

Table197_multiples(xz+3x/4)times4's.

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#	4 multiples	x	z	(xz=PN	+	3x/4)	equals	Sum	x4 multiples	equals	product of 4n multiples (xz+3x/4)	using -> these values	x=2 x=3 Set 2	x=4 z=7 Set 1	x=8 z=15 Set 2	x=16 z=31 Set 1	x=32 z=63 Set 2	x=64 z=127 Set 1	x=128 z=255 Set 2	x=256 z=511 Set 1	x=512 z=1023 Set 2	x=1024 z=2047 Set 1	x=2048 z=4095 Set 2	x=4096 z=8191 Set 1
1	4	2	3	6	+	1.5	=	7.5	4	=	30	see header	30	124	504	2032	8160	32704	130944	524032	2096640	8387584	33552384	134213632
2	8	4	7	28	+	3	=	31	8	=	248	see header	60	248	1008	4064	16320	65408	261888	1048064	4193280	16775168	67104768	268427264
3	12	6	11	66	+	4.5	=	70.5	12	=	846	see header	90	372	1512	6096	24480	98112	392832	1572096	6289920	25162752	100657152	402640896
4	16	8	15	120	+	6	=	126	16	=	2016	see header	120	496	2016	8128	32640	130816	523776	2096128	8386560	33550336	134209536	536854528
5	20	10	19	190	+	7.5	=	197.5	20	=	3950	see header	150	620	2520	10160	40800	163520	654720	2620160	10483200	41937920	167761920	671068160
6	24	12	23	276	+	9	=	285	24	=	6840	see header	180	744	3024	12192	48960	196224	785664	3144192	12579840	50325504	201314304	805281792
7	28	14	27	378	+	10.5	=	388.5	28	=	10878	see header	210	868	3528	14224	57120	228928	916608	3668224	14676480	58713088	234866688	939495424
8	32	16	31	496	+	12	=	508	32	=	16256	see header	240	992	4032	16256	65280	261632	1047552	4192256	16773120	67100672	268419072	1073709056
9	36	18	35	630	+	13.5	=	643.5	36	=	23166	see header	270	1116	4536	18288	73440	294336	1178496	4716288	18869760	75488256	301971456	1207922688
10	40	20	39	780	+	15	=	795	40	=	31800	see header	300	1240	5040	20320	81600	327040	1309440	5240320	20966400	83875840	335523840	1342136320
11	44	22	43	946	+	16.5	=	962.5	44	=	42350	see header	330	1364	5544	22352	89760	359744	1440384	5764352	23063040	92263424	369076224	1476349952
12	48	24	47	1128	+	18	=	1146	48	=	55008	see header	360	1488	6048	24384	97920	392448	1571328	6288384	25159680	100651008	402628608	1610563584
13	52	26	51	1326	+	19.5	=	1345.5	52	=	69966	see header	390	1612	6552	26416	106080	425152	1702272	6812416	27256320	109038592	436180992	1744777216
14	56	28	55	1540	+	21	=	1561	56	=	87416	see header	420	1736	7056	28448	114240	457856	1833216	7336448	29352960	117426176	469733376	1878990848
15	60	30	59	1770	+	22.5	=	1792.5	60	=	107550	see header	450	1860	7560	30480	122400	490560	1964160	7860480	31449600	125813760	503285760	2013204480
16	64	32	63	2016	+	24	=	2040	64	=	130560	see header	480	1984	8064	32512	130560	523264	2095104	8384512	33546240	134201344	536838144	2147418112
32	128	64	127	8128	+	48	=	8176	128	=	1046528	see header	960	3968	16128	65024	261120	1046528	4190208		67092480	268402688	1073676288	4294836224
64	256	128	255	32640	+	96	=	32736	256	=	8380416	see header	1920	7936	32256	130048	522240	2093056	8380416		134184960	536805376	2147352576	8589672448
128	512	256	511	130816	+	192	=	131008	512	=	67076096	see header	3840	15872	64512	260096	1044480	4186112	16760832		268369920	1073610752	4294705152	17179344896
256	1024	512	1023	523776	+	384	=	524160	1024	=	53673984	see header	7680	31744	129024	520192	2088960	8372224	33521664		536739840	2147221504	8589410304	34358689792
512	2048	1024	2047	2096128	+	768	=	2096896	2048	=	42944430	see header	15360	63488	258048	1040384	4177920	16744448	67043328		1073479680	4294443008	17178820608	68717379584
1024	4096	2048	4095	8386560	+	1536	=	8388096	4096	=	34357641	see header	30720	126976	516096	2080768	8355840	33488896	134086656		2146959360	8588886016	34357641216	137434759168
2048	8192	4096	8191	33550336	+	3072	=	33553408	8192	=	27486951	see header	61440	253952	1032192	4161536	16711680	66977792	268173312	1073217536	4293918720	17177772032	68715282432	274869518336
Take 107	4((4 × 7) + (3 / 4 × 4)) = 124 8((4 × 7) + (3 / 4 × 4)) = 248 12((4 × 7) + (3 / 4 × 4)) = 372 16((4 × 7) + (3 / 4 × 4)) = 496 4 × 7 + 3 = 31 31 * 4 = 124 16((8 × 15) + (3 / 4 × 8)) = 2016 16((32 × 63) + (3 / 4 × 32)) = 32640 16((64 × 127) + (3 / 4 × 64)) = 130816 16((128 × 255) + (3 / 4 × 128)) = 523776 16((256 × 511) + (3 / 4 × 256)) = 2096128 16((512 × 1023) + (3 / 4 × 512)) = 8386560 4((512 × 1023) + (3 / 4 × 512)) = 2096640 2096640 × 2 = 4193280 2096640 × 3 = 6289920 2096640 × 4 = 8386560 2096640 × 5 = 10483200 2096640 × 6 = 12579840 2096640 × 7 = 14676480 2096640 × 8 = 16773120 2096640 × 9 = 18869760 2096640 × 10 = 20966400 2096640 × 11 = 23063040 2096640 × 12 = 25159680 2096640 × 13 = 27256320 2096640 × 14 = 29352960 2096640 × 15 = 31449600 2096640 × 16 = 33546240 4((1024 × 2047) + (3 / 4 × 1024)) = 8387584 8387584 × 2 = 16775168 8387584 × 3 = 25162752 8387584 × 4 = 33550336 8387584 × 5 = 41937920 8387584 × 6 = 50325504 8387584 × 7 = 58713088 8387584 × 8 = 67100672 8387584 × 9 = 75488256 8387584 × 10 = 83875840 8387584 × 11 = 92263424 8387584 × 12 = 100651008 8387584 × 13 = 109038592 8387584 × 14 = 117426176 8387584 × 15 = 125813760 8387584 × 15 = 125813760 8387584 × 16 = 134201344016 - 1984 = 32 8128 - 8064 = 64 32640 - 32512 = 128 130816 - 130560 = 256 523776 - 523264 = 512 2096128 - 2095104 = 1024 8386560 - 8384512 = 2048 33550336 - 33546240 = 4096 134209536 - 134201344 = 8192 536854528 - 536838144 = 16384 Copyright©2025, Reginald Brooks, Brooks Design. All rights reserved.							Math shown to the left demo several things: 1.- how the various 4n multiples of the n(xz+3x/4) formula generate a result using the x and z values shown; 2.- how the same math, now using the x and z values on the right side, gives the next Set 1 and 2 values for container PNs; 3.- those Column values on the right are 1,2,3 times the initial value found on the 1st Row entry. There are a multitude of inter-connections between the various values in the right side part of the grid: the Rows are increasing by doubling their x-values and doubling-1 their z-values, while the 4n value of the Columns is also sequentially doubled. Some examples: 8128 - 8064 = 64 32640 - 32512 = 128 130816 - 130560 = 256 523776 - 523264 = 512 8128 (table above) is 64 more than 8064, found in Row 16, under Col x=8; 32640 is 128 more than 32512, along same Row as before; 130816 is 256 more than 130560, along same Row; and, 523776 - 523264 = 512 as shown in the light purple and gray banding above. 8128 can also be formed by going back 2 Columns, down to Row 64 to 7936, as 7936 + 192= 8128 and the 14 factors of 192 are 192— 192/2=96—96/2=48—48/2=24— 24/2=12—12/2=6—6/2=3 and 1—2—4—8—16—32—64. Adding 3x64=192 to 7936=8128..... Similarly, 130816 can be formed by going back 2 Columns, down to Row 64, to 130048, as 130048+768=130816 and the 18 factors of 768 are the same as the 14 factors of 192 plus 768—383—128—256. Adding 3x256=768 to 130048=130816. One may notice that there is a definite pattern here: Set 1 Columns: x=4,16, 64, 256,1024 and 4096 (GRAY) are distinguished in that, other than the first PN6, all other PNs are found exclusively here, and, the Columns relate to each other as in the previous examples shown. . Set 2 Columns: x=2, 8, 32, 128, 512 and 2048 (BLUE) contain, other than the first PN6, NO other PNs, while their Set 2 Columns do relate to each other. Connections across Set 1 and Set 2 Columns are also present: witness..... 496 - 480 = 16 8128 - 8064 = 64 8064 - 7936 = 128 8128 - 7680 = 448 For example: If you draw a line down from the x=2 header to 120, then draw a line down from x=4 to 124, the Δ=4; from the x=2 header to 240, then draw a line down from x=4 to 248, the Δ=8; from the x=2 header to 360, then draw a line down from x=4 to 372, the Δ=12; from the x=2 header to 480, then draw a line down from x=4 to 496, the Δ=16 and so on. Pattern continues across sets: from the x=4 header to 496, then draw a line down from x=8 to 504, the Δ=8; from the x=4 header to 992, then draw a line down from x=8 to 1008, the Δ=16; from the x=4 header to 1488, then draw a line down from x=8 to 1512, the Δ=24; from the x=4 header to 1984, then draw a line down from x=8 to 2016, the Δ=32.							While the various 4n multiples fill in the table, it is only when n=4, giving 4*4=16 that we generate the PN containers and within them the PNs! With the exception of PN6, the first and smallest of the 52 known (at the time of this writing) PNs, all PNs are found exclusively under the Set 1 Columns, though not all containers under the column are TRUE PNs. ACROSS the ROWS the 2nd term increases sequentially by 4 TIMES; 3x/4—3 —12—48—192—768... and the 1st term x & z values are from the PN product before: In the Examples here, x=2 and x=4 to start the series Set 2 and Set 1, respectively. Only Set 1 continues. 16(6 + (3 × 2 / 4)) =16(6 + 1.5) = 120 16(28 + (3 × 4 / 4)) =16(28 + 3) = 496 16(496 + (3 × 4 /)) =16(496 + (3 × 16 / 4))=16(496 + 12) = 8128 16(8128 + (12 × 4 /)) =16(8128 + (3 × 64 / 4)) = 16(8128 + (3 × 16)) = 16(8128 + 48) = 130816 16(130816 + (48 × 4 /)) = 6(130816 + (3 × 256 / 4)) =16(130816 + (3 × 64)) =16(130816 + 192) = 2096128 16(2096128 + (192 × 4 /)) = 16(2096128 + (3 × 1024 / 4)) = 16(2096128 + (3 × 256) = 16(2096128 + 768) = 33550336 16(6 + (2 × 3 / 4)) = 120 16(28 + (3 × 4 / 4)) = 496 16(496 + (3 × 4 /)) = 8128 16(8128 + (12 × 4 /)) = 130816 16(130816 + (48 × 4 /)) = 2096128 16(2096128 + (192 × 4 /)) = 33550336 16(33550336 + (768 × 4 /)) = 536854528 16(536854528 + (3072 × 4 /)) = 8589869056 16(8589869056 + (12288 × 4 /)) = 137438691328 16(137438691328 + (49152 × 4 /)) = 2199022206976 16(2199022206976 + (196608 × 4 /)) = 35184367894528 16(35184367894528 + (786432 × 4 /)) = 562949936644096 16(562949936644096 + (3145728 × 4 /)) = 9007199187632128 16(9007199187632128 + (12582912 × 4 /)) = 144115187807420416 16(144115187807420416 + (50831648 × 4 /)) = 2305843008139952128 The next-PN — going across the Row here — is 16 times the current PN + 16 times 0.75 of its current x-value: 16((xz+(3/4)x) that translates to: e.i. 16(6 + (3 × 2 / 4)) = 16(6 + 1.5) → True 16(28 + (3 × 4 / 4)) = 16(28 + 3) → True 16(8128 + (3 × 64 / 4)) = 16(8128 + 48) → True 16(130816 + (3 × 256 / 4)) = 16(130816 + 192) → True 16(xz+3/4x) will get you to next value within the same SET. Set 1 jumps to 1 Set 1 Columns (or 2 total columns) e.i. PN28 —→496 16(28 + (3 × 4 / 4)) = 496 16(496 + (3 × 16 / 4)) = 8128 16(8128 + (3 × 64 / 4)) = 130816 16(130816 + (3 × 256 / 4)) = 2096128 16(2096128 + (3 × 1024 / 4)) = 33550336 16(33550336 + (3 × 4096 / 4)) = 536854528 Set 1 jumps to 2 Set 1 Columns (or 4 total columns) e.i. PN28 —→8128 64 ((4 times 28) + (3 times 20 divided by 4)) where 20=5x 64(112 + (3 / 4 × 20)) = 8128 64(1984 + (3 / 4 × 80)) = 130816 64(32512 + (3 / 4 × 320)) = 2096128 64(523264 + (3 / 4 × 1280)) = 33550336 repeat, only decrease 64—→32, while increase xz 4 times—→8 times xz 32 ((8 times 28) + (3 times 20 divided by 2)) where 40=5x(2) 32(16(224 + (3 / 4 × 40))) = 8128 consolidate 32(224 + (3 × 40 / 4)) = 8128 32(3968 + (3 × 160 / 4)) = 130816 32(65024 + (3 × 640 / 4)) = 2096128 32(1046528 + (3 × 2560 / 4)) = 33550336 Set 1 jumps to 3 Set 1 Columns (or 6 total columns) e.i. PN28 —→130816 256 ((16 times 28) + (3 times 84 divided by 4)) where 21x=84 256(448 + (3 / 4 × 84)) = 130816 256(7936 + (3 / 4 × 336)) = 2096128 256(130048 + (3 / 4 × 1344)) = 33550336 256(2093056 + (3 / 4 × 5376)) = 536854528 256(536805376 + (3 / 4 × 86016)) = 137438691328 Set 1 jumps to 5 Set 1 Columns (or 10 total columns) e.i. PN28 —→33550336 4096((256 times 28) + (3 times 1364 divided by 4)) where 21x=84 4096(7168 + (3 / 4 × 1364)) = 33550336 4096(126976 + (3 / 4 × 5456)) = 536854528 4096(2080768 + (3 / 4 × 21824)) = 8589869056 4096(33488896 + (3 / 4 × 87296)) = 137438691328 Set 1 jumps to 14 Set 1 Columns (or 28 total columns) e.i. PN28 —→2305843008139952128 1073741824((2^28) + (3 times 2773833044) divided by 4)) where 1073741824(67108864 + (3 / 4 × 2773833044)) = 2305843008139952128 1073741824=2^30 = 2^31-1 67108864=2^26 31-3=28 28 -2=26 use 26 as exp power of 2									