

Table 132c: x, y, z and p give z-next & z gives x-next via: Exponential Power of 2 + Butterfly Fractal1 + Mersenne Prime Squares

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line #	x, y, z and p give z-next & z gives x-next via: Exponential Power of 2 + Butterfly Fractal1 + Mersenne Prime Squares								z _n = z next = xz + y =										MPS	(2 ⁿ⁻¹) - 1 = z	z + 1 = x-next	z _n = z next = xz + y =		
	n	2 ⁿ = x	2 ⁿ - 1 = y	2 ⁿ⁻¹	(2 ⁿ⁻¹) - 1 = z	xz = nΣn	yz	xy	ex p 2x	variables: x,y,z	variables: x,y,z	variables: x,y	variables: y,z	variables: x	variables: y	variables: y	variables: z	variables: z					variables: z	variables: p
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	2CR + z	x ² +y ² +2y	MPS-2y ²	2x ² - 1	(2y+4)y + 1	4y+3	2z+1	4z+3	8z+7	2(2 ^{2p-2}) - 1	(2 ^p) ² /2 - 1	2(x ² +y ²)-1	z = Mp = 2 ^p - 1	z + 1 = x-next	2x ² - 1
1	1	2	1	1	3	6	3	2	7	7	7	7	7	7	7	7	15	31	7	7	9	3	4	31
2	2	4	3	2	7	28	21	12	31	31	31	31	31	31	15	15	31	63	31	31	49	7	8	127
3	3	8	7	4	15	120	105	56	127	127	127	127	127	127	31	31	63	127	127	127	225	15	16	511
4	4	16	15	8	31	496	465	240	511	511	511	511	511	511	63	63	127	255	511	511	961	31	32	2047
5	5	32	31	16	63	2016	1953	992	2047	2047	2047	2047	2047	2047	127	127	255	511	2047	2047	3969	63	64	8191
6	6	64	63	32	127	8128	8001	4032	8191	8191	8191	8191	8191	8191	255	255	511	1023	8191	8191	16129	127	128	32767
7	7	128	127	64	255	32640	32385	16256	32767	32767	32767	32767	32767	32767	511	511	1023	2047	32767	32767	65025	255	256	131071
8	8	256	255	128	511	130816	130305	65280	131071	131071	131071	131071	131071	131071	1023	1023	2047	4095	131071	131071	261121	511	512	524287
9	9	512	511	256	1023	523776	522753	261632	524287	524287	524287	524287	524287	524287	2047	2047	4095	8191	524287	524287	1046529	1023	1024	2097151
10	10	1024	1023	512	2047	2096128	2094081	1047552	2097151	2097151	2097151	2097151	2097151	2097151	4095	4095	8191	16383	2097151	2097151	4190209	2047	2048	8388607
11	11	2048	2047	1024	4095	8386560	8382465	4192256	8388607	8388607	8388607	8388607	8388607	8388607	8191	8191	16383	32767	8388607	8388607	16769025	4095	4096	33554431
12	12	4096	4095	2048	8191	33550336	33542145	16773120	33554431	33554431	33554431	33554431	33554431	33554431	16383	16383	32767	65535	33554431	33554431	67092481	8191	8192	134217727
13	13	8192	8191	4096	16383	134209536	134193153	67100672	134217727	134217727	134217727	134217727	134217727	134217727	32767	32767	65535	131071	134217727	134217727	268402689	16383	16384	536870911
14	14	16384	16383	8192	32767	536854528	536821761	268419072	536870911	536870911	536870911	536870911	536870911	536870911	65535	65535	131071	262143	536870911	536870911	1073676289	32767	32768	2147483647
15	15	32768	32767	16384	65535	2147450880	2147385345	1073709056	2147483647	2147483647	2147483647	2147483647	2147483647	2147483647	131071	131071	262143	524287	2147483647	2147483647	4294836225	65535	65536	8589934591
16	16	65536	65535	32768	131071	8589869056	8589737985	4294901760	8589934591	8589934591	8589934591	8589934591	8589934591	8589934591	262143	262143	524287	1048575	8589934591	8589934591	17179607041	131071	131072	34359738367
17	17	131072	131071	65536	262143	34359607296	34359345153	17179738112	34359738367	34359738367	34359738367	34359738367	34359738367	34359738367	524287	524287	1048575	2097151	34359738367	34359738367	68718952449	262143	262144	137438953471
18	18	262144	262143	131072	524287	137438691328	137438167041	68719214592	137438953471	137438953471	137438953471	137438953471	137438953471	137438953471	1048575	1048575	2097151	4194303	137438953471	137438953471	274876858369	524287	524288	549755813887
19	19	524288	524287	262144	1048575	549755289600	549754241025	27487382656	549755813887	549755813887	549755813887	549755813887	549755813887	549755813887	2097151	2097151	4194303	8388607	549755813887	549755813887	1099509530625	1048575	1048576	219902325551
20	20	1048576	1048575	524288	2097151	2199022206976	2199020109825	1099510579200	219902325551	219902325551	219902325551	219902325551	219902325551	219902325551	4194303	4194303	8388607	16777215	219902325551	219902325551	4398042316801	2097151	2097152	8796093022207
21	21	2097152	2097151	1048576	4194303	8796090925056	8796086730753	4398044413952	8796093022207	8796093022207	8796093022207	8796093022207	8796093022207	8796093022207	8388607	8388607	16777215	33554431	8796093022207	8796093022207	17592177655809	4194303	4194304	35184372088831
22	22	4194304	4194303	2097152	8388607	35184367894528	35184359505921	17592181850112	35184372088831	35184372088831	35184372088831	35184372088831	35184372088831	35184372088831	16777215	16777215	33554431	67108863	35184372088831	35184372088831	70368727400449	8388607	8388608	140737488355327
23	23	8388608	8388607	4194304	16777215	140737479966720	140737463189505	70368735789056	140737488355327	140737488355327	140737488355327	140737488355327	140737488355327	140737488355327	33554431	33554431	67108863	134217727	140737488355327	140737488355327	281474943166225	16777215	16777216	562949953421311
24	24	16777216	16777215	8388608	33554431	562949936644096	562949903089665	281474959933440	562949953421311	562949953421311	562949953421311	562949953421311	562949953421311	562949953421311	67108863	67108863	134217727	268435455	562949953421311	562949953421311	1125899839733761	33554431	33554432	2251799813685250
25	25	33554432	33554431	16777216	67108863	2251799780130816	2251799713021953	1125899873288192	2251799813685250	2251799813685250	2251799813685250	2251799813685250	2251799813685250	2251799813685250	134217727	134217727	268435455	536870911	2251799813685250	2251799813685250	4503599493152769	67108863	67108864	9007199254740990
26	26	67108864	67108863	33554432	134217727	9007199187632128	9007199053414401	4503599560261632	9007199254740990	9007199254740990	9007199254740990	9007199254740990	9007199254740990	9007199254740990	268435455	268435455	536870911	1073741823	9007199254740990	9007199254740990	18014398241046529	134217727	134217728	36028797018964000
27	27	134217728	134217727	67108864	268435455	36028796884746240	36028796616310785	18014398375264256	3602879701896400	3602879701896400	3602879701896400	3602879701896400	3602879701896400	3602879701896400	536870911	536870911	1073741823	2147483647	3602879701896400	3602879701896400	72057593501057025	268435455	268435456	144115188075856000
28	28	268435456	268435455	134217728	536870911	14411518807585600	144115187270549505	72057593769492480	14411518807585600	14411518807585600	14411518807585600	14411518807585600	14411518807585600	14411518807585600	1073741823	1073741823	2147483647	4294967295	14411518807585600	14411518807585600	288230375077969921	536870911	536870912	576460752303423000
29	29	536870912	536870911	268435456	1073741823	576460751766552576	576460750692810753	288230375614840832	5764607523034230	5764607523034230	5764607523034230	5764607523034230	5764607523034230	5764607523034230	2147483647	2147483647	4294967295	8589934591	5764607523034230	5764607523034230	1152921502459363329	1073741823	1073741824	230584300921369000
30	30	1073741824	1073741823	536870912	2147483647	2305843008139952128	2305843005992468481	1152921503533105152	2305843009213690	2305843009213690	2305843009213690	2305843009213690	2305843009213690	2305843009213690	4294967295	4294967295	8589934591	17179869183	2305843009213690	2305843009213690	4611686014132420609	2147483647	2147483648	922337203685478000
31	31	2147483648	2147483647	1073741824	4294967295	9223372034707290000	922337203412320000	4611686016279900000	9223372036854770	9223372036854770	9223372036854780	9223372036854780	9223372036854780	9223372036854780	8589934591	8589934591	17179869183	34359738367	9223372036854780	9223372036854780	18446744065119600000	4294967295	4294967296	368934881474191000

Table 132c: x, y, z & p give z-next & x-next via: 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 Column—with gradient highlights—shows that taking the previous z-value x 4 and adding 3 to this, gives the z-next values that match those other Columns. The fundamental relationship — xz+y=z-next is actually played out in the PN+y, x²+y² +2y, 4y+3, 2z+1, 4z+3, 8z+7, 16z+15, 32z+31, 64z+63,128x+127,... Columns (the latter 4 not shown). 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. Far-right: Here we see that adding "1" to the current "z" gives x-next. When the x-next values are used to calculate the z-next, we get the last column. STEPS spacing is similar to PN+y... (first 6), upshifted. If z+1=x-next and x-1=y, then it appears that y=z, as x-next - 1=z. What we are seeing is how the simple doubling of numbers (quantities) seen in the Exponential Power of 2 series — forming the Butterfly Fractal 1 — and their running sums, often with ±1, gives rise to the individual parameters of x, y, z, (and p) values having similar, intimate and repeating values. It is the result of the fractals at work! Copyright©2022, Reginald Brooks, Brooks Design. All rights reserved.