Table 132e: x, y, z and p give z-next & 2PN=CRnext_2CR+y: Exponential Power of 2 + Butterfly Fractal1 + Mersenne Prime Squares

x, y, z and p give z-next & z gives x-next via: Exponential Power of 2 + Butterfly Fractal$_1$ + Mersenne Prime Squares

line #		$2^n = x$	$2^n - 1 = y$	2^{n-1}	$(2^{n-1}) - 1 = z$	$xz = n\sum n$				z_n = z next = xz +y =				MPS	z_n = z next = xz +y = PN + y_n			
	n	x	y = x - 1		z = x + y	xz	yz	xy	exp 2x	variables: x,y,z	variables: x	variables: y	variables: z	z^2	variables: x,y,z	variables: x,y,z $z_{prev} = y$ $z = y_{next}$ $z_{next} = y_{next\text{-}next}$	variables: x,y,z $z_{prev} = y$ $z = y_{next}$ $z_{next} = y_{next\text{-}next}$	variables: x,y,z $z_{prev} = y$ $z = y_{next}$ $z_{next} = y_{next\text{-}next}$
	n	$x = 2^{p-1} = 2^p/2$	$y = 2^{p-1} - 1 = (2^p-2)/2$		$z = Mp = 2^p - 1$	PN	OC	CR	p	PN + y	$2x^2 - 1$	4y+3	2z+1	$2(x^2+y^2)-1$	PN + y	2PN + y = CR + y	2CR + z	CR_{next} + y or z_{prev}
1	1	2	1	1	3	6	3	2	2	7	7	7	7	9	7	3	7	3
2	2	4	3	2	7	28	21	12	3	31	31	15	15	49	31	15	31	15
3	3	8	7	4	15	120	105	56	4	127	127	31	31	225	127	63	127	63
4	4	16	15	8	31	496	465	240	5	511	511	63	63	961	511	255	511	255
5	5	32	31	16	63	2016	1953	992	6	2047	2047	127	127	3969	2047	1023	2047	1023
6	6	64	63	32	127	8128	8001	4032	7	8191	8191	255	255	16129	8191	4095	8191	4095
7	7	128	127	64	255	32640	32385	16256	8	32767	32767	511	511	65025	32767	16383	32767	16383
8	8	256	255	128	511	130816	130305	65280	9	131071	131071	1023	1023	261121	131071	65535	131071	65535
9	9	512	511	256	1023	523776	522753	261632	10	524287	524287	2047	2047	1046529	524287	262143	524287	262143
10	10	1024	1023	512	2047	2096128	2094081	1047552	11	2097151	2097151	4095	4095	4190209	2097151	1048575	2097151	1048575
11	11	2048	2047	1024	4095	8386560	8382465	4192256	12	8388607	8388607	8191	8191	16769025	8388607	4194303	8388607	4194303
12	12	4096	4095	2048	8191	33550336	33542145	16773120	13	33554431	33554431	16383	16383	67092481	33554431	16777215	33554431	16777215
13	13	8192	8191	4096	16383	134209536	134193153	67100672	14	134217727	134217727	32767	32767	268402689	134217727	67108863	134217727	67108863
14	14	16384	16383	8192	32767	536854528	536821761	268419072	15	536870911	536870911	65535	65535	1073676289	536870911	268435455	536870911	268435455
15	15	32768	32767	16384	65535	2147450880	2147385345	1073709056	16	2147483647	2147483647	131071	131071	4294836225	2147483647	1073741823	2147483647	1073741823
16	16	65536	65535	32768	131071	8589869056	8589737985	4294901760	17	8589934591	8589934591	262143	262143	17179607041	8589934591	4294967295	8589934591	4294967295
17	17	131072	131071	65536	262143	34359607296	34359345153	17179738112	18	34359738367	34359738367	524287	524287	68718952449	34359738367	17179869183	34359738367	17179869183
18	18	262144	262143	131072	524287	137438691328	137438167041	68719214592	19	137438953471	137438953471	1048575	1048575	274876858369	137438953471	68719476735	137438953471	68719476735
19	19	524288	524287	262144	1048575	549755289600	549754241025	274877382656	20	549755813887	549755813887	2097151	2097151	1099509530625	549755813887	274877906943	549755813887	274877906943
20	20	1048576	1048575	524288	2097151	2199022206976	2199020109825	1099510579200	21	2199023255551	2199023255551	4194303	4194303	4398042316801	2199023255551	1099511627775	2199023255551	1099511627775
21	21	2097152	2097151	1048576	4194303	8796090925056	8796086730753	4398044413952	22	8796093022207	8796093022207	8388607	8388607	17592177655809	8796093022207	4398046511103	8796093022207	4398046511103
22	22	4194304	4194303	2097152	8388607	35184367894528	35184359505921	17592181850112	23	35184372088831	35184372088831	16777215	16777215	70368727400449	35184372088831	17592186044415	35184372088831	17592186044415
23	23	8388608	8388607	4194304	16777215	140737479966720	140737463189505	70368735789056	24	140737488355327	140737488355327	33554431	33554431	281474943156225	140737488355327	70368744177663	140737488355327	70368744177663
24	24	16777216	16777215	8388608	33554431	562949936644096	562949903089665	281474959933440	25	562949953421311	562949953421311	67108863	67108863	1125899839733761	562949953421311	281474976710655	562949953421311	281474976710655
25	25	33554432	33554431	16777216	67108863	2251799780130816	2251799713021953	1125899873288192	26	2251799813685250	2251799813685250	134217727	134217727	4503599493152769	2251799813685250	1125899906842620	2251799813685250	1125899906842620
26	26	67108864	67108863	33554432	134217727	9007199187632128	9007199053414401	4503599560261632	27	9007199254740990	9007199254740990	268435455	268435455	18014398241046529	9007199254740990	4503599627370500	9007199254740990	4503599627370500
27	27	134217728	134217727	67108864	268435455	36028796884746240	36028796616310785	18014398375264256	28	36028797018964000	36028797018964000	536870911	536870911	72057593501057025	36028797018964000	18014398509482000	36028797018964000	18014398509482000
28	28	268435456	268435455	134217728	536870911	144115187807420416	144115187270549505	72057593769492480	29	144115188075856000	144115188075856000	1073741823	1073741823	288230375077969921	144115188075856000	72057594037927900	144115188075856000	72057594037927900
29	29	536870912	536870911	268435456	1073741823	576460751766552576	576460750692810753	288230375614840832	30	576460752303423000	576460752303423000	2147483647	2147483647	1152921502459363329	576460752303423000	288230376151712000	576460752303423000	288230376151712000
30	30	1073741824	1073741823	536870912	2147483647	2305843008139952128	2305843005992468481	1152921503533105152	31	2305843009213690000	2305843009213690000	4294967295	4294967295	4611686014132420609	2305843009213690000	1152921504606850000	2305843009213690000	1152921504606850000
31	31	2147483648	2147483647	1073741824	4294967295	9223372034707290000	9223372030412320000	4611686016279900000	32	9223372036854775000	9223372036854780000	8589934591	8589934591		9223372036854775000	4611686018427380000	9223372036854775000	4611686018427380000

Table 132e: x, y, z and p give z-next & 2PN=CRnext & 2CR+y: Exponential Power of 2 + Butterfly Fractal1 + Mersenne Prime Squares The next "z" values — shown after the "p" Column — are derived from the values in the Columns before the "p" Column. Computer rounds out. 4y+3 and 2z+1, feeding directly off of the Column values to the far left, generate double the number of container-Mersenne Prime values as compared to the other. The RED Columns—with gradient highlights—shows that the CR (Complement Rectangle) values are intimately related to the relationship between not only "x" and "y" — as CR=xy — but to "z" and "z²". The first and third RED Columns are identical, as PN+y is inserted for comparison. The second and fourth Columns are identical, too. They reveal ONLY Containers. ALL ÷3. The former also has some of the Containers. These are NOT ÷3. Remember that y=x-1=z-x= (Mp-1)/2. While "y" is ALWAYS ÷3 and Mp (>3) is NOT, they share intimate connections, as "y" reveals the "containers" between the z-values. Going back to the LEFT side of this table, note that: $z_{prev} = y$ $z = y_{next}$ $z_{next} = y_{next\text{-}next}$. Parsing this out is key to understanding the fractal nature of the Exponential Power of Two as seen in the Butterfly Fractal 1. The revelation is in the "Containers" and is into these that resonating values of the Mersenne Primes fall. The same 3-7-15-31-63-127-255-511-1023-2047-4095-8191-16383-32767-65535-131071-… running sums (∑) Container values formed by summing up the doubling of numbers can be found alternating between the values in the RED Columns.

Copyright©2022, Reginald Brooks, Brooks Design. All rights reserved.