

Butterfly Fractals as n , 2^n and $2^n - 1$ Inform the Mersenne Prime Squares (MPS)

	p	n	2^n	$2^n = x$	2^{n+1}	$2^{n+1} = 2^p$	$(2^{n+1}) - 1 = z$	z^2	$xz = n \sum n$	$**y = x - 1$
#	p	*n	* $2^n = x$	value	* 2^{n+1}	value	Mp = $2^p - 1 = z$	Mp ² = MPS	PN	Mp - x = z - x = y
	2	1	2 ¹	2	2 ²	4	3	9	6	1
2	3	2	2 ²	4	2 ³	8	7	49	28	3
3			2 ³	8	2 ⁴	16	15	225		7
4	5	4	2 ⁴	16	2 ⁵	32	31	961	496	15
5			2 ⁵	32	2 ⁶	64	63	3969		31
6	7	6	2 ⁶	64	2 ⁷	128	127	16129	8128	63
7			2 ⁷	128	2 ⁸	256	255	65025		127
8			2 ⁸	256	2 ⁹	512	511	261121		255
9			2 ⁹	512	2 ¹⁰	1024	1023	1046529		511
10			2 ¹⁰	1024	2 ¹¹	2048	2047	4190209		1023
11			2 ¹¹	2048	2 ¹²	4096	4095	16769025		2047
12	13	12	2 ¹²	4096	2 ¹³	8192	8191	67092481	33550336	4095
13	17	16	2 ¹⁶	65536	2 ¹⁷	131072	131071	17179607041	8589869056	65535
14	19	18	2 ¹⁸	262144	2 ¹⁹	524288	524287	274876858369	137438691328	262143
15	31	30	2 ³⁰	1073741824	2 ³¹	2147483648	2147483647	4611686014132420608	2305843008139952128	1073741823
16	61	60	2 ⁶⁰	1152921504606846976	2 ⁶¹	2305843009213693952	2305843009213693951	5316911983139663487003 542222693990401	2658455991569831744 654692615953842176	1152921504606846975
17	89	88	2 ⁸⁸	30948500982134506872 4781056	2 ⁸⁹	61897001964269013744 9562112	61897001964269013744 9562111	3831238852164722145895 8675554963725661930450 5646776321	1915619426082361072 9479337808430363813 0997321548169216	**notice how the y value is a reiteration of the previous z = Mp values, until the rows are limited to just Mersenne Primes. Substituting (2 ⁿ⁺¹) - 1 = z and z - x = y gives [(2 ⁿ⁺¹) - 1] - 2 ⁿ = y
18	107	106	2 ¹⁰⁶	81129638414606681695 789005144064	2 ¹⁰⁷	16225927682921336339 1578010288128	16225927682921336339 1578010288127	2632807291713929667447 9506920917283561170115 423410494657557168129	131640364585696483 372397534604587229 102234723183869431 17783728128	
19	127	126	2 ¹²⁶	85070591730234615865 843651857942052864	2 ¹²⁷	17014118346046923173 1687303715884105728	17014118346046923173 1687303715884105727	2894802230932904885589 2746252171976962977213 7994892025464010213945 46514198529	14474011154664524427 9463731260859884815 7367749147483588906 6354349131199152128	
20	521	520	2 ⁵²⁰	34323988300653048574 ...8576	2 ⁵²¹	68647976601306097149 ...7152	68647976601306097149 ...7151	...01	235627...646976	
21	607	606	2 ⁶⁰⁶	26556899640838354934 ...4064	2 ⁶⁰⁷	53113799281676709868 ...8128	53113799281676709868 ...8127	...29	141053...328128	
22	1279	1278	2 ¹²⁷⁸	52039660973321995409 ...4544	2 ¹²⁷⁹	10407932194664399081 ...9088	10407932194664399081 ...9087	...69	541625...291328	
23	2203	2202	2 ²²⁰²	73798995760709011754 ...5504	2 ²²⁰³	14759799152141802350 ...1008	14759799152141802350 ...1007	...49	108925...782528	
24	2281	2280	2 ²²⁸⁰	22304377859187921478 ...8176	2 ²²⁸¹	44608755718375842957 ...6352	44608755718375842957 ...6351	...01	994970...915776	
25	3217	3216	2 ³²¹⁶	12955854300660131388 ...7536	2 ³²¹⁷	25911708601320262777 ...5072	25911708601320262777 ...5071	...41	335708...525056	
26	4253	4252	2 ⁴²⁵²	95398503762219536903 ...2496	2 ⁴²⁵³	19079700752443907380 ...4992	19079700752443907380 ...4991	...81	182017...377536	
27	4423	4422	2 ⁴⁴²²	14277127111413980695 ...0304	2 ⁴⁴²³	2855425422827961390 ...0608	2855425422827961390 ...0607	...49	407672...534528	
28	9689	9688	2 ⁹⁶⁸⁸	23911013940273060147 ...7056	2 ⁹⁶⁸⁹	47822027880546120295 ...4112	47822027880546120295 ...4111	...21	114347...577216	
29	9941		2 ⁹⁹⁴⁰	17304414124542560762 ...1776	2 ⁹⁹⁴¹	34608828249085121524 ...3552	34608828249085121524 ...3551	...01	598885...496576	
30	11213	11212	2 ¹¹²¹²	14070560068486865666 ...6096	2 ¹¹²¹³	28141120136973731333 ...2192	28141120136973731333 ...2191	...81	395961...086336	
31	19937	19936	2 ¹⁹⁹³⁶	21577123986940813240 ...0736	2 ¹⁹⁹³⁷	43154247973881626480 ...1472	43154247973881626480 ...1471	...41	931144...942656	
32	21701	21700	2 ²¹⁷⁰⁰	22433958305952166739 ...1376	2 ²¹⁷⁰¹	44867916611904333479 ...2752	44867916611904333479 ...2751	...01	100656...605376	
33	23209	23208	2 ²³²⁰⁸	20143705788949438909 ...2256	2 ²³²⁰⁹	40287411577898877818 ...4512	40287411577898877818 ...4511	...21	811537...666816	
34	44497	44496	2 ⁴⁴⁴⁹⁶	42725491215181690159 ...4336	2 ⁴⁴⁴⁹⁷	85450982430363380319 ...8672	85450982430363380319 ...8671	...41	365093...827456	
35	86243	86242	2 ⁸⁶²⁴²	26846399775137816076 ...9104	2 ⁸⁶²⁴³	53692799550275632152 ...8208	53692799550275632152 ...8207	...49	144145...406528	
36	https://www.wolframalpha.com https://en.wikipedia.org/wiki/List_of_Mersenne_primes_and_perfect_numbers https://www.mersenne.org/primes/									

Table 83: Mersenne Prime Squares: 10 parameters of the First 28 Mersenne Primes. Copyright©2021, Reginald Brooks, Brooks Design. All rights reserved.