Table 80_: Mersenne Prime Squares + Butterfly Fractal1

																				*Butterfly Fractal$_1$ Shortcuts
		$(2y^2+y)/y$	$[2(x^2+y^2)]-1$	$z^2 - OC$	$x^2 - CR$	$(x^2 - CR)^2$	$z^2 - PN$	$z - x$	$(z - x)^2$	$x^2 - x$				$x^2 - x$	$z^2 - OC$			$[2(x^2+y^2)]-1$	
		$(2x^2-x)/x$	$4CR + 1$	$xMp = 2CR + x$	$xz/Mp = (Mp+1)/2$	$CR + x$	$yMp = 2CR - y$	$yz/Mp = CR - y$ $(Mp - 1)/2$	$CR - y$	$y^2 + y$				$y^2 + y$	$xMp = 2CR + x$			$4CR + 1$	
		$x + y = x^2 - y^2$	$xz + yz$	$x^2 + xy = 2xy + x = 2x^2 - x$	$x^2 - xy$	$xz - xy$	$y^2 + xy = 2xy - y = 2y2 + y$	$x - 1 = (xz - 1)/(2^p + 1)$	$(yz/z)^2$	$xz - x^2$		$2^n=2^{p-1}$ $=x$	$2^n=2^{p-1}=x$	$xz - x^2$	$x^2 + xy = 2xy + x = 2x^2 - x$	$\sum$ =summing up the 2^n values sequentially by # of Entries.		$xz + yz$	$(2^{n+1})(2^{n+1})= (2^p)(2^p) = (2^p)^2$
		2PN/2^p	PN + OC	Mp + OC	PN/Mp	$(PN/Mp)^2$	PN - Mp	OC/Mp	$(OC/Mp)^2$	PN-PNS				PN-PNS	CR+PNS			PN + OC	- by 4x
	p	z	z^2	xz	x	x^2	yz	y	y^2	xy	p	2^n	$2^n=$	# of Entries=n, start @ x	# of Entries=n+1 # of Entries=p, start @ x	# of Entries=n+2 # of Entries=p+1, start @ x	Subtract 3·x value from the previous $\sum$	*Add + 1 to the Δ found in the previous Subtract 3x column	Add + 1 = z^2 = MPS *see Example at bottom
#	p	Mp = 2^p -1	Mp^2 = MPS	PN = $(2^{p-1})(2^p -1)$	$2^{p-1} = 2^p/2$	PNS	OC	OC/Mp	OCS	CR	p	n	$2^n=x$	$\sum 2^n=xy=CR$	$\sum 2^{n+1}=xz=PN$	$\sum 2^{n+2}$	Subtract 3x	Add + 1=z^2 =MPS	Calculation Shortcuts
1	2	3	9	6	2	4	3	1	1	2	2	1	2	2	6	14	8	9	If you know x you can quickly calculate the rest.
2	3	7	49	28	4	16	21	3	9	12	3	2	4	12	28	60	48	49	
3	5	31	961	496	16	256	465	15	225	240	5	4	16	240	496	1008	960	961	
4	7	127	16129	8128	64	4096	8001	63	3969	4032	7	6	64	4032	8128	16320	16128	16129	
5	13	8191	67092481	33550336	4096	16777216	33542145	4095	16769025	16773120	13	12	4096	16773120	33550336	67104768	67092480	67092481	x = 2^n and x = 2^{p-1} = $2^p/2$ where p = PRIME
6	17	131071	17179607041	8589869056	65536	4294967296	8589737985	65535	4294836225	4294901760	17	16	65536	4294901760	8589869056	17179803648	17179607040	17179607041	
7	19	524287	274876858369	137438691328	262144	68719476736	137438167041	262143	68718952449	68719214592	19	18	262144	68719214592	137438691328	274877644800	274876858368	274876858369	
8	31	2147483647	4611686014132420609	2305843008139952128	1073741824	1152921504606846976	2305843009592468481	1073741823	1152921502459363329	1152921503533105152	31	30	1073741824	1152921503533105152	2305843008139952128	4611686014545431561	4611686014324206089	4611686014132420609	y = x-1
9	61	2305843009213693951	5316911983139663487003542222269399 0401	2658455991569831744654692615953842176	1152921504606846976	1329227995784915872903807060280344576	2658455991569831742348496067401482 25	1152921504606846975	1329227995784915870597964051066650625	1329227995784915871750885555673497600	61	60	1152921504606846976	1329227995784915871750885555673497600	2658455991569831744654692615953842176	5316911983139663490462306736514531328	5316911983139663487003542222269399 0400	5316911983139663487003542222269399 0401	z = Mp = x + y
10	89	6189700196426901374495 62111	3831238852164722145895867555496372561930450 5646776321	1915619426082361072947938084303638130997321548 169216	30948500982134506872478105 6	9578097130411805364739668919683923976171195 136475136	1915619426082361072947933774653338418830718 4098607105	30948500982134506872478105 5	9578097130411805364739668857792430433348105 7686913025	9578097130411805364739668887409314154826126 411694080	89	88	30948500982134506872478105 6	9578097130411805364739668887409314154826126 411694080	1915619426082361072947933708430363813099732 1548169216	3831238852164722145895867556478092286083339 71821119488	3831238852164722145895867555496372561930450 5646776320	3831238852164722145895867555496372561930450 5646776321	x · y = CR = x^2 - x x · y = CR = y^2 + y x · z = PN = x^2 + xy
11	107	1622592768292133633915780102881 27	2632807291713929667447950692091728356117011542341049465 7557168129	1316403645856964833723975346045856509664633723975346045856065094664310502355153 28128	8112963841460668169578900514406 4	6582018229284824168619876730229402019309434625343194539 4436096	1316403645856964833723975346045856065094664310502355153 9773440001	8112963841460668169578900514406 3	6582018229284824168619876730229237960654114249170927875 384147969	6582018229284824168619876730229328902925288558526236643 89292032	107	106	8112963841460668169578900514406 4	6582018229284824168619876730229328902925288558526236643 89292032	1316403645856964833723975346045871122910223472318386943117 83728128	2632807291713929667447950692091752695008535935924345558202 4572600320	2632807291713929667447950692091728361170115423410494657 557168128	2632807291713929667447950692091728361170115423410494657 557168129	x² = PNS = CR + x y² = OCS = CR - y z² = MPS = Mp²1
12	127	1701411834604692317316873037158841 05727	2894802230932904885589274625217197696279772139794892025464010213945 46514198529	1447401115466452442794637312608598848157367744914748358890663543491311991 52128	8507059173023461586584365185794205 2864	7237005577332262213973186563042994240829374041602535252466099000494570602496	1447401115466452442794637312608598848140353630801436665733466704541531504640 1	8507059173023461586584365185794205 2863	7237005577332262213973186563042994240659232858142066020734411696778686496769	7237005577332262213973186563042994240744303449872300636600255348636628549632	127	126	8507059173023461586584365185794205 2864	7237005577332262213973186563042994240744303449872300636600255348636628549632	1447401115466452442794637312608598848149174883588906635434911991 52128	2894802230932904885589274625217196962977213794892025464010213945 20340357120	2894802230932904885589274625217196962977213794892025464010213945 46514198528	2894802230932904885589274625217196962977213794892025464010213945 46514198529	*for a 2^n shortcut: add + 1 to $(2^{n+1})(2^{n+1})$ = $(2^p)(2^p)$ = $(2^p)^2$, subtracted by 4x. Example, if n=2, then doubling 2^n+1 = 2^6 then 2^6- 4x = 64-16 = 48 and 48 +1 = 49
	p	ODD	ODD	EVEN	EVEN	EVEN	ODD	ODD	ODD	EVEN	p	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	ODD	

KEY: p=PRIME Mp=Mersenne Prime= 2^p -1 Mp^2 = Mersenne Prime Square PN=Perfect Number = $(2^{p-1})(2^p -1)$ OC=ODD Complement (to PN) PNS=Perfect Number Square OCS=ODD Complement Square CR=Complement Rectangle

In this section, the ramifications of the Butterfly Fractal$_1$ are shown in tabular form. Put simply, one can take the essential idea of the Butterfly Fractal1 : that the MPS and its tri-generational relationship of geometric areas can easily be seen as the natural interference of the PRIME wave with the exponential power of 2 wave of numbers. Indeed, one can, using nothing more than the exponential power of 2 ,2^n , calculate all the parameters without ever directly invoking the value of p=PRIME, bypassing the Euclid-Euler Theorem.

Table 80: Mersenne Prime Squares: 18 parameters of the First 12 Mersenne Primes.

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