
→ (214007962X012475)(3Ɛ243X0Ɛ42787814X7X2627)
(14389813Ɛ659789840566943937X82X012Ɛ)
→ (11)(1Ɛ47526Ɛ3657699782Ɛ4XƐ1967Ɛ8X9409X023X84Ɛ4452X5605435440051540359X077293Ɛ)
→ (21746855710095743367)(4X885Ɛ74512912X98Ɛ915076X35)
(131537819292ƐƐ907650X8392Ɛ221)
→ (347)(287678Ɛ81)(3641419Ɛ68Ɛ)(601X79X3Ɛ91)
(16XX2Ɛ78604Ɛ790Ɛ2722Ɛ61280985068511Ɛ14ƐƐ1815)
→ (673Ɛ)(253951XX43ƐƐ)
(26206200ƐX3825485984X2217Ɛ494Ɛ946055XXX07673710197Ɛ446945XXX495)
→ (6Ɛ1)(1447Ɛ)(137557)(42826941211633123X361574235)
(16387Ɛ20241672X05937792636791736XƐ51668Ɛ5)
→ (5)(5)(8Ɛ)(45X7)(2678223901437)
(482216583753939Ɛ80382742964354Ɛ47882Ɛ1013060XƐ1654989ƐX1Ɛ4X3587)
→ (1Ɛ5)(82X197)(101147ƐƐ)(12032X2X1)(1Ɛ45150985)
(194X04ƐX5059167X41548168X5X9XƐ63Ɛ4568XXƐ8275ƐX89785Ɛ)
→ (Ɛ2Ɛ)(2299420417)(3053X710157)(18011442X1855Ɛ8Ɛ04578991Ɛ3X405Ɛ61)
(226X2Ɛ927861335784963X29518759251)
→ (28X1)(5954Ɛ)(166Ɛ8Ɛ095XƐ67)
(5602X32710181Ɛ47063025782X556823X3Ɛ5535573088419885Ɛ28179Ɛ6414Ɛ7895295)
→ (31)(150Ɛ)(657076638107072947)
(11X86629X48Ɛ80914584452921Ɛ59808791546Ɛ93246ƐX95Ɛ73585X36X0134X939X681)
→ (17)(57)(433913487)(182836937764Ɛ215)(2Ɛ3X6131327756XƐ44704Ɛ325)
(2460310Ɛ5X870135717X97222Ɛ11089750469744ƐƐ7)
→ (5)(5)(996Ɛ)(2056035)(Ɛ6X522057317454XƐ)(165171X474112X862X8888447)
(395Ɛ952826X511149754593Ɛ539937X905684Ɛ2X2505)
→ 55996Ɛ2056035Ɛ6X522057317454XƐ165171X474112X862X8888447395Ɛ952826X-
511149754593Ɛ539937X905684Ɛ2X2505 which is COMPOSITE after 48; (**56.**) steps.

55 → (5)(11) → PRIME 511 (1).

56 → (2)(25) → PRIME 225 (1).

58 → (2)(2)(15) → PRIME 2215 (1).

59 → (3)(1Ɛ) → (5)(7)(11) → (17)(37) → (7)(291) → (11)(27)(27) → (45)(2ƐXƐ)
→ PRIME 452ƐXƐ (6).

5X → (2)(5)(7) → (5)(5Ɛ) → (7)(95) → (17)(4Ɛ) → (5)(11)(37) → (5)(7)(7)(2ƐƐ)
→ (17)(75)(591) → PRIME 452ƐXƐ (6).

60 → (2)(2)(2)(3)(3) → (3)(5)(7)(2ƐƐ) → PRIME 3572ƐƐ (2).

62 → (2)(31) → (5)(5)(11) → (7)(11)(87) → (11Ɛ)(615)→ (7)(1ƐƐ1Ɛ)
→ (5)(5)(3533Ɛ) → PRIME 553533Ɛ (6).

63 → (3)(5)(5) → (7)(5Ɛ) → (11)(6Ɛ) → (5)(15)(1Ɛ) → (85)(737) → (17)(5421)
→ (5)(5)(X7)(X7) → (5)(Ɛ)(12461) → PRIME 5Ɛ12461 (8).

64 → (2)(2)(17) → (45)(5Ɛ) → PRIME 455Ɛ (2).

65 → (7)(Ɛ) → (5)(17) → PRIME 517 (2).

66 → (2)(3)(11) → (33)(6Ɛ) → (11)(15)(27) → (117)(Ɛ71) → (2Ɛ1)(481) → (7)(15)(25)(157)
→ (Ɛ)(27)(31)(Ɛ84Ɛ) → (181Ɛ)(681591) → prime 181Ɛ681591 (8).

68 → (2)(2)(2)(2)(5) → (5)(52X1) → (Ɛ7)(577) → (7)(17Ɛ11) → (17)(46127) → (5)(3X602Ɛ)
→ (7)(7)(397)(415) → (31)(37)(8321Ɛ) → (5)(2745)(2X2ƐƐ) → (27)(1Ɛ7Ɛ)(103627)
→ (11)(15)(87)(24480625) → (5)(111)(24X794X7091) → (31)(179919064ƐƐ661)
→ (94X1)(3Ɛ4868619581) → (5)(15)(45)(11020X5)(33XƐ011)
→ (75)(9X4407)(X0Ɛ583X136Ɛ) → (45)(361Ɛ3481)(5956229047)
→ (5)(7)(211690Ɛ)(88849X314487) → (15)(1771047911)(25065X8Ɛ42Ɛ)
→ (111)(30Ɛ)(9380Ɛ)(6707X6032Ɛ71Ɛ) > (287Ɛ)(49944000042Ɛ06XX3161)
→ (25)(87)(16X8Ɛ4952401449ƐƐ7X8Ɛ) → (25)(2121X57)(5X3X3912333545X91)
→ (5)(Ɛ)(61)(3X5)(32Ɛ5506476580XX84XƐƐ)
→ (Ɛ141261)(235545671)(29908166110Ɛ)
→ (15)(45)(95)(105)(8X997575)(2Ɛ4708950Ɛ2077)
→ (X7)(8Ɛ67161Ɛ)(22460X0XX4X869Ɛ94036Ɛ)
→ (25)(27)(3Ɛ)(217)(4XƐ55)(16Ɛ005)(104220Ɛ)(383408457)
→ (15)(2893X86XX1)(357Ɛ9056641)(2211X5499X8X10Ɛ)
→ (485)(8616733663X072411)(520003463836880137)
→ (31)(105)(45Ɛ)(25657)(1725880Ɛ01ƐXƐX6Ɛ963303702447)
→ (1185)(247Ɛ)(899XƐ)(780090X2281)(24Ɛ6X2173542826Ɛ25Ɛ)
→ (6Ɛ)(13X8031)(15Ɛ5572614X61897691577 64Ɛ9X42217XX1)
→ (157Ɛ1)(33051)(36117)(455747)(928505)(15407Ɛ3154274X671855)
→ (59872004Ɛ7021X6147)(30589890XƐ0X482Ɛ587809917609Ɛ)
→ (5)(5)(7)(11)(1947)(17ƐX1046247)(15X14Ɛ6Ɛ0X5X28546080Ɛ04129128X5)
→ (Ɛ)(45)(145)(34X03506Ɛ1)((3591538X021Ɛ3649Ɛ2814Ɛ5Ɛ68101Ɛ008Ɛ497)
→ (7)(1543629ƐX7)(224Ɛ501726Ɛ)(6155Ɛ07916172828X8367277518 87Ɛ135)
→ (33Ɛ5X5)(4X7X75689468575)(Ɛ40397818XƐ150Ɛ) > (56833Ɛ00Ɛ116X8325467)
→ (5)(5)(277987)(73315944X805845948244740779141663 21XX0ƐX400397781)
→ (3X58897125Ɛ270175)(14X0X0267XX8152755566X9Ɛ3089Ɛ351057457XƐ5)
→ (2741)(1Ɛ054527577)(480551Ɛ58X34X343Ɛ705)(1Ɛ9X1X61Ɛ2X47X8Ɛ0565809X7)
→ (37618587)(5921X8932721)(7X88917710Ɛ05)(234252X56177841Ɛ1193XX331X25)
→ (5)(11)(1711)(15ƐƐ930351)(344959X4755X64981Ɛ3Ɛ41X7607Ɛ8142456333430XƐ7031)
→ (28665)(56X43321Ɛ)(1886604Ɛ8X92X17442217)(2413819X84X80X5X45976Ɛ242X11471)
→ (11)(17)(81)(375585343852 5X665)(3XX37665Ɛ3687X1054899Ɛ)
(1ƐX9Ɛ35136746Ɛ25572157X1)
→ (25)(55291943Ɛ071978X52028562016028302945 9Ɛ4374592095430X57357507 2891X25)
→ (2Ɛ0Ɛ)(4975)(113997794025265)(37200838746935456271 46Ɛ)
(638376954755467178Ɛ7X0775)
→ (5)(7)(45)(8XƐ)(234Ɛ)(1374Ɛ)(3X332690X0Ɛ6075)(1183831216X7924Ɛ0924Ɛ)
(344677444Ɛ33X3Ɛ00830107)
→ (1Ɛ)(25)(2Ɛ975466XX10495)
(4X6062372766 5007X5992584ƐX85X077Ɛ560X8188Ɛ8802Ɛ988672Ɛ1805)
→ (Ɛ)(Ɛ)(Ɛ)(11)(252Ɛ7)(167765)
(741XX6234Ɛ5128522309898 2X80X9735710827961956 46Ɛ13X03596202XƐƐ65)
→ (271)(153308X77Ɛ97)(5ƐX7867805X5Ɛ)
(653Ɛ92X4426457X5Ɛ7981661452Ɛ2Ɛ5X5Ɛ02275526848661 61371)
→ (7)(Ɛ)(35)(35)(251)(6807)(355XƐ)
(109Ɛ8707900283571Ɛ9259X822835896353795496 95X44Ɛ64X49Ɛ7892X714X8621)
→ (5)(2118335)(1Ɛ7X39261)(1174673Ɛ251Ɛ)(713X437973845)
(6X454541Ɛ188X2X49X0982Ɛ9Ɛ4Ɛ3X48Ɛ0X639Ɛ9055X07)
→ (5)(5)(35)(2485)(22523530X106972112594 4Ɛ0X5)
(17X530438X65X3039543473X62439X7Ɛ7128Ɛ9553Ɛ94201586 4Ɛ35Ɛ)
→ 3Ɛ4554523X52XƐ201079Ɛ5X8Ɛ0336112Ɛ87083XXX992564872335 5X3379341X517580
X2408 984230800778288 2365 → composite (49).

69 → (3)(3)(3)(3) → (3)(5)(11)(25) → (435)(971) → PRIME 435971 (3).

6Ӿ → (2)(35) → (7)(3Ɛ) → continues as in HP[26]. We arrive at the integer 17255Ɛ7Ӿ7122Ӿ1ƐƐ-ƐӾƐ909Ɛ95994494Ɛ6Ɛ910Ɛ31Ɛ51051706Ɛ3808141ƐƐ4074627557Ӿ761295Ӿ494049Ɛ0410-53161598399Ӿ1 which is COMPOSITE after 54; (**64.**) steps.

70 → (2)(2)(3)(7) → (7)(391) → PRIME 7391 (2).

71 → (5)(15) → (Ɛ)(57) → (11)(Ӿ7) → PRIME 11Ӿ7 (3).

72 → (2)(37) → PRIME 237 (1).

73 → (3)(25) → PRIME 325 (1).

74 → (2)(2)(2)(Ɛ) → PRIME 222Ɛ (1).

76 → (2)(3)(3)(5) → PRIME 2335 (1).

77 → (7)(11) → PRIME 711 (1).

78 → (2)(2)(1Ɛ) → PRIME 221Ɛ (1).

79 → (3)(27) → PRIME 327 (1).

7Ӿ → (2)(3Ɛ) → (5)(57) → PRIME 557 (2).

7Ɛ → (5)(17) → PRIME 517 (1).

80 → (2)(2)(2)(2)(2)(3) → (3)(3)(12Ɛ)(241) → (5)(5)(307)(61Ӿ7) → (Ɛ)(5Ɛ22Ӿ465)
→ (1Ɛ)(Ɛ7)(1Ɛ1)(3291) → (25)(169Ɛ)(63Ӿ307) → (1Ӿ3451)(1383317)
→ (7)(25)(35)(47615Ɛ941) → (17)(18Ɛ)(273Ӿ262Ӿ795) → (7)(4Ɛ)(681309Ӿ5Ɛ3871)
→ (Ӿ37)(877Ɛ0Ӿ3712567) → (11)(81)(35891)(408816007)
→ PRIME 118135891408816007 (10).

82 → (2)(7)(7) → PRIME 277 (1).

83 → (3)(3)(Ɛ) → PRIME 33Ɛ (1).

84 → (2)(2)(5)(5) → (11)(205) → (7)(1Ӿ6Ɛ) → PRIME 71Ӿ6Ɛ (3).

86 → (2)(3)(15) → (5)(Ɛ)(5Ɛ) → (5)(25)(5Ɛ) → PRIME 5255Ɛ (3).

88 → (2)(2)(2)(11) → (22)(Ӿ17) → (7)(7)(797) → PRIME 77797 (3).

89 → (3)(5)(7) → PRIME 357 (1).

8Ӿ → (2)(45) → (Ɛ)(27) → (5)(15)(17) → (12Ɛ)(415) → (5)(2ƐӾ51) → (315)(1825)
→ (871)(4435) → (7)(17)(93785) → (Ӿ95)(7Ɛ371) → (11)(61)(177901) → (771)(1943251)
→ (35)(Ӿ4Ɛ)(2689Ӿ7) → (5)(5)(7)(7)(175)(277)(11Ӿ5) → (1635)(370Ӿ78866Ɛ1)
→ (3Ɛ)(107)(Ӿ4Ɛ07)(51710Ɛ) → (5)(58Ӿ527)(178366Ӿ101)
→ (37)(3Ӿ55)(71Ɛ667)(7Ɛ32Ӿ5) → (7)(30665)(158275)(1466Ӿ3ƐƐ)
→ (11Ɛ4229255)(62Ӿ983Ӿ5027) → PRIME 11Ɛ422925562Ӿ983Ӿ5027 (17).

90 → (2)(2)(3)(3)(3) → (3)(31)(2Ӿ1) → (255)(13Ɛ5) → (5)(7)(Ӿ1097) → PRIME 57Ӿ1097 (4).

92 → (2)(5)(Ɛ) → PRIME 25Ɛ (1).

93 → (3)(31) → (7)(57) → (5)(5)(37) → PRIME 5537 (3).

94 → (2)(2)(2)(2)(7) → PRIME 22227 (1).

96 → (2)(3)(17) → PRIME 2317 (1).

97 → (5)(1Ɛ) → PRIME 51Ɛ (1).

98 → (2)(2)(25) → (7)(7)(7)(Ɛ) → (57)(145) → (Ɛ)(11)(577) → (Ӿ87)(1051)
→ (186Ɛ)(62ƐƐ) → (17)(841)(1685) → (11ӾƐ)(14ƐӾ87) → (8Ɛ)(577)(33Ӿ7Ɛ)
→ PRIME 8Ɛ57733Ӿ7Ɛ (9).

99 → (3)(3)(11) → (11)(301) → (7)(1Ӿ87) → (Ɛ)(87)(ӾƐ) → (75)(16Ɛ7)
→ (5)(159ӾƐƐ) → (91)(6928Ɛ) → PRIME 916928Ɛ (9).

9X → (2)(4Ɛ) → prime 24Ɛ (1).

9Ɛ → (7)(15) → (5)(5)(35) → (7)(15)(67) → (7)(15)(15)(61) → (7)(37)(34X51) → (1Ɛ)(301)(1324Ɛ) → (11)(1956668 5Ɛ) → (7)(37)(67)(Ɛ571X5) → (3Ɛ)(XXƐ)(2073915) → (7)(82Ɛ)(1245)(83X35) → (91)(X1X4394Ɛ065) → (5)(1Ɛ5)(Ɛ312349295) → prime 51Ɛ5Ɛ312349295 (10).

X0 → (2)(2)(2)(3)(5) → (11Ɛ)(1X7) → (11)(15)(90Ɛ) → (75)(19297) → (15)(52Ɛ16Ɛ) → (5)(7)(1Ɛ)(31511Ɛ) → (37)(2X95)(6571) → (5)(5)(Ɛ)(3Ɛ)(5945X1) → (7)(665)(871)(201ƐƐ) → (5)(9X17)(1X0X6481) → (5)(91)(107Ɛ)(155XƐ2X7) → (17)(41097)(X80910087) → (2297145)(87Ɛ0X584Ɛ) → prime 229714587Ɛ0X584Ɛ (11).

X1 → (Ɛ)(Ɛ) → (Ɛ)(11) → prime Ɛ11 (2).

X2 → (2)(51) → prime 251 (1).

X3 → (3)(35) → (Ɛ)(37) → prime Ɛ37 (2).

X4 → (2)(2)(27) → (5)(5)(107) → (3Ɛ)(1475) → (5)(31)(3081) → (8Ɛ7)(7057) → (31)(3Ɛ)(8XƐ5) → prime 313Ɛ8XƐ5 (6).

X5 → (5)(5)(5) → (5)(111) → (17)(327) → (5)(3X2Ɛ) → prime 53X2Ɛ (4).

X6 → (2)(3)(3)(7) → prime 2337 (1).

X8 → (2)(2)(2)(2)(2)(2)(2) → (2)(46Ɛ)(2X3Ɛ) → prime 246Ɛ2X3Ɛ (2).

X9 → (3)(37) → (5)(5)(17) → (6Ɛ)(95) → (5)(17)(X7) → prime 517X7 (4).

XX → (2)(5)(11) → (4Ɛ)(5Ɛ) → (11)(46Ɛ) → (17)(855) → (67)(2ƐƐ) → prime 672ƐƐ (5).

Ɛ0 → (2)(2)(3)(Ɛ) → (15)(167) → prime 15167 (2).

Ɛ1 → (7)(17) → (11)(67) → prime 1167 (2).

Ɛ2 → (2)(57) → (5)(5Ɛ) → (7)(95) → (17)(4Ɛ) → (5)(11)(37) → (5)(7)(7)(2ƐƐ) → (17)(75)(591) → prime 1775591 (7).

Ɛ3 → (3)(3)(3)(5) → prime 3335 (1).

Ɛ4 → (2)(2)(2)(15) → prime 22215 (1).

Ɛ6 → (2)(3)(1Ɛ) → prime 231Ɛ (1).

Ɛ8 → (2)(2)(5)(7) → (31)(87) → prime 3187 (2).

Ɛ9 → (3)(3Ɛ) → prime 33Ɛ (1).

ƐX → (2)(5Ɛ) → prime 25Ɛ (1).

ƐƐ → (Ɛ)(11) → prime Ɛ11 (1).

100 → (2)(2)(2)(2)(3)(3) → (3)(11)(8081) → (Ɛ)(27)(35)(471) → (1Ɛ)(5Ɛ)(ƐX531) → (1Ɛ)(205)(60387) → (5)(37)(21Ɛ1)(7225) → (181)(3200119X5) → (171)(2221)(596815) → prime 1712221596815 (8).

Editor's Note: This data is current as of 27 November 2010.

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