Table 32b

Mersenne PRIMES 1-12

	BIM Algebraic - Geometry Method												Standard Algebraic Method				
	Algebra on the BIM Geometry:			<———EQUAL———>				Δ and Common Factors (of 24) in the BIM Geometry Method					Algebraic Calc Mersenne Primes		Δs and Common Factors (24)		
#	n	Δ	2^n	$2^n/4$ - 1	*2^n up^2steps	√2^nup^2steps	Δ	*Δ	*Δ/8	*Δ/2	Δ of (*Δ/2)	Δ of (*Δ/2)/8	p	$M_p=2^p$ - 1	Δ	Δ/4	Δ/6
1	1		2														
2	2		4	0													
3	3		8	(1)	1	(1)		(2)		(1)							
4	4	1	16	3	9	3	2	8	1	4			2	3			
5	5	1	32	7	49	7	4	40	5	20	16	2	3	7	4	1	~
6	6		64														
7	7	2	128	31	961	31	24	912	114	456	436	~	5	31	24	6	1
8	8		256														
9	9	2	512	127	16129	127	96	15168	1896	7584	7128	891	7	127	96	24	4
10	10		1024														
11	11		2048														
12	13		8192														
13	15	6	32768	8191	67092481	8191	8064	67076352	8384544	33538176	33530592	4191324	13	8191	8,064	2016	336
14	16		65,536														
15	17		131072														
16	18		262144														
17	19	4	524288	131071	17179607041	131071	122880	17112514560	2139064320	8556257280	8522719104	1065339888	17	131071	122,880	30720	5120
18	20		1048576														
19	21	2	2097152	524287	274876858369	524287	393216	257697251328	32212156416	128848625664	120292368384	15036546048	19	524287	393216	98304	16384
20	22		4194304														
21	23		8388608														
22	25		33554432														
23	27		134217728														
24	29		536870912														
25	31		2147483648														
26	33	12	8589934592	2147483647	46116860141 32420609	2147483647	2146959360	461168573925 5562240	5764607174 06945280	23058428696 27781120	230584274077 9160064	2882303425 97395008	31	2147483647	2146959360	536739840	89456640
27	63	30	92233720368 54775808	230584300 921369395 1	53169119831 39663487003 54222269399 0401	2305843009 213693951	230584300706 6210000	531691198313 966348239185 620856156979 2	6646139978 9245793529 8982026070 196224	26584559915 69831741195 92810428078 4896	265845599156 983173889008 523465300377 6	3323069989 4622896736 1260654331 625472	61	230584300 921369395 1	230584300706 6210000	576460751 766553000	~
28	91	28	24758800785 70760549798 248448	618970019 642690137 449562111	38312388521 64722145895 86755549637 25661930450 5646776321	6189700196 4269013744 9562111	61897001733 68471282358 68160	383123885216 472209272674 772409973769 615762282952 785920	4789048565 2059026159 0843465512 4672120197 0285369098 240	19156194260 82361046363 37386204986 88480788114 1476392960	191561942608 236101977881 394635155143 611953037195 608064	2394524282 6029512747 2351743293 9439295149 4129649451 008	89	618970019 642690137 449562111	618970017336 847128235868 160	154742504 334211782 058967040	257904173 890352970 09827840
29	109	18	24758800785 70760549798 248448	162259276 829213363 391578010 288127	26328072917 13929667447 95069209172 835611701154 23410494657 557168129	1622592768 2921336339 1578010288 127	16225865785 91937207014 40560726016	263280729167 561727892630 347063276968 056204781667 911901519103 91808	32910091145 9452159865 7879338290 9621007025 5977084889 8768988798 976	13164036458 37808639463 15173531638 48402810239 08339559507 5955195904	131640364581 865244520232 812485275110 166052521985 877139344788 02944	1645504557 2733155565 0291015606 5938877075 6565248234 6424180985 0368	107	162259276 829213363 391578010 288127	162258657859 193720701440 560726016	405646644 647984301 753601401 81504	676077741 079973836 256002336 3584
30	129	20	68056473384 18769269267 49214863536 422912	1701411834 604692317 316873037 158841057 27	28948022309 32904885589 27462521719 76962977213 79948920254 64010213945 46514198529	17014118346 0469231731 6873037158 84105727	17014102120 11924025183 23912137873 817600	289480223093 027207829756 069554974974 560562965159 280324309776 108998889570 30400	3618502788 6628400978 7195086943 7187182007 0370644910 0405387220 13624861196 28800	144740111546 51360391487 80347774874 87280281482 57964016215 48880544994 4478515200	144740111546 381963550294 253913541172 106749844095 612059764054 098548685233 19296	1809251394 3297745443 7867817391 9264651334 3730511951 5074705067 6231858565 414912	127	170141183 460469231 731687303 715884105 727	170141021201 192402518323 912137873817 600	425352553 002981006 295809780 344684544 00	708920921 671635010 493016300 574474240 0
…																	

reference: https://en.wikipedia.org/wiki/Mersenne_prime#About_Mersenne_primes and https://oeis.org/A000668/list

Table 32b

*n= 1,2,3,.. Δ = difference, 2^n = power 2 to exponent **n** = found on the **Axis # 2 Diagonal** on the **BIM**, **($2^n/4$) - 1** = Mersenne Prime = same Mersenne Prime found by the Standard Algebraic Method offset by **n** - 2, **p**=prime exponent,* M_p = Mersenne Prime (2^p-1), *M_p-1 = Mersenne Prime - 1 = **BIM Sub-Matrix 2** Column 1 value.

On the **BIM** Algebraic - Geometry Method (BAGM), one approaches the Mersenne Primes in an entirely different manner. Not as straight forward as the Standard Algebraic Method, nevertheless, the BAGM gives a visualization of the Mersenne Primes upon the **BIM** and perhaps provides further insights into the distribution of the Mersenne Primes.

On the BIM, all exponential powers of 2 (>2) are found in a Number Pattern Sequence going DIAGONALLY down from the Left Axis # 2. Thus 2^3 = 8, 2^4 = 16, 2^5 = 32, 2^6 = 64, 2^7 =128,… are found on the Axis 2 Diagonal (parallel to the PD). Once located, go vertically up 2 cell steps to intercept the PD. The Square Root of that PD # will be the Mersenne Prime candidate.

One can see that unlike in the Standard Algebraic Method where the exponential (**p**) must ALWAYS be a PRIME #, as must **M**, this is NOT a requirement in the BAGM, thus **n**=4 generates the Mersenne Prime #3. As seen in the 5th Column above, algebraically this may be written as $2^n/4$ **- 1**. ***This is EQUAL to the Mersenne Prime Method offset by n-2 = p-2. The PROOF FOLLOWS BELOW:***

BIM = MP with (p-2 = n-2)

$$(2^n/4) - 1 = M^{p-2} - 1 = 2^{n-2} - 1$$

$$2^n/4 = 2^{n-2} - 1 + 1$$

$$2^n/4 = 2^{n-2}$$

$$2^n = 4 \cdot 2^{n-2}$$

$$2^n = 2^2 \cdot 2^{n-2}$$

$$2^n = 2^n$$

Example:** let **n = 5** in the **BIM Method

↓

$$(2^5/4) - 1 = M^{p-2} - 1 = 2^{5-2} - 1 = 2^3 - 1$$

$$(32/4) - 1 = M^{5-2} - 1 = 2^{5-2} - 1 = 8 - 1$$