

Table 132a: x, y, z and p give z-next via: Exponential Power of 2 + Butterfly Fractal<sub>1</sub> + Mersenne Prime Squares

x, y, z and p give z-next via: Exponential Power of 2 + Butterfly Fractal <sub>1</sub> + Mersenne Prime Squares																					
line #	$2^n = x$	$2^n - 1 = y$	$2^{n-1}$	$(2^{n-1}) - 1 = z$	$xz = n \sum n$				$z_n = z \text{ next} = xz + y =$											MPS	
n	x	y = x - 1		z = x + y	xz	yz	xy	exp 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	variables: p	$z^2$
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 <sup>2</sup>	2x <sup>2</sup> - 1	(2y+4)y + 1	4y+3	2z+1	4z+3	8z+7	$2(2^{2p-2}) - 1$	$(2^p)^2/2 - 1$	$2(x^2+y^2)-1$
1	1	2	1	1	3	6	3	2	7	7	7	7	7	7	7	7	15	31	7	7	9
2	2	4	3	2	7	28	21	3	31	31	31	31	31	31	15	15	31	63	31	31	49
3	3	8	7	4	15	120	105	4	127	127	127	127	127	127	31	31	63	127	127	127	225
4	4	16	15	8	31	496	465	5	511	511	511	511	511	511	63	63	127	255	511	511	961
5	5	32	31	16	63	2016	1953	6	2047	2047	2047	2047	2047	2047	127	127	255	511	2047	2047	3969
6	6	64	63	32	127	8128	8001	7	8191	8191	8191	8191	8191	8191	255	255	511	1023	8191	8191	16129
7	7	128	127	64	255	32640	32385	8	32767	32767	32767	32767	32767	32767	511	511	1023	2047	32767	32767	65025
8	8	256	255	128	511	130816	130305	9	131071	131071	131071	131071	131071	131071	1023	1023	2047	4095	131071	131071	261121
9	9	512	511	256	1023	523776	522753	10	524287	524287	524287	524287	524287	524287	2047	2047	4095	8191	524287	524287	1046529
10	10	1024	1023	512	2047	2096128	2094081	11	2097151	2097151	2097151	2097151	2097151	2097151	4095	4095	8191	16383	2097151	2097151	4190209
11	11	2048	2047	1024	4095	8386560	8382465	12	8388607	8388607	8388607	8388607	8388607	8388607	8191	8191	16383	32767	8388607	8388607	16769025
12	12	4096	4095	2048	8191	33550336	33542145	13	33554431	33554431	33554431	33554431	33554431	33554431	16383	16383	32767	65535	33554431	33554431	67092481
13	13	8192	8191	4096	16383	134209536	134193153	14	134217727	134217727	134217727	134217727	134217727	134217727	32767	32767	65535	131071	134217727	134217727	268402689
14	14	16384	16383	8192	32767	536854528	536821761	15	536870911	536870911	536870911	536870911	536870911	536870911	65535	65535	131071	262143	536870911	536870911	1073676289
15	15	32768	32767	16384	65535	2147450880	2147385345	16	2147483647	2147483647	2147483647	2147483647	2147483647	2147483647	131071	131071	262143	524287	2147483647	2147483647	4294836225
16	16	65536	65535	32768	131071	8589869056	8589737985	17	8589934591	8589934591	8589934591	8589934591	8589934591	8589934591	262143	262143	524287	1048575	8589934591	8589934591	17179607041
17	17	131072	131071	65536	262143	34359607296	34359345153	18	34359738367	34359738367	34359738367	34359738367	34359738367	34359738367	524287	524287	1048575	2097151	34359738367	34359738367	68718952449
18	18	262144	262143	131072	524287	137438691328	137438167041	19	137438953471	137438953471	137438953471	137438953471	137438953471	137438953471	1048575	1048575	2097151	4194303	137438953471	137438953471	274876858369
19	19	524288	524287	262144	1048575	549755289600	549754241025	20	549755813887	549755813887	549755813887	549755813887	549755813887	549755813887	2097151	2097151	4194303	8388607	549755813887	549755813887	1099509530625
20	20	1048576	1048575	524288	2097151	2199022206976	2199020109825	21	2199023255551	2199023255551	2199023255551	2199023255551	2199023255551	2199023255551	4194303	4194303	8388607	16777215	2199023255551	2199023255551	4398042316801
21	21	2097152	2097151	1048576	4194303	8796090925056	8796086730753	22	8796093022207	8796093022207	8796093022207	8796093022207	8796093022207	8796093022207	8388607	8388607	16777215	33554431	8796093022207	8796093022207	17592177655809
22	22	4194304	4194303	2097152	8388607	35184367894528	35184359505921	23	35184372088831	35184372088831	35184372088831	35184372088831	35184372088831	35184372088831	16777215	16777215	33554431	67108863	35184372088831	35184372088831	70368727400449
23	23	8388608	8388607	4194304	16777215	140737479966720	140737463169505	24	140737488355327	140737488355327	140737488355327	140737488355327	140737488355327	140737488355327	33554431	33554431	67108863	134217727	140737488355327	140737488355327	281474943156225
24	24	16777216	16777215	8388608	33554431	562949936644096	562948903089665	25	562949953421311	562949953421311	562949953421311	562949953421311	562949953421311	562949953421311	67108863	67108863	134217727	268435455	562949953421311	562949953421311	1125899839733761
25	25	33554432	33554431	16777216	67108863	2251799780130816	2251799713021953	26	2251799813685250	2251799813685250	2251799813685250	2251799813685250	2251799813685250	2251799813685250	134217727	134217727	268435455	536870911	2251799813685250	2251799813685250	4503599493152769
26	26	67108864	67108863	33554432	134217727	9007199187632128	9007199053414401	27	9007199254740990	9007199254740990	9007199254740990	9007199254740990	9007199254740990	9007199254740990	268435455	268435455	536870911	1073741823	9007199254740990	9007199254740990	18014398241046529
27	27	134217728	134217727	67108864	268435455	36028796884746240	36028796616310785	28	36028797018964000	36028797018964000	36028797018964000	36028797018964000	36028797018964000	36028797018964000	536870911	536870911	1073741823	2147483647	36028797018964000	36028797018964000	72057593501057025
28	28	268435456	268435455	134217728	536870911	144115187607420416	144115187270549505	29	144115188075856000	144115188075856000	144115188075856000	144115188075856000	144115188075856000	144115188075856000	1073741823	1073741823	2147483647	4294967295	144115188075856000	144115188075856000	288230375077969921
29	29	536870912	536870911	268435456	1073741823	576460751766552576	576460750692810753	30	576460752303423000	576460752303423000	576460752303423000	576460752303423000	576460752303423000	576460752303423000	2147483647	2147483647	4294967295	8589934591	576460752303423000	576460752303423000	1152921502459363329
30	30	1073741824	1073741823	536870912	2147483647	2305843008139952128	2305843005992468481	31	2305843009213690000	2305843009213690000	2305843009213690000	2305843009213690000	2305843009213690000	2305843009213690000	4294967295	4294967295	8589934591	17179869183	2305843009213690000	2305843009213690000	4611686014132420609
31	31	2147483648	2147483647	1073741824	4294967295	9223372034707290000	9223372030412320000	32	9223372036854770000	9223372036854770000	9223372036854780000	9223372036854780000	9223372036854780000	9223372036854780000	8589934591	8589934591	17179869183	34359738367	9223372036854780000	9223372036854780000	18446744065119600000

Table 132a: x, y, z & p give z-next via: Exponential Power of 2 + Butterfly Fractal<sub>1</sub> + 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, x<sup>2</sup>+y<sup>2</sup> +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. Copyright©2022, Reginald Brooks, Brooks Design. All rights reserved.