

M71 wheel example

TF example

let  $f=2kp+1$ , wheel size 60 as in prime95.

p 71

$2^p-1$  2.36118E+21 Sqrt (p) = 48.5920E+09

Build the wheel, before further candidate sieving

k	2kp+1	sieve by 3	sieve by 5	1 or 7 mod 8		
1	143	143	143	143	11 x 13	a wheel up to 11 would eliminate this from consideration, as in more-classes mfaktc (960 out of 4620)
2	285					
3	427	427	427			
4	569	569	569	569		
5	711					
6	853	853	853			
7	995	995				
8	1137					
9	1279	1279	1279	1279		
10	1421	1421	1421			
11	1563					
12	1705	1705				
13	1847	1847	1847	1847		
14	1989					
15	2131	2131	2131			
16	2273	2273	2273	2273		
17	2415					
18	2557	2557	2557			
19	2699	2699	2699			
20	2841					
21	2983	2983	2983	2983	19 x 57	light sieving would eliminate this after the wheel
22	3125	3125				
23	3267					
24	3409	3409	3409	3409	7 x 487	a wheel up to 7 would eliminate this from consideration, as in less-classes mfaktc (96 out of 420), or more-classes
25	3551	3551	3551	3551	53 x 67	sieving could eliminate this after the wheel
26	3693					
27	3835	3835				
28	3977	3977	3977	3977	41 x 97	sieving could eliminate this after the wheel
29	4119					
30	4261	4261	4261			
31	4403	4403	4403			
32	4545					
33	4687	4687	4687	4687	43 x 109	sieving could eliminate this after the wheel
34	4829	4829	4829			
35	4971					
36	5113	5113	5113	5113		
37	5255	5255				
38	5397					
39	5539	5539	5539			
40	5681	5681	5681	5681	13 x 19 x 23	light sieving would eliminate this after the wheel
41	5823					
42	5965	5965				
43	6107	6107	6107			
44	6249					

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45	6391	6391	6391	6391	7 x 11 x 83	a wheel up to 7 would eliminate this from consideration, as in less-classes mfaktc (96 out of 420), or more-classes
46	6533	6533	6533			
47	6675					
48	6817	6817	6817	6817	17 x 401	sieving could eliminate this after the wheel
49	6959	6959	6959	6959		
50	7101					
51	7243	7243	7243			
52	7385	7385				
53	7527					
54	7669	7669	7669			
55	7811	7811	7811			
56	7953					
57	8095	8095				
58	8237	8237	8237			
59	8379					
60	8521	8521	8521	8521		

Effectively, since we're only dealing with the odd numbers, the 60 wheel covers a span of 120 p (3 \* 5 \* 8 p).

It weeds out immediately, all but 16 values.

These initial survivors in column E can be saved, and incremented by successive multiples of 120p before sieving those factor candidates.

Wheel size	largest wheel prime	wheel survivors	ratio left	fraction avoided (of odds)	ratio to previous	Usage notes
12	3	4	0.33333	0.66667		?
60	5	16	0.26667	0.73333	1.1000	prime95 etc and example above
420	7	96	0.22857	0.77143	1.0519	mfaktx less-classes
4620	11	960	0.20779	0.79221	1.0269	mfaktx more-classes
60060	13	11520	0.19181	0.80819	1.0202	diminishing or negative returns to greater complexity
1021020	17	184320	0.18053	0.81947	1.0140	" ("classes") (perhaps the tradeoff shifts at very high exponents)