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Bordered Magic Squares Multiples of 6

The work is also available at author's site:
https://numbers-magic.com/?p=316

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Abstract

*During past years author worked with **block-wise**, **bordered** and **block-bordered** magic squares. This work make connection between **block-wise** and **bordered** magic squares. We first constructed **bordered** magic squares of orders 120 and 114 multiples of magic square of order 6. Based on these two big magic inner order magic squares lower order magic squares are obtained. By inner orders we understand that magic squares of orders 108, 102, 96, 90, 84, etc. The construction of the **bordered** magic squares multiples of 6 is based on equal sum blocks of magic squares of order 6. We considered three types of magic square of order 6. One as normal magic squares of order 6. The second is **bordered** magic squares of order 6, where the inner magic square of order 4 is **pandiagonal**. The third is cornered magic square of order 6, where magic square of order 4 appears in the corner. The advantage in studying **bordered** magic squares is that when we remove external border, still we left with magic squares with sequential entries. It is the same property of **bordered** magic squares of single digit borders. The difference is that that instead of numbers here we have blocks of equal sum magic squares of order 6. For multiples of order 4 see author's recent work [23]. The further multiples, such as multiples, 8, 10, 12, etc. shall be done in another works. This work brings examples only up to order 36. Higher orders examples can be seen in **Excel file** attached with the work. The total work is up to order 120.*

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Contents

1 Introduction

During past years author [3, 4, 5, 6, 7, 8, 9] worked with **block-wise** magic squares from orders 12 to 47. Author [10, 11, 12, 13, 14, 15] also worked with **bordered** magic squares. The study on **bordered** magic squares is extended to **block-bordered** magic squares [16, 17, 18]. This is specially done for the magic squares of orders p and p, where p is a prime number. This study is still extended to **block-wise bordered** magic squares [19, 20, 21, 22]. Some conection with Pythagorean triples and area-representations are also made [24, 25, 26, 27, 28]. The main property of **bordered** magic squares is that if we remove external borders, still we get **sub-bordered** magic squares, i.e., each layer in itself lead us to magic squares. In many cases, the properties of **bordered** magic square are seperated by **even** and **odd** orders magic squares. In many cases, we get good properties for the **even** order **bordered** magic squares. In many cases, we have to use fractional numbers entries, specially to reach minimum perfect square sum of entries. For more study on **bordered** magic squares refer H. White's [1] and H. Danielsson's [2] web-sites.

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The aim of this work is to extend the study of **bordered** magic squares. In this case we considers blocks of magic squares such as magic squares of order 6, and then put them in such a way that every time removing external borders, still we are left with magic squares. Based on this idea, we wrote with **bordered** magic squares of orders 120 and 114. Every time when we remove the external border, we are left with **block-bordered** magic squares with minus order 12. For example, in case of order 120, removing external orders we are left with orders 108, 96, 84, 72, etc. and in case of orders 114, removing external orders, we are left with orders 102, 90, 78, 66, etc. Thus alternatively we complete all order magic squares multiples of 6. Three diiferent types of magic squares of order 6 are considered. One as normal magic squares of order 6. The second is **bordered** magic squares of order 6, where the inner magic square of order 4 is **pandiagonal**. The third is cornered magic square of order 6, where magic square of order 4 appears in the corner. One as normal magic squares of order 6. The second is **bordered** magic squaresof order 6, where the inner magic square of order 4 is **pandiagonal**. The third is cornered magic square of order 6, where magic square of order 4 appears in the corner. The constructions of magic squares of order 6 are of equal sums.

1.1 Summary of Bordered Magic Squares

1.1.1 Odd Numbers Multiples

- **Single Digit:** Bordered magic squares based on single digit [10, 11, 1].
- **Three Digits:** Bordered magic squares based on magic squares of order 3 [30].
- **Five Digits:** Bordered magic squares multiples of magic squares of order 5 [31].
- **Seven Digits:** Bordered magic squares multiples of magic squares of order 7 [32].
- **Nine Digits:** Bordered magic squares multiples of magic squares of order 9 [33]
- **Eleven Digits:** Bordered magic squares multiples of magic squares of order 11 [34]
- **Thirteen Digits:** Bordered magic squares multiples of magic squares of order 13 [35]
- **Fifteen Digits:** Bordered magic squares multiples of magic squares of order 15 [36]
- **Seventeen Digits:** Bordered magic squares multiples of magic squares of order 17 [37]

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1.1.2 Even Numbers Multiples

- **Two Digits:** Bordered magic squares based on magic rectangles multiples of 2 [78, 79, 67, 68, 68, 69].
- **Four Digits:** Bordered magic squares multiples of magic squares of order 4 [24].
- **Six Digits:** Bordered magic squares multiples of magic squares of order 6 [25] (This work)

The work on even number multiples is with equal sums blocks of magic squares. The work on odd number multiples is with different sum magic squares.

It is revised and extended verison of authors previous work on multiples of 6. In the previous work we consider only two magic squares of order 6. Here we have considered three magic squares of order 6. The work is here only up to order 36. Higher order examples can be seen in an **excel files** attached with the work.

2 Bordered Magic Squares Multiples of 6

Let's consider following three magic squares of order 6.

1	mgc	83	125	118	146	83	111
	1	35	34	33	2	6	111
	30	8	28	9	11	25	111
	24	23	15	16	20	13	111
	18	14	21	22	17	19	111
	7	26	10	27	29	12	111
	31	5	3	4	32	36	111
	111	111	111	111	111	111	111

2	mgc	72	147	74	158	104	111
	6	30	3	36	4	32	111
	35	17	22	11	24	2	111
	29	12	23	18	21	8	111
	27	26	13	20	15	10	111
	9	19	16	25	14	28	111
	5	7	34	1	33	31	111
	111	111	111	111	111	111	111

3	mgc	146	76	101	111	121	111
	17	22	11	24	29	8	111
	12	23	18	21	27	10	111
	26	13	20	15	35	2	111
	19	16	25	14	9	28	111
	4	3	36	30	6	32	111
	33	34	1	7	5	31	111
	111	111	111	111	111	111	111

2.1 Bordered Magic Squares of Orders 114 and 120

Let's consider following distributions of numbers 361 and 400:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	20
71	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	90	21
70	135	192	193	194	195	196	197	198	199	200	201	202	203	204	205	152	91	22
69	134	191	240	241	242	243	244	245	246	247	248	249	250	251	206	153	92	23
68	133	190	239	280	281	282	283	284	285	286	287	288	289	252	207	154	93	24
67	132	189	238	279	312	313	314	315	316	317	318	319	290	253	208	155	94	25
66	131	188	237	278	311	336	337	338	339	340	341	320	291	254	209	156	95	26
65	130	187	236	277	310	335	352	353	354	355	342	321	292	255	210	157	96	27
64	129	186	235	276	309	334	351	360	361	356	343	322	293	256	211	158	97	28
63	128	185	234	275	308	333	350	359	358	357	344	323	294	257	212	159	98	29
62	127	184	233	274	307	332	349	348	347	346	345	324	295	258	213	160	99	30
61	126	183	232	273	306	331	330	329	328	327	326	325	296	259	214	161	100	31
60	125	182	231	272	305	304	303	302	301	300	299	298	297	260	215	162	101	32
59	124	181	230	271	270	269	268	267	266	265	264	263	262	261	216	163	102	33
58	123	180	229	228	227	226	225	224	223	222	221	220	219	218	217	164	103	34
57	122	179	178	177	176	175	174	173	172	171	170	169	168	167	166	165	104	35
56	121	120	119	118	117	116	115	114	113	112	111	110	109	108	107	106	105	36
55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37

Table: 19×19 - 361 numbers

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	21
75	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	95	22
74	143	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	161	96	23
73	142	203	256	257	258	259	260	261	262	263	264	265	266	267	268	219	162	97	24
72	141	202	255	300	301	302	303	304	305	306	307	308	309	310	269	220	163	98	25
71	140	201	254	299	336	337	338	339	340	341	342	343	344	311	270	221	164	99	26
70	139	200	253	298	335	364	365	366	367	368	369	370	345	312	271	222	165	100	27
69	138	199	252	297	334	363	384	385	386	387	388	371	346	313	272	223	166	101	28
68	137	198	251	296	333	362	383	396	397	398	389	372	347	314	273	224	167	102	29
67	136	197	250	295	332	361	382	395	400	399	390	373	348	315	274	225	168	103	30
66	135	196	249	294	331	360	381	394	393	392	391	374	349	316	275	226	169	104	31
65	134	195	248	293	330	359	380	379	378	377	376	375	350	317	276	227	170	105	32
64	133	194	247	292	329	358	357	356	355	354	353	352	351	318	277	228	171	106	33
63	132	193	246	291	328	327	326	325	324	323	322	321	320	319	278	229	172	107	34
62	131	192	245	290	289	288	287	286	285	284	283	282	281	280	279	230	173	108	35
61	130	191	244	243	242	241	240	239	238	237	236	235	234	233	232	231	174	109	36
60	129	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176	175	110	37
59	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112	111	38
58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39

Table: 20×20 - 400 numbers

2.2 Equal Sums Distribution for 19

It has total 361 numbers. Let's 361 distribution of numbers in such a way that each set with 36 numbers results in equal sums:

$D_1 := \{1, 2, \ldots, 18, 12979, 12978, \ldots, 12996\};$ Total Sum $D_1 := 233946$

$D_2 := \{19, 20, \ldots, 36, 12961, 12962, \ldots, 12978\};$ Total Sum $D_2 := 233946$

$\ldots \quad \ldots \quad \ldots$ $\ldots$

$\ldots \quad \ldots \quad \ldots$ $\ldots$

$D_{360} := \{6463, 6464, \ldots, 6480, 6517, 6518, \ldots, 6534\};$ Total Sum $D_{360} := 233946$

$D_{361} := \{6481, 6481, \ldots, 6498, 6499, 6500, \ldots, 6516\};$ Total Sum $D_{361} := 233946$

Below are four examples of magic squares of order 6×6 based on above distributions. These are separately for each magic square of order 6 given above.

1						38991
1	12995	12994	12993	2	6	38991
12990	8	12988	9	11	12985	38991
12984	12983	15	16	12980	13	38991
18	14	12981	12982	17	12979	38991
7	12986	10	12987	12989	12	38991
12991	5	3	4	12992	12996	38991
38991	38991	38991	38991	38991	38991	38991

2						38991
19	12977	12976	12975	20	24	38991
12972	26	12970	27	29	12967	38991
12966	12965	33	34	12962	31	38991
36	32	12963	12964	35	12961	38991
25	12968	28	12969	12971	30	38991
12973	23	21	22	12974	12978	38991
38991	38991	38991	38991	38991	38991	38991

360						38991
6463	6533	6532	6531	6464	6468	38991
6528	6470	6526	6471	6473	6523	38991
6522	6521	6477	6478	6518	6475	38991
6480	6476	6519	6520	6479	6517	38991
6469	6524	6472	6525	6527	6474	38991
6529	6467	6465	6466	6530	6534	38991
38991	38991	38991	38991	38991	38991	38991

361						38991
6481	6515	6514	6513	6482	6486	38991
6510	6488	6508	6489	6491	6505	38991
6504	6503	6495	6496	6500	6493	38991
6498	6494	6501	6502	6497	6499	38991
6487	6506	6490	6507	6509	6492	38991
6511	6485	6483	6484	6512	6516	38991
38991	38991	38991	38991	38991	38991	38991

1							38991
	6	12990	3	12996	4	12992	38991
	12995	17	12982	11	12984	2	38991
	12989	12	12983	18	12981	8	38991
	12987	12986	13	12980	15	10	38991
	9	12979	16	12985	14	12988	38991
	5	7	12994	1	12993	12991	38991
	38991	38991	38991	38991	38991	38991	38991

2							38991
	24	12972	21	12978	22	12974	38991
	12977	35	12964	29	12966	20	38991
	12971	30	12965	36	12963	26	38991
	12969	12968	31	12962	33	28	38991
	27	12961	34	12967	32	12970	38991
	23	25	12976	19	12975	12973	38991
	38991	38991	38991	38991	38991	38991	38991

360							38991
	6468	6528	6465	6534	6466	6530	38991
	6533	6479	6520	6473	6522	6464	38991
	6527	6474	6521	6480	6519	6470	38991
	6525	6524	6475	6518	6477	6472	38991
	6471	6517	6478	6523	6476	6526	38991
	6467	6469	6532	6463	6531	6529	38991
	38991	38991	38991	38991	38991	38991	38991

361							38991
	6486	6510	6483	6516	6484	6512	38991
	6515	6497	6502	6491	6504	6482	38991
	6509	6492	6503	6498	6501	6488	38991
	6507	6506	6493	6500	6495	6490	38991
	6489	6499	6496	6505	6494	6508	38991
	6485	6487	6514	6481	6513	6511	38991
	38991	38991	38991	38991	38991	38991	38991

1						38991
17	12982	11	12984	12989	8	38991
12	12983	18	12981	12987	10	38991
12986	13	12980	15	12995	2	38991
12979	16	12985	14	9	12988	38991
4	3	12996	12990	6	12992	38991
12993	12994	1	7	5	12991	38991
38991	38991	38991	38991	38991	38991	38991

2						38991
35	12964	29	12966	12971	26	38991
30	12965	36	12963	12969	28	38991
12968	31	12962	33	12977	20	38991
12961	34	12967	32	27	12970	38991
22	21	12978	12972	24	12974	38991
12975	12976	19	25	23	12973	38991
38991	38991	38991	38991	38991	38991	38991

360						38991
6479	6520	6473	6522	6527	6470	38991
6474	6521	6480	6519	6525	6472	38991
6524	6475	6518	6477	6533	6464	38991
6517	6478	6523	6476	6471	6526	38991
6466	6465	6534	6528	6468	6530	38991
6531	6532	6463	6469	6467	6529	38991
38991	38991	38991	38991	38991	38991	38991

361						38991
6497	6502	6491	6504	6509	6488	38991
6492	6503	6498	6501	6507	6490	38991
6506	6493	6500	6495	6515	6482	38991
6499	6496	6505	6494	6489	6508	38991
6484	6483	6516	6510	6486	6512	38991
6513	6514	6481	6487	6485	6511	38991
38991	38991	38991	38991	38991	38991	38991

In a Table of order 19×19, total we have 361 numbers. Replacing each number by their respective distribution according to given above, we get a magic squares of order 114 multiples of equal sums of magic squares of order 6. Since there are three magic squares of order 6, thus, we get three magic squares of order 114. See the attached **excel file**.

2.3 Equal Sums Distribution for 20

It has total 400 numbers. Let's 400 distribution of numbers in such a way that each set with 36 numbers results in equal sums:

$$D_1 := \{1, 2, \ldots, 18, 12979, 12978, \ldots, 12996\}; \qquad \text{Total Sum } D_1 := 259218$$
$$D_2 := \{19, 20, \ldots, 36, 12961, 12962, \ldots, 12978\}; \qquad \text{Total Sum } D_2 := 259218$$
$$\ldots \quad \ldots \quad \ldots \qquad \ldots$$
$$\ldots \quad \ldots \quad \ldots \qquad \ldots$$
$$D_{399} := \{6463, 6464, \ldots, 6480, 6517, 6518, \ldots, 6534\}; \qquad \text{Total Sum } D_{399} := 259218$$
$$D_{400} := \{6481, 6481, \ldots, 6498, 6499, 6500, \ldots, 6516\}; \qquad \text{Total Sum } D_{400} := 259218$$

Below are four examples of magic squares of order 6×6 based on above distributions. These are separately for each magic square of order 6 given above.

1						43203
1	14399	14398	14397	2	6	43203
14394	8	14392	9	11	14389	43203
14388	14387	15	16	14384	13	43203
18	14	14385	14386	17	14383	43203
7	14390	10	14391	14393	12	43203
14395	5	3	4	14396	14400	43203
43203	43203	43203	43203	43203	43203	43203

2						43203
19	14381	14380	14379	20	24	43203
14376	26	14374	27	29	14371	43203
14370	14369	33	34	14366	31	43203
36	32	14367	14368	35	14365	43203
25	14372	28	14373	14375	30	43203
14377	23	21	22	14378	14382	43203
43203	43203	43203	43203	43203	43203	43203

399						43203
7183	7217	7216	7215	7184	7188	43203
7212	7190	7210	7191	7193	7207	43203
7206	7205	7197	7198	7202	7195	43203
7200	7196	7203	7204	7199	7201	43203
7189	7208	7192	7209	7211	7194	43203
7213	7187	7185	7186	7214	7218	43203
43203	43203	43203	43203	43203	43203	43203

400						43203
7165	7235	7234	7233	7166	7170	43203
7230	7172	7228	7173	7175	7225	43203
7224	7223	7179	7180	7220	7177	43203
7182	7178	7221	7222	7181	7219	43203
7171	7226	7174	7227	7229	7176	43203
7231	7169	7167	7168	7232	7236	43203
43203	43203	43203	43203	43203	43203	43203

1							43203
	6	14394	3	14400	4	14396	43203
	14399	17	14386	11	14388	2	43203
	14393	12	14387	18	14385	8	43203
	14391	14390	13	14384	15	10	43203
	9	14383	16	14389	14	14392	43203
	5	7	14398	1	14397	14395	43203
	43203	43203	43203	43203	43203	43203	43203

2							43203
	24	14376	21	14382	22	14378	43203
	14381	35	14368	29	14370	20	43203
	14375	30	14369	36	14367	26	43203
	14373	14372	31	14366	33	28	43203
	27	14365	34	14371	32	14374	43203
	23	25	14380	19	14379	14377	43203
	43203	43203	43203	43203	43203	43203	43203

399							43203
	7188	7212	7185	7218	7186	7214	43203
	7217	7199	7204	7193	7206	7184	43203
	7211	7194	7205	7200	7203	7190	43203
	7209	7208	7195	7202	7197	7192	43203
	7191	7201	7198	7207	7196	7210	43203
	7187	7189	7216	7183	7215	7213	43203
	43203	43203	43203	43203	43203	43203	43203

400							43203
	7170	7230	7167	7236	7168	7232	43203
	7235	7181	7222	7175	7224	7166	43203
	7229	7176	7223	7182	7221	7172	43203
	7227	7226	7177	7220	7179	7174	43203
	7173	7219	7180	7225	7178	7228	43203
	7169	7171	7234	7165	7233	7231	43203
	43203	43203	43203	43203	43203	43203	43203

1						43203
17	14386	11	14388	14393	8	43203
12	14387	18	14385	14391	10	43203
14390	13	14384	15	14399	2	43203
14383	16	14389	14	9	14392	43203
4	3	14400	14394	6	14396	43203
14397	14398	1	7	5	14395	43203
43203	43203	43203	43203	43203	43203	43203

2						43203
35	14368	29	14370	14375	26	43203
30	14369	36	14367	14373	28	43203
14372	31	14366	33	14381	20	43203
14365	34	14371	32	27	14374	43203
22	21	14382	14376	24	14378	43203
14379	14380	19	25	23	14377	43203
43203	43203	43203	43203	43203	43203	43203

399						43203
7199	7204	7193	7206	7211	7190	43203
7194	7205	7200	7203	7209	7192	43203
7208	7195	7202	7197	7217	7184	43203
7201	7198	7207	7196	7191	7210	43203
7186	7185	7218	7212	7188	7214	43203
7215	7216	7183	7189	7187	7213	43203
43203	43203	43203	43203	43203	43203	43203

400						43203
7181	7222	7175	7224	7229	7172	43203
7176	7223	7182	7221	7227	7174	43203
7226	7177	7220	7179	7235	7166	43203
7219	7180	7225	7178	7173	7228	43203
7168	7167	7236	7230	7170	7232	43203
7233	7234	7165	7171	7169	7231	43203
43203	43203	43203	43203	43203	43203	43203

In a Table of order 20×20, total we have 400 numbers. Replacing each number by their respective distribution according to given above, we get a magic squares of order 120 multiples of equal sums of magic squares of order 6. Since there are three magic squares of order 6, thus, we get three magic squares of order 120. See the attached **excel file**.

In the magic squares orders 114 and 120, the distribution is considered in such a way that removing the external border of order 6, still we are left with magic squares of lower orders. Based on this idea, below we shall give some examples magic squares up to order 36 derived from above two big magic squares. For complete work see the **excel file** attached with this work.

2.4 Magic Squares of Order 36

Below are three examples of magic squares of order 36 obtained from magic squares of order 120. It is obtained by the application of the formula $\frac{a^2-b^2}{2}$, $a>b$, i.e., subtract $\frac{120^2-36^2}{2} := 6552$ from each entry of magic square order 120, we get the following three magic squares of order 36:

1	mgc	22566	24654	26520	27300	15078	23346	22926	23934	27384	27804	14430	23346	23070	23646	27744	28020	14142	23346	23286	23214	27744	27804	14790	23346	23574	22638	27240	27012	16662	23346	23646	22494	26376	26076	18606	23346
	1	1295	1294	1293	2	6	19	1277	1276	1275	20	24	37	1259	1258	1257	38	42	55	1241	1240	1239	56	60	73	1223	1222	1221	74	78	91	1205	1204	1203	92	96	23346
	1290	8	1288	9	11	1285	1272	26	1270	27	29	1267	1254	44	1252	45	47	1249	1236	62	1234	63	65	1231	1218	80	1216	81	83	1213	1200	98	1198	99	101	1195	23346
	1284	1283	15	16	1280	13	1266	1265	33	34	1262	31	1248	1247	51	52	1244	49	1230	1229	69	70	1226	67	1212	1211	87	88	1208	85	1194	1193	105	106	1190	103	23346
	18	14	1281	1282	17	1279	36	32	1263	1264	35	1261	54	50	1245	1246	53	1243	72	68	1227	1228	71	1225	90	86	1209	1210	89	1207	108	104	1191	1192	107	1189	23346
	7	1286	10	1287	1289	12	25	1268	28	1269	1271	30	43	1250	46	1251	1253	48	61	1232	64	1233	1235	66	79	1214	82	1215	1217	84	97	1196	100	1197	1199	102	23346
	1291	5	3	4	1292	1296	1273	23	21	22	1274	1278	1255	41	39	40	1256	1260	1237	59	57	58	1238	1242	1219	77	75	76	1220	1224	1201	95	93	94	1202	1206	23346
	343	953	952	951	344	348	361	935	934	933	362	366	379	917	916	915	380	384	397	899	898	897	398	402	415	881	880	879	416	420	109	1187	1186	1185	110	114	23346
	948	350	946	351	353	943	930	368	928	369	371	925	912	386	910	387	389	907	894	404	892	405	407	889	876	422	874	423	425	871	1182	116	1180	117	119	1177	23346
	942	941	357	358	938	355	924	923	375	376	920	373	906	905	393	394	902	391	888	887	411	412	884	409	870	869	429	430	866	427	1176	1175	123	124	1172	121	23346
	360	356	939	940	359	937	378	374	921	922	377	919	396	392	903	904	395	901	414	410	885	886	413	883	432	428	867	868	431	865	126	122	1173	1174	125	1171	23346
	349	944	352	945	947	354	367	926	370	927	929	372	385	908	388	909	911	390	403	890	406	891	893	408	421	872	424	873	875	426	115	1178	118	1179	1181	120	23346
	949	347	345	346	950	954	931	365	363	364	932	936	913	383	381	382	914	918	895	401	399	400	896	900	877	419	417	418	878	882	1183	113	111	112	1184	1188	23346
	325	971	970	969	326	330	559	737	736	735	560	564	577	719	718	717	578	582	595	701	700	699	596	600	433	863	862	861	434	438	127	1169	1168	1167	128	132	23346
	966	332	964	333	335	961	732	566	730	567	569	727	714	584	712	585	587	709	696	602	694	603	605	691	858	440	856	441	443	853	1164	134	1162	135	137	1159	23346
	960	959	339	340	956	337	726	725	573	574	722	571	708	707	591	592	704	589	690	689	609	610	686	607	852	851	447	448	848	445	1158	1157	141	142	1154	139	23346
	342	338	957	958	341	955	576	572	723	724	575	721	594	590	705	706	593	703	612	608	687	688	611	685	450	446	849	850	449	847	144	140	1155	1156	143	1153	23346
	331	962	334	963	965	336	565	728	568	729	731	570	583	710	586	711	713	588	601	692	604	693	695	606	439	854	442	855	857	444	133	1160	136	1161	1163	138	23346
	967	329	327	328	968	972	733	563	561	562	734	738	715	581	579	580	716	720	697	599	597	598	698	702	859	437	435	436	860	864	1165	131	129	130	1166	1170	23346
	307	989	988	987	308	312	541	755	754	753	542	546	631	665	664	663	632	636	613	683	682	681	614	618	451	845	844	843	452	456	145	1151	1150	1149	146	150	23346
	984	314	982	315	317	979	750	548	748	549	551	745	660	638	658	639	641	655	678	620	676	621	623	673	840	458	838	459	461	835	1146	152	1144	153	155	1141	23346
	978	977	321	322	974	319	744	743	555	556	740	553	654	653	645	646	650	643	672	671	627	628	668	625	834	833	465	466	830	463	1140	1139	159	160	1136	157	23346
	324	320	975	976	323	973	558	554	741	742	557	739	648	644	651	652	647	649	630	626	669	670	629	667	468	464	831	832	467	829	162	158	1137	1138	161	1135	23346
	313	980	316	981	983	318	547	746	550	747	749	552	637	656	640	657	659	642	619	674	622	675	677	624	457	836	460	837	839	462	151	1142	154	1143	1145	156	23346
	985	311	309	310	986	990	751	545	543	544	752	756	661	635	633	634	662	666	679	617	615	616	680	684	841	455	453	454	842	846	1147	149	147	148	1148	1152	23346
	289	1007	1006	1005	290	294	523	773	772	771	524	528	505	791	790	789	506	510	487	809	808	807	488	492	469	827	826	825	470	474	163	1133	1132	1131	164	168	23346
	1002	296	1000	297	299	997	768	530	766	531	533	763	786	512	784	513	515	781	804	494	802	495	497	799	822	476	820	477	479	817	1128	170	1126	171	173	1123	23346
	996	995	303	304	992	301	762	761	537	538	758	535	780	779	519	520	776	517	798	797	501	502	794	499	816	815	483	484	812	481	1122	1121	177	178	1118	175	23346
	306	302	993	994	305	991	540	536	759	760	539	757	522	518	777	778	521	775	504	500	795	796	503	793	486	482	813	814	485	811	180	176	1119	1120	179	1117	23346
	295	998	298	999	1001	300	529	764	532	765	767	534	511	782	514	783	785	516	493	800	496	801	803	498	475	818	478	819	821	480	169	1124	172	1125	1127	174	23346
	1003	293	291	292	1004	1008	769	527	525	526	770	774	787	509	507	508	788	792	805	491	489	490	806	810	823	473	471	472	824	828	1129	167	165	166	1130	1134	23346
	271	1025	1024	1023	272	276	253	1043	1042	1041	254	258	235	1061	1060	1059	236	240	217	1079	1078	1077	218	222	199	1097	1096	1095	200	204	181	1115	1114	1113	182	186	23346
	1020	278	1018	279	281	1015	1038	260	1036	261	263	1033	1056	242	1054	243	245	1051	1074	224	1072	225	227	1069	1092	206	1090	207	209	1087	1110	188	1108	189	191	1105	23346
	1014	1013	285	286	1010	283	1032	1031	267	268	1028	265	1050	1049	249	250	1046	247	1068	1067	231	232	1064	229	1086	1085	213	214	1082	211	1104	1103	195	196	1100	193	23346
	288	284	1011	1012	287	1009	270	266	1029	1030	269	1027	252	248	1047	1048	251	1045	234	230	1065	1066	233	1063	216	212	1083	1084	215	1081	198	194	1101	1102	197	1099	23346
	277	1016	280	1017	1019	282	259	1034	262	1035	1037	264	241	1052	244	1053	1055	246	223	1070	226	1071	1073	228	205	1088	208	1089	1091	210	187	1106	190	1107	1109	192	23346
	1021	275	273	274	1022	1026	1039	257	255	256	1040	1044	1057	239	237	238	1058	1062	1075	221	219	220	1076	1080	1093	203	201	202	1094	1098	1111	185	183	184	1112	1116	23346
	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346

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2	mgc	26598	26010	16224	23412	23874	23346	27462	27234	14856	23412	23514	23346	27822	27738	14280	23412	23370	23346	27822	27954	14496	23412	23154	23346	27318	27738	15792	23412	22866	23346	26454	26946	17592	23412	22794	23346
	1292	1290	3	1296	4	6	1274	1272	21	1278	22	24	1256	1254	39	1260	40	42	1238	1236	57	1242	58	60	1220	1218	75	1224	76	78	1202	1200	93	1206	94	96	23346
	2	17	1282	11	1284	1295	20	35	1264	29	1266	1277	38	53	1246	47	1248	1259	56	71	1228	65	1230	1241	74	89	1210	83	1212	1223	92	107	1192	101	1194	1205	23346
	8	12	1283	18	1281	1289	26	30	1265	36	1263	1271	44	48	1247	54	1245	1253	62	66	1229	72	1227	1235	80	84	1211	90	1209	1217	98	102	1193	108	1191	1199	23346
	10	1286	13	1280	15	1287	28	1268	31	1262	33	1269	46	1250	49	1244	51	1251	64	1232	67	1226	69	1233	82	1214	85	1208	87	1215	100	1196	103	1190	105	1197	23346
	1288	1279	16	1285	14	9	1270	1261	34	1267	32	27	1252	1243	52	1249	50	45	1234	1225	70	1231	68	63	1216	1207	88	1213	86	81	1198	1189	106	1195	104	99	23346
	1291	7	1294	1	1293	5	1273	25	1276	19	1275	23	1255	43	1258	37	1257	41	1237	61	1240	55	1239	59	1219	79	1222	73	1221	77	1201	97	1204	91	1203	95	23346
	950	948	345	954	346	348	932	930	363	936	364	366	914	912	381	918	382	384	896	894	399	900	400	402	878	876	417	882	418	420	1184	1182	111	1188	112	114	23346
	344	359	940	353	942	953	362	377	922	371	924	935	380	395	904	389	906	917	398	413	886	407	888	899	416	431	868	425	870	881	110	125	1174	119	1176	1187	23346
	350	354	941	360	939	947	368	372	923	378	921	929	386	390	905	396	903	911	404	408	887	414	885	893	422	426	869	432	867	875	116	120	1175	126	1173	1181	23346
	352	944	355	938	357	945	370	926	373	920	375	927	388	908	391	902	393	909	406	890	409	884	411	891	424	872	427	866	429	873	118	1178	121	1172	123	1179	23346
	946	937	358	943	356	351	928	919	376	925	374	369	910	901	394	907	392	387	892	883	412	889	410	405	874	865	430	871	428	423	1180	1171	124	1177	122	117	23346
	949	349	952	343	951	347	931	367	934	361	933	365	913	385	916	379	915	383	895	403	898	397	897	401	877	421	880	415	879	419	1183	115	1186	109	1185	113	23346
	968	966	327	972	328	330	734	732	561	738	562	564	716	714	579	720	580	582	698	696	597	702	598	600	860	858	435	864	436	438	1166	1164	129	1170	130	132	23346
	326	341	958	335	960	971	560	575	724	569	726	737	578	593	706	587	708	719	596	611	688	605	690	701	434	449	850	443	852	863	128	143	1156	137	1158	1169	23346
	332	336	959	342	957	965	566	570	725	576	723	731	584	588	707	594	705	713	602	606	689	612	687	695	440	444	851	450	849	857	134	138	1157	144	1155	1163	23346
	334	962	337	956	339	963	568	728	571	722	573	729	586	710	589	704	591	711	604	692	607	686	609	693	442	854	445	848	447	855	136	1160	139	1154	141	1161	23346
	964	955	340	961	338	333	730	721	574	727	572	567	712	703	592	709	590	585	694	685	610	691	608	603	856	847	448	853	446	441	1162	1153	142	1159	140	135	23346
	967	331	970	325	969	329	733	565	736	559	735	563	715	583	718	577	717	581	697	601	700	595	699	599	859	439	862	433	861	437	1165	133	1168	127	1167	131	23346
	986	984	309	990	310	312	752	750	543	756	544	546	662	660	633	666	634	636	680	678	615	684	616	618	842	840	453	846	454	456	1148	1146	147	1152	148	150	23346
	308	323	976	317	978	989	542	557	742	551	744	755	632	647	652	641	654	665	614	629	670	623	672	683	452	467	832	461	834	845	146	161	1138	155	1140	1151	23346
	314	318	977	324	975	983	548	552	743	558	741	749	638	642	653	648	651	659	620	624	671	630	669	677	458	462	833	468	831	839	152	156	1139	162	1137	1145	23346
	316	980	319	974	321	981	550	746	553	740	555	747	640	656	643	650	645	657	622	674	625	668	627	675	460	836	463	830	465	837	154	1142	157	1136	159	1143	23346
	982	973	322	979	320	315	748	739	556	745	554	549	658	649	646	655	644	639	676	667	628	673	626	621	838	829	466	835	464	459	1144	1135	160	1141	158	153	23346
	985	313	988	307	987	311	751	547	754	541	753	545	661	637	664	631	663	635	679	619	682	613	681	617	841	457	844	451	843	455	1147	151	1150	145	1149	149	23346
	1004	1002	291	1008	292	294	770	768	525	774	526	528	788	786	507	792	508	510	806	804	489	810	490	492	824	822	471	828	472	474	1130	1128	165	1134	166	168	23346
	290	305	994	299	996	1007	524	539	760	533	762	773	506	521	778	515	780	791	488	503	796	497	798	809	470	485	814	479	816	827	164	179	1120	173	1122	1133	23346
	296	300	995	306	993	1001	530	534	761	540	759	767	512	516	779	522	777	785	494	498	797	504	795	803	476	480	815	486	813	821	170	174	1121	180	1119	1127	23346
	298	998	301	992	303	999	532	764	535	758	537	765	514	782	517	776	519	783	496	800	499	794	501	801	478	818	481	812	483	819	172	1124	175	1118	177	1125	23346
	1000	991	304	997	302	297	766	757	538	763	536	531	784	775	520	781	518	513	802	793	502	799	500	495	820	811	484	817	482	477	1126	1117	178	1123	176	171	23346
	1003	295	1006	289	1005	293	769	529	772	523	771	527	787	511	790	505	789	509	805	493	808	487	807	491	823	475	826	469	825	473	1129	169	1132	163	1131	167	23346
	1022	1020	273	1026	274	276	1040	1038	255	1044	256	258	1058	1056	237	1062	238	240	1076	1074	219	1080	220	222	1094	1092	201	1098	202	204	1112	1110	183	1116	184	186	23346
	272	287	1012	281	1014	1025	254	269	1030	263	1032	1043	236	251	1048	245	1050	1061	218	233	1066	227	1068	1079	200	215	1084	209	1086	1097	182	197	1102	191	1104	1115	23346
	278	282	1013	288	1011	1019	260	264	1031	270	1029	1037	242	246	1049	252	1047	1055	224	228	1067	234	1065	1073	206	210	1085	216	1083	1091	188	192	1103	198	1101	1109	23346
	280	1016	283	1010	285	1017	262	1034	265	1028	267	1035	244	1052	247	1046	249	1053	226	1070	229	1064	231	1071	208	1088	211	1082	213	1089	190	1106	193	1100	195	1107	23346
	1018	1009	286	1015	284	279	1036	1027	268	1033	266	261	1054	1045	250	1051	248	243	1072	1063	232	1069	230	225	1090	1081	214	1087	212	207	1108	1099	196	1105	194	189	23346
	1021	277	1024	271	1023	275	1039	259	1042	253	1041	257	1057	241	1060	235	1059	239	1075	223	1078	217	1077	221	1093	205	1096	199	1095	203	1111	187	1114	181	1113	185	23346
	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346

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3	mgc	22944	20616	23898	23346	26538	23346	23304	19392	23538	23346	27402	23346	23448	18888	23394	23346	27762	23346	23664	18672	23178	23346	27762	23346	23952	18888	22890	23346	27258	23346	24024	19680	22818	23346	26394	23346
	17	1282	11	1284	1289	8	35	1264	29	1266	1271	26	53	1246	47	1248	1253	44	71	1228	65	1230	1235	62	89	1210	83	1212	1217	80	107	1192	101	1194	1199	98	23346
	12	1283	18	1281	1287	10	30	1265	36	1263	1269	28	48	1247	54	1245	1251	46	66	1229	72	1227	1233	64	84	1211	90	1209	1215	82	102	1193	108	1191	1197	100	23346
	1286	13	1280	15	1295	2	1268	31	1262	33	1277	20	1250	49	1244	51	1259	38	1232	67	1226	69	1241	56	1214	85	1208	87	1223	74	1196	103	1190	105	1205	92	23346
	1279	16	1285	14	9	1288	1261	34	1267	32	27	1270	1243	52	1249	50	45	1252	1225	70	1231	68	63	1234	1207	88	1213	86	81	1216	1189	106	1195	104	99	1198	23346
	4	3	1296	1290	6	1292	22	21	1278	1272	24	1274	40	39	1260	1254	42	1256	58	57	1242	1236	60	1238	76	75	1224	1218	78	1220	94	93	1206	1200	96	1202	23346
	1293	1294	1	7	5	1291	1275	1276	19	25	23	1273	1257	1258	37	43	41	1255	1239	1240	55	61	59	1237	1221	1222	73	79	77	1219	1203	1204	91	97	95	1201	23346
	359	940	353	942	947	350	377	922	371	924	929	368	395	904	389	906	911	386	413	886	407	888	893	404	431	868	425	870	875	422	125	1174	119	1176	1181	116	23346
	354	941	360	939	945	352	372	923	378	921	927	370	390	905	396	903	909	388	408	887	414	885	891	406	426	869	432	867	873	424	120	1175	126	1173	1179	118	23346
	944	355	938	357	953	344	926	373	920	375	935	362	908	391	902	393	917	380	890	409	884	411	899	398	872	427	866	429	881	416	1178	121	1172	123	1187	110	23346
	937	358	943	356	351	946	919	376	925	374	369	928	901	394	907	392	387	910	883	412	889	410	405	892	865	430	871	428	423	874	1171	124	1177	122	117	1180	23346
	346	345	954	948	348	950	364	363	936	930	366	932	382	381	918	912	384	914	400	399	900	894	402	896	418	417	882	876	420	878	112	111	1188	1182	114	1184	23346
	951	952	343	349	347	949	933	934	361	367	365	931	915	916	379	385	383	913	897	898	397	403	401	895	879	880	415	421	419	877	1185	1186	109	115	113	1183	23346
	341	958	335	960	965	332	575	724	569	726	731	566	593	706	587	708	713	584	611	688	605	690	695	602	449	850	443	852	857	440	143	1156	137	1158	1163	134	23346
	336	959	342	957	963	334	570	725	576	723	729	568	588	707	594	705	711	586	606	689	612	687	693	604	444	851	450	849	855	442	138	1157	144	1155	1161	136	23346
	962	337	956	339	971	326	728	571	722	573	737	560	710	589	704	591	719	578	692	607	686	609	701	596	854	445	848	447	863	434	1160	139	1154	141	1169	128	23346
	955	340	961	338	333	964	721	574	727	572	567	730	703	592	709	590	585	712	685	610	691	608	603	694	847	448	853	446	441	856	1153	142	1159	140	135	1162	23346
	328	327	972	966	330	968	562	561	738	732	564	734	580	579	720	714	582	716	598	597	702	696	600	698	436	435	864	858	438	860	130	129	1170	1164	132	1166	23346
	969	970	325	331	329	967	735	736	559	565	563	733	717	718	577	583	581	715	699	700	595	601	599	697	861	862	433	439	437	859	1167	1168	127	133	131	1165	23346
	323	976	317	978	983	314	557	742	551	744	749	548	647	652	641	654	659	638	629	670	623	672	677	620	467	832	461	834	839	458	161	1138	155	1140	1145	152	23346
	318	977	324	975	981	316	552	743	558	741	747	550	642	653	648	651	657	640	624	671	630	669	675	622	462	833	468	831	837	460	156	1139	162	1137	1143	154	23346
	980	319	974	321	989	308	746	553	740	555	755	542	656	643	650	645	665	632	674	625	668	627	683	614	836	463	830	465	845	452	1142	157	1136	159	1151	146	23346
	973	322	979	320	315	982	739	556	745	554	549	748	649	646	655	644	639	658	667	628	673	626	621	676	829	466	835	464	459	838	1135	160	1141	158	153	1144	23346
	310	309	990	984	312	986	544	543	756	750	546	752	634	633	666	660	636	662	616	615	684	678	618	680	454	453	846	840	456	842	148	147	1152	1146	150	1148	23346
	987	988	307	313	311	985	753	754	541	547	545	751	663	664	631	637	635	661	681	682	613	619	617	679	843	844	451	457	455	841	1149	1150	145	151	149	1147	23346
	305	994	299	996	1001	296	539	760	533	762	767	530	521	778	515	780	785	512	503	796	497	798	803	494	485	814	479	816	821	476	179	1120	173	1122	1127	170	23346
	300	995	306	993	999	298	534	761	540	759	765	532	516	779	522	777	783	514	498	797	504	795	801	496	480	815	486	813	819	478	174	1121	180	1119	1125	172	23346
	998	301	992	303	1007	290	764	535	758	537	773	524	782	517	776	519	791	506	800	499	794	501	809	488	818	481	812	483	827	470	1124	175	1118	177	1133	164	23346
	991	304	997	302	297	1000	757	538	763	536	531	766	775	520	781	518	513	784	793	502	799	500	495	802	811	484	817	482	477	820	1117	178	1123	176	171	1126	23346
	292	291	1008	1002	294	1004	526	525	774	768	528	770	508	507	792	786	510	788	490	489	810	804	492	806	472	471	828	822	474	824	166	165	1134	1128	168	1130	23346
	1005	1006	289	295	293	1003	771	772	523	529	527	769	789	790	505	511	509	787	807	808	487	493	491	805	825	826	469	475	473	823	1131	1132	163	169	167	1129	23346
	287	1012	281	1014	1019	278	269	1030	263	1032	1037	260	251	1048	245	1050	1055	242	233	1066	227	1068	1073	224	215	1084	209	1086	1091	206	197	1102	191	1104	1109	188	23346
	282	1013	288	1011	1017	280	264	1031	270	1029	1035	262	246	1049	252	1047	1053	244	228	1067	234	1065	1071	226	210	1085	216	1083	1089	208	192	1103	198	1101	1107	190	23346
	1016	283	1010	285	1025	272	1034	265	1028	267	1043	254	1052	247	1046	249	1061	236	1070	229	1064	231	1079	218	1088	211	1082	213	1097	200	1106	193	1100	195	1115	182	23346
	1009	286	1015	284	279	1018	1027	268	1033	266	261	1036	1045	250	1051	248	243	1054	1063	232	1069	230	225	1072	1081	214	1087	212	207	1090	1099	196	1105	194	189	1108	23346
	274	273	1026	1020	276	1022	256	255	1044	1038	258	1040	238	237	1062	1056	240	1058	220	219	1080	1074	222	1076	202	201	1098	1092	204	1094	184	183	1116	1110	186	1112	23346
	1023	1024	271	277	275	1021	1041	1042	253	259	257	1039	1059	1060	235	241	239	1057	1077	1078	217	223	221	1075	1095	1096	199	205	203	1093	1113	1114	181	187	185	1111	23346
	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346	23346

2.5 Magic Squares of Order 30

Below are three examples of magic squares of order 30 obtained from magic squares of order 114. It is obtained by the application of the formula $\frac{a^2-b^2}{2}, a > b$, i.e., subtract $\frac{114^2-30^2}{2} := 6048$ from each entry of magic square order 114, we get the following three magic squares of order 36:

1	mgc	12943	14449	15422	15994	8335	13515	13303	13729	15926	16138	8407	13515	13303	13729	16070	16282	8119	13515	13663	13009	15854	15706	9631	13515	13663	13009	15278	15130	10783	13515
	1	899	898	897	2	6	19	881	880	879	20	24	37	863	862	861	38	42	55	845	844	843	56	60	73	827	826	825	74	78	13515
	894	8	892	9	11	889	876	26	874	27	29	871	858	44	856	45	47	853	840	62	838	63	65	835	822	80	820	81	83	817	13515
	888	887	15	16	884	13	870	869	33	34	866	31	852	851	51	52	848	49	834	833	69	70	830	67	816	815	87	88	812	85	13515
	18	14	885	886	17	883	36	32	867	868	35	865	54	50	849	850	53	847	72	68	831	832	71	829	90	86	813	814	89	811	13515
	7	890	10	891	893	12	25	872	28	873	875	30	43	854	46	855	857	48	61	836	64	837	839	66	79	818	82	819	821	84	13515
	895	5	3	4	896	900	877	23	21	22	878	882	859	41	39	40	860	864	841	59	57	58	842	846	823	77	75	76	824	828	13515
	271	629	628	627	272	276	289	611	610	609	290	294	307	593	592	591	308	312	325	575	574	573	326	330	91	809	808	807	92	96	13515
	624	278	622	279	281	619	606	296	604	297	299	601	588	314	586	315	317	583	570	332	568	333	335	565	804	98	802	99	101	799	13515
	618	617	285	286	614	283	600	599	303	304	596	301	582	581	321	322	578	319	564	563	339	340	560	337	798	797	105	106	794	103	13515
	288	284	615	616	287	613	306	302	597	598	305	595	324	320	579	580	323	577	342	338	561	562	341	559	108	104	795	796	107	793	13515
	277	620	280	621	623	282	295	602	298	603	605	300	313	584	316	585	587	318	331	566	334	567	569	336	97	800	100	801	803	102	13515
	625	275	273	274	626	630	607	293	291	292	608	612	589	311	309	310	590	594	571	329	327	328	572	576	805	95	93	94	806	810	13515
	253	647	646	645	254	258	415	485	484	483	416	420	433	467	466	465	434	438	343	557	556	555	344	348	109	791	790	789	110	114	13515
	642	260	640	261	263	637	480	422	478	423	425	475	462	440	460	441	443	457	552	350	550	351	353	547	786	116	784	117	119	781	13515
	636	635	267	268	632	265	474	473	429	430	470	427	456	455	447	448	452	445	546	545	357	358	542	355	780	779	123	124	776	121	13515
	270	266	633	634	269	631	432	428	471	472	431	469	450	446	453	454	449	451	360	356	543	544	359	541	126	122	777	778	125	775	13515
	259	638	262	639	641	264	421	476	424	477	479	426	439	458	442	459	461	444	349	548	352	549	551	354	115	782	118	783	785	120	13515
	643	257	255	256	644	648	481	419	417	418	482	486	463	437	435	436	464	468	553	347	345	346	554	558	787	113	111	112	788	792	13515
	235	665	664	663	236	240	397	503	502	501	398	402	379	521	520	519	380	384	361	539	538	537	362	366	127	773	772	771	128	132	13515
	660	242	658	243	245	655	498	404	496	405	407	493	516	386	514	387	389	511	534	368	532	369	371	529	768	134	766	135	137	763	13515
	654	653	249	250	650	247	492	491	411	412	488	409	510	509	393	394	506	391	528	527	375	376	524	373	762	761	141	142	758	139	13515
	252	248	651	652	251	649	414	410	489	490	413	487	396	392	507	508	395	505	378	374	525	526	377	523	144	140	759	760	143	757	13515
	241	656	244	657	659	246	403	494	406	495	497	408	385	512	388	513	515	390	367	530	370	531	533	372	133	764	136	765	767	138	13515
	661	239	237	238	662	666	499	401	399	400	500	504	517	383	381	382	518	522	535	365	363	364	536	540	769	131	129	130	770	774	13515
	217	683	682	681	218	222	199	701	700	699	200	204	181	719	718	717	182	186	163	737	736	735	164	168	145	755	754	753	146	150	13515
	678	224	676	225	227	673	696	206	694	207	209	691	714	188	712	189	191	709	732	170	730	171	173	727	750	152	748	153	155	745	13515
	672	671	231	232	668	229	690	689	213	214	686	211	708	707	195	196	704	193	726	725	177	178	722	175	744	743	159	160	740	157	13515
	234	230	669	670	233	667	216	212	687	688	215	685	198	194	705	706	197	703	180	176	723	724	179	721	162	158	741	742	161	739	13515
	223	674	226	675	677	228	205	692	208	693	695	210	187	710	190	711	713	192	169	728	172	729	731	174	151	746	154	747	749	156	13515
	679	221	219	220	680	684	697	203	201	202	698	702	715	185	183	184	716	720	733	167	165	166	734	738	751	149	147	148	752	756	13515
	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515

2	mgc	15487	15075	9134	13570	13877	13515	15991	15939	8486	13570	13517	13515	16135	16083	8198	13570	13517	13515	15919	16227	8990	13570	13157	13515	15343	15651	10142	13570	13157	13515
	896	894	3	900	4	6	878	876	21	882	22	24	860	858	39	864	40	42	842	840	57	846	58	60	824	822	75	828	76	78	13515
	2	17	886	11	888	899	20	35	868	29	870	881	38	53	850	47	852	863	56	71	832	65	834	845	74	89	814	83	816	827	13515
	8	12	887	18	885	893	26	30	869	36	867	875	44	48	851	54	849	857	62	66	833	72	831	839	80	84	815	90	813	821	13515
	10	890	13	884	15	891	28	872	31	866	33	873	46	854	49	848	51	855	64	836	67	830	69	837	82	818	85	812	87	819	13515
	892	883	16	889	14	9	874	865	34	871	32	27	856	847	52	853	50	45	838	829	70	835	68	63	820	811	88	817	86	81	13515
	895	7	898	1	897	5	877	25	880	19	879	23	859	43	862	37	861	41	841	61	844	55	843	59	823	79	826	73	825	77	13515
	626	624	273	630	274	276	608	606	291	612	292	294	590	588	309	594	310	312	572	570	327	576	328	330	806	804	93	810	94	96	13515
	272	287	616	281	618	629	290	305	598	299	600	611	308	323	580	317	582	593	326	341	562	335	564	575	92	107	796	101	798	809	13515
	278	282	617	288	615	623	296	300	599	306	597	605	314	318	581	324	579	587	332	336	563	342	561	569	98	102	797	108	795	803	13515
	280	620	283	614	285	621	298	602	301	596	303	603	316	584	319	578	321	585	334	566	337	560	339	567	100	800	103	794	105	801	13515
	622	613	286	619	284	279	604	595	304	601	302	297	586	577	322	583	320	315	568	559	340	565	338	333	802	793	106	799	104	99	13515
	625	277	628	271	627	275	607	295	610	289	609	293	589	313	592	307	591	311	571	331	574	325	573	329	805	97	808	91	807	95	13515
	644	642	255	648	256	258	482	480	417	486	418	420	464	462	435	468	436	438	554	552	345	558	346	348	788	786	111	792	112	114	13515
	254	269	634	263	636	647	416	431	472	425	474	485	434	449	454	443	456	467	344	359	544	353	546	557	110	125	778	119	780	791	13515
	260	264	635	270	633	641	422	426	473	432	471	479	440	444	455	450	453	461	350	354	545	360	543	551	116	120	779	126	777	785	13515
	262	638	265	632	267	639	424	476	427	470	429	477	442	458	445	452	447	459	352	548	355	542	357	549	118	782	121	776	123	783	13515
	640	631	268	637	266	261	478	469	430	475	428	423	460	451	448	457	446	441	550	541	358	547	356	351	784	775	124	781	122	117	13515
	643	259	646	253	645	257	481	421	484	415	483	419	463	439	466	433	465	437	553	349	556	343	555	347	787	115	790	109	789	113	13515
	662	660	237	666	238	240	500	498	399	504	400	402	518	516	381	522	382	384	536	534	363	540	364	366	770	768	129	774	130	132	13515
	236	251	652	245	654	665	398	413	490	407	492	503	380	395	508	389	510	521	362	377	526	371	528	539	128	143	760	137	762	773	13515
	242	246	653	252	651	659	404	408	491	414	489	497	386	390	509	396	507	515	368	372	527	378	525	533	134	138	761	144	759	767	13515
	244	656	247	650	249	657	406	494	409	488	411	495	388	512	391	506	393	513	370	530	373	524	375	531	136	764	139	758	141	765	13515
	658	649	250	655	248	243	496	487	412	493	410	405	514	505	394	511	392	387	532	523	376	529	374	369	766	757	142	763	140	135	13515
	661	241	664	235	663	239	499	403	502	397	501	401	517	385	520	379	519	383	535	367	538	361	537	365	769	133	772	127	771	131	13515
	680	678	219	684	220	222	698	696	201	702	202	204	716	714	183	720	184	186	734	732	165	738	166	168	752	750	147	756	148	150	13515
	218	233	670	227	672	683	200	215	688	209	690	701	182	197	706	191	708	719	164	179	724	173	726	737	146	161	742	155	744	755	13515
	224	228	671	234	669	677	206	210	689	216	687	695	188	192	707	198	705	713	170	174	725	180	723	731	152	156	743	162	741	749	13515
	226	674	229	668	231	675	208	692	211	686	213	693	190	710	193	704	195	711	172	728	175	722	177	729	154	746	157	740	159	747	13515
	676	667	232	673	230	225	694	685	214	691	212	207	712	703	196	709	194	189	730	721	178	727	176	171	748	739	160	745	158	153	13515
	679	223	682	217	681	221	697	205	700	199	699	203	715	187	718	181	717	185	733	169	736	163	735	167	751	151	754	145	753	149	13515
	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515

3	mgc	13258	11900	13897	13515	15437	13515	13618	11036	13537	13515	15941	13515	13618	10892	13537	13515	16085	13515	13978	10748	13177	13515	15869	13515	13978	11324	13177	13515	15293	13515
	17	886	11	888	893	8	35	868	29	870	875	26	53	850	47	852	857	44	71	832	65	834	839	62	89	814	83	816	821	80	13515
	12	887	18	885	891	10	30	869	36	867	873	28	48	851	54	849	855	46	66	833	72	831	837	64	84	815	90	813	819	82	13515
	890	13	884	15	899	2	872	31	866	33	881	20	854	49	848	51	863	38	836	67	830	69	845	56	818	85	812	87	827	74	13515
	883	16	889	14	9	892	865	34	871	32	27	874	847	52	853	50	45	856	829	70	835	68	63	838	811	88	817	86	81	820	13515
	4	3	900	894	6	896	22	21	882	876	24	878	40	39	864	858	42	860	58	57	846	840	60	842	76	75	828	822	78	824	13515
	897	898	1	7	5	895	879	880	19	25	23	877	861	862	37	43	41	859	843	844	55	61	59	841	825	826	73	79	77	823	13515
	287	616	281	618	623	278	305	598	299	600	605	296	323	580	317	582	587	314	341	562	335	564	569	332	107	796	101	798	803	98	13515
	282	617	288	615	621	280	300	599	306	597	603	298	318	581	324	579	585	316	336	563	342	561	567	334	102	797	108	795	801	100	13515
	620	283	614	285	629	272	602	301	596	303	611	290	584	319	578	321	593	308	566	337	560	339	575	326	800	103	794	105	809	92	13515
	613	286	619	284	279	622	595	304	601	302	297	604	577	322	583	320	315	586	559	340	565	338	333	568	793	106	799	104	99	802	13515
	274	273	630	624	276	626	292	291	612	606	294	608	310	309	594	588	312	590	328	327	576	570	330	572	94	93	810	804	96	806	13515
	627	628	271	277	275	625	609	610	289	295	293	607	591	592	307	313	311	589	573	574	325	331	329	571	807	808	91	97	95	805	13515
	269	634	263	636	641	260	431	472	425	474	479	422	449	454	443	456	461	440	359	544	353	546	551	350	125	778	119	780	785	116	13515
	264	635	270	633	639	262	426	473	432	471	477	424	444	455	450	453	459	442	354	545	360	543	549	352	120	779	126	777	783	118	13515
	638	265	632	267	647	254	476	427	470	429	485	416	458	445	452	447	467	434	548	355	542	357	557	344	782	121	776	123	791	110	13515
	631	268	637	266	261	640	469	430	475	428	423	478	451	448	457	446	441	460	541	358	547	356	351	550	775	124	781	122	117	784	13515
	256	255	648	642	258	644	418	417	486	480	420	482	436	435	468	462	438	464	346	345	558	552	348	554	112	111	792	786	114	788	13515
	645	646	253	259	257	643	483	484	415	421	419	481	465	466	433	439	437	463	555	556	343	349	347	553	789	790	109	115	113	787	13515
	251	652	245	654	659	242	413	490	407	492	497	404	395	508	389	510	515	386	377	526	371	528	533	368	143	760	137	762	767	134	13515
	246	653	252	651	657	244	408	491	414	489	495	406	390	509	396	507	513	388	372	527	378	525	531	370	138	761	144	759	765	136	13515
	656	247	650	249	665	236	494	409	488	411	503	398	512	391	506	393	521	380	530	373	524	375	539	362	764	139	758	141	773	128	13515
	649	250	655	248	243	658	487	412	493	410	405	496	505	394	511	392	387	514	523	376	529	374	369	532	757	142	763	140	135	766	13515
	238	237	666	660	240	662	400	399	504	498	402	500	382	381	522	516	384	518	364	363	540	534	366	536	130	129	774	768	132	770	13515
	663	664	235	241	239	661	501	502	397	403	401	499	519	520	379	385	383	517	537	538	361	367	365	535	771	772	127	133	131	769	13515
	233	670	227	672	677	224	215	688	209	690	695	206	197	706	191	708	713	188	179	724	173	726	731	170	161	742	155	744	749	152	13515
	228	671	234	669	675	226	210	689	216	687	693	208	192	707	198	705	711	190	174	725	180	723	729	172	156	743	162	741	747	154	13515
	674	229	668	231	683	218	692	211	686	213	701	200	710	193	704	195	719	182	728	175	722	177	737	164	746	157	740	159	755	146	13515
	667	232	673	230	225	676	685	214	691	212	207	694	703	196	709	194	189	712	721	178	727	176	171	730	739	160	745	158	153	748	13515
	220	219	684	678	222	680	202	201	702	696	204	698	184	183	720	714	186	716	166	165	738	732	168	734	148	147	756	750	150	752	13515
	681	682	217	223	221	679	699	700	199	205	203	697	717	718	181	187	185	715	735	736	163	169	167	733	753	754	145	151	149	751	13515
	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515	13515

2.6 Magic Squares of Order 24

Below are three examples of magic squares of order 24 obtained from magic squares of order 36. It is obtained by the application of the formula $\frac{a^2-b^2}{2}$, $a>b$, i.e., subtract $\frac{36^2-24^2}{2} := 360$ from each entry of magic square order 36, we get the following three magic squares of order 24:

1	mgc	6560	7484	7924	8288	4112	6924	6776	7052	8212	8360	4184	6924	6920	6764	8140	8144	4760	6924	6992	6620	7852	7784	5552	6924
	1	575	574	573	2	6	19	557	556	555	20	24	37	539	538	537	38	42	55	521	520	519	56	60	6924
	570	8	568	9	11	565	552	26	550	27	29	547	534	44	532	45	47	529	516	62	514	63	65	511	6924
	564	563	15	16	560	13	546	545	33	34	542	31	528	527	51	52	524	49	510	509	69	70	506	67	6924
	18	14	561	562	17	559	36	32	543	544	35	541	54	50	525	526	53	523	72	68	507	508	71	505	6924
	7	566	10	567	569	12	25	548	28	549	551	30	43	530	46	531	533	48	61	512	64	513	515	66	6924
	571	5	3	4	572	576	553	23	21	22	554	558	535	41	39	40	536	540	517	59	57	58	518	522	6924
	199	377	376	375	200	204	217	359	358	357	218	222	235	341	340	339	236	240	73	503	502	501	74	78	6924
	372	206	370	207	209	367	354	224	352	225	227	349	336	242	334	243	245	331	498	80	496	81	83	493	6924
	366	365	213	214	362	211	348	347	231	232	344	229	330	329	249	250	326	247	492	491	87	88	488	85	6924
	216	212	363	364	215	361	234	230	345	346	233	343	252	248	327	328	251	325	90	86	489	490	89	487	6924
	205	368	208	369	371	210	223	350	226	351	353	228	241	332	244	333	335	246	79	494	82	495	497	84	6924
	373	203	201	202	374	378	355	221	219	220	356	360	337	239	237	238	338	342	499	77	75	76	500	504	6924
	181	395	394	393	182	186	271	305	304	303	272	276	253	323	322	321	254	258	91	485	484	483	92	96	6924
	390	188	388	189	191	385	300	278	298	279	281	295	318	260	316	261	263	313	480	98	478	99	101	475	6924
	384	383	195	196	380	193	294	293	285	286	290	283	312	311	267	268	308	265	474	473	105	106	470	103	6924
	198	194	381	382	197	379	288	284	291	292	287	289	270	266	309	310	269	307	108	104	471	472	107	469	6924
	187	386	190	387	389	192	277	296	280	297	299	282	259	314	262	315	317	264	97	476	100	477	479	102	6924
	391	185	183	184	392	396	301	275	273	274	302	306	319	257	255	256	320	324	481	95	93	94	482	486	6924
	163	413	412	411	164	168	145	431	430	429	146	150	127	449	448	447	128	132	109	467	466	465	110	114	6924
	408	170	406	171	173	403	426	152	424	153	155	421	444	134	442	135	137	439	462	116	460	117	119	457	6924
	402	401	177	178	398	175	420	419	159	160	416	157	438	437	141	142	434	139	456	455	123	124	452	121	6924
	180	176	399	400	179	397	162	158	417	418	161	415	144	140	435	436	143	433	126	122	453	454	125	451	6924
	169	404	172	405	407	174	151	422	154	423	425	156	133	440	136	441	443	138	115	458	118	459	461	120	6924
	409	167	165	166	410	414	427	149	147	148	428	432	445	131	129	130	446	450	463	113	111	112	464	468	6924
	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924

2	mgc	7976	7740	4564	6968	7120	6924	8264	8244	4204	6968	6904	6924	8192	8316	4492	6968	6760	6924	7904	8100	5140	6968	6688	6924
	572	570	3	576	4	6	554	552	21	558	22	24	536	534	39	540	40	42	518	516	57	522	58	60	6924
	2	17	562	11	564	575	20	35	544	29	546	557	38	53	526	47	528	539	56	71	508	65	510	521	6924
	8	12	563	18	561	569	26	30	545	36	543	551	44	48	527	54	525	533	62	66	509	72	507	515	6924
	10	566	13	560	15	567	28	548	31	542	33	549	46	530	49	524	51	531	64	512	67	506	69	513	6924
	568	559	16	565	14	9	550	541	34	547	32	27	532	523	52	529	50	45	514	505	70	511	68	63	6924
	571	7	574	1	573	5	553	25	556	19	555	23	535	43	538	37	537	41	517	61	520	55	519	59	6924
	374	372	201	378	202	204	356	354	219	360	220	222	338	336	237	342	238	240	500	498	75	504	76	78	6924
	200	215	364	209	366	377	218	233	346	227	348	359	236	251	328	245	330	341	74	89	490	83	492	503	6924
	206	210	365	216	363	371	224	228	347	234	345	353	242	246	329	252	327	335	80	84	491	90	489	497	6924
	208	368	211	362	213	369	226	350	229	344	231	351	244	332	247	326	249	333	82	494	85	488	87	495	6924
	370	361	214	367	212	207	352	343	232	349	230	225	334	325	250	331	248	243	496	487	88	493	86	81	6924
	373	205	376	199	375	203	355	223	358	217	357	221	337	241	340	235	339	239	499	79	502	73	501	77	6924
	392	390	183	396	184	186	302	300	273	306	274	276	320	318	255	324	256	258	482	480	93	486	94	96	6924
	182	197	382	191	384	395	272	287	292	281	294	305	254	269	310	263	312	323	92	107	472	101	474	485	6924
	188	192	383	198	381	389	278	282	293	288	291	299	260	264	311	270	309	317	98	102	473	108	471	479	6924
	190	386	193	380	195	387	280	296	283	290	285	297	262	314	265	308	267	315	100	476	103	470	105	477	6924
	388	379	196	385	194	189	298	289	286	295	284	279	316	307	268	313	266	261	478	469	106	475	104	99	6924
	391	187	394	181	393	185	301	277	304	271	303	275	319	259	322	253	321	257	481	97	484	91	483	95	6924
	410	408	165	414	166	168	428	426	147	432	148	150	446	444	129	450	130	132	464	462	111	468	112	114	6924
	164	179	400	173	402	413	146	161	418	155	420	431	128	143	436	137	438	449	110	125	454	119	456	467	6924
	170	174	401	180	399	407	152	156	419	162	417	425	134	138	437	144	435	443	116	120	455	126	453	461	6924
	172	404	175	398	177	405	154	422	157	416	159	423	136	440	139	434	141	441	118	458	121	452	123	459	6924
	406	397	178	403	176	171	424	415	160	421	158	153	442	433	142	439	140	135	460	451	124	457	122	117	6924
	409	169	412	163	411	167	427	151	430	145	429	149	445	133	448	127	447	131	463	115	466	109	465	113	6924
	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924

3	mgc	6812	6064	7136	6924	7936	6924	7028	5560	6920	6924	8224	6924	7172	5488	6776	6924	8152	6924	7244	5704	6704	6924	7864	6924
	17	562	11	564	569	8	35	544	29	546	551	26	53	526	47	528	533	44	71	508	65	510	515	62	6924
	12	563	18	561	567	10	30	545	36	543	549	28	48	527	54	525	531	46	66	509	72	507	513	64	6924
	566	13	560	15	575	2	548	31	542	33	557	20	530	49	524	51	539	38	512	67	506	69	521	56	6924
	559	16	565	14	9	568	541	34	547	32	27	550	523	52	529	50	45	532	505	70	511	68	63	514	6924
	4	3	576	570	6	572	22	21	558	552	24	554	40	39	540	534	42	536	58	57	522	516	60	518	6924
	573	574	1	7	5	571	555	556	19	25	23	553	537	538	37	43	41	535	519	520	55	61	59	517	6924
	215	364	209	366	371	206	233	346	227	348	353	224	251	328	245	330	335	242	89	490	83	492	497	80	6924
	210	365	216	363	369	208	228	347	234	345	351	226	246	329	252	327	333	244	84	491	90	489	495	82	6924
	368	211	362	213	377	200	350	229	344	231	359	218	332	247	326	249	341	236	494	85	488	87	503	74	6924
	361	214	367	212	207	370	343	232	349	230	225	352	325	250	331	248	243	334	487	88	493	86	81	496	6924
	202	201	378	372	204	374	220	219	360	354	222	356	238	237	342	336	240	338	76	75	504	498	78	500	6924
	375	376	199	205	203	373	357	358	217	223	221	355	339	340	235	241	239	337	501	502	73	79	77	499	6924
	197	382	191	384	389	188	287	292	281	294	299	278	269	310	263	312	317	260	107	472	101	474	479	98	6924
	192	383	198	381	387	190	282	293	288	291	297	280	264	311	270	309	315	262	102	473	108	471	477	100	6924
	386	193	380	195	395	182	296	283	290	285	305	272	314	265	308	267	323	254	476	103	470	105	485	92	6924
	379	196	385	194	189	388	289	286	295	284	279	298	307	268	313	266	261	316	469	106	475	104	99	478	6924
	184	183	396	390	186	392	274	273	306	300	276	302	256	255	324	318	258	320	94	93	486	480	96	482	6924
	393	394	181	187	185	391	303	304	271	277	275	301	321	322	253	259	257	319	483	484	91	97	95	481	6924
	179	400	173	402	407	170	161	418	155	420	425	152	143	436	137	438	443	134	125	454	119	456	461	116	6924
	174	401	180	399	405	172	156	419	162	417	423	154	138	437	144	435	441	136	120	455	126	453	459	118	6924
	404	175	398	177	413	164	422	157	416	159	431	146	440	139	434	141	449	128	458	121	452	123	467	110	6924
	397	178	403	176	171	406	415	160	421	158	153	424	433	142	439	140	135	442	451	124	457	122	117	460	6924
	166	165	414	408	168	410	148	147	432	426	150	428	130	129	450	444	132	446	112	111	468	462	114	464	6924
	411	412	163	169	167	409	429	430	145	151	149	427	447	448	127	133	131	445	465	466	109	115	113	463	6924
	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924	6924

2.7 Magic Squares of Order 18

Below are three examples of magic squares of order 18 obtained from magic squares of order 30. It is obtained by the application of the formula $\frac{a^2-b^2}{2}$, $a > b$, i.e., subtract $\frac{30^2-18^2}{2} := 288$ from each entry of magic square order 30, we get the following three magic squares of order 18:

1	mgc	2697	3255	3378	3606	1545	2925	2913	2823	3450	3462	2049	2925	2913	2823	3306	3318	2337	2925
	1	323	322	321	2	6	19	305	304	303	20	24	37	287	286	285	38	42	2925
	318	8	316	9	11	313	300	26	298	27	29	295	282	44	280	45	47	277	2925
	312	311	15	16	308	13	294	293	33	34	290	31	276	275	51	52	272	49	2925
	18	14	309	310	17	307	36	32	291	292	35	289	54	50	273	274	53	271	2925
	7	314	10	315	317	12	25	296	28	297	299	30	43	278	46	279	281	48	2925
	319	5	3	4	320	324	301	23	21	22	302	306	283	41	39	40	284	288	2925
	127	197	196	195	128	132	145	179	178	177	146	150	55	269	268	267	56	60	2925
	192	134	190	135	137	187	174	152	172	153	155	169	264	62	262	63	65	259	2925
	186	185	141	142	182	139	168	167	159	160	164	157	258	257	69	70	254	67	2925
	144	140	183	184	143	181	162	158	165	166	161	163	72	68	255	256	71	253	2925
	133	188	136	189	191	138	151	170	154	171	173	156	61	260	64	261	263	66	2925
	193	131	129	130	194	198	175	149	147	148	176	180	265	59	57	58	266	270	2925
	109	215	214	213	110	114	91	233	232	231	92	96	73	251	250	249	74	78	2925
	210	116	208	117	119	205	228	98	226	99	101	223	246	80	244	81	83	241	2925
	204	203	123	124	200	121	222	221	105	106	218	103	240	239	87	88	236	85	2925
	126	122	201	202	125	199	108	104	219	220	107	217	90	86	237	238	89	235	2925
	115	206	118	207	209	120	97	224	100	225	227	102	79	242	82	243	245	84	2925
	211	113	111	112	212	216	229	95	93	94	230	234	247	77	75	76	248	252	2925
	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925

2	mgc	3417	3285	1794	2958	3027	2925	3489	3573	1866	2958	2811	2925	3345	3429	2154	2958	2811	2925
	320	318	3	324	4	6	302	300	21	306	22	24	284	282	39	288	40	42	2925
	2	17	310	11	312	323	20	35	292	29	294	305	38	53	274	47	276	287	2925
	8	12	311	18	309	317	26	30	293	36	291	299	44	48	275	54	273	281	2925
	10	314	13	308	15	315	28	296	31	290	33	297	46	278	49	272	51	279	2925
	316	307	16	313	14	9	298	289	34	295	32	27	280	271	52	277	50	45	2925
	319	7	322	1	321	5	301	25	304	19	303	23	283	43	286	37	285	41	2925
	194	192	129	198	130	132	176	174	147	180	148	150	266	264	57	270	58	60	2925
	128	143	184	137	186	197	146	161	166	155	168	179	56	71	256	65	258	269	2925
	134	138	185	144	183	191	152	156	167	162	165	173	62	66	257	72	255	263	2925
	136	188	139	182	141	189	154	170	157	164	159	171	64	260	67	254	69	261	2925
	190	181	142	187	140	135	172	163	160	169	158	153	262	253	70	259	68	63	2925
	193	133	196	127	195	131	175	151	178	145	177	149	265	61	268	55	267	59	2925
	212	210	111	216	112	114	230	228	93	234	94	96	248	246	75	252	76	78	2925
	110	125	202	119	204	215	92	107	220	101	222	233	74	89	238	83	240	251	2925
	116	120	203	126	201	209	98	102	221	108	219	227	80	84	239	90	237	245	2925
	118	206	121	200	123	207	100	224	103	218	105	225	82	242	85	236	87	243	2925
	208	199	124	205	122	117	226	217	106	223	104	99	244	235	88	241	86	81	2925
	211	115	214	109	213	113	229	97	232	91	231	95	247	79	250	73	249	77	2925
	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925

3	mgc	2886	2532	3039	2925	3387	2925	3102	2244	2823	2925	3459	2925	3102	2388	2823	2925	3315	2925
	17	310	11	312	317	8	35	292	29	294	299	26	53	274	47	276	281	44	2925
	12	311	18	309	315	10	30	293	36	291	297	28	48	275	54	273	279	46	2925
	314	13	308	15	323	2	296	31	290	33	305	20	278	49	272	51	287	38	2925
	307	16	313	14	9	316	289	34	295	32	27	298	271	52	277	50	45	280	2925
	4	3	324	318	6	320	22	21	306	300	24	302	40	39	288	282	42	284	2925
	321	322	1	7	5	319	303	304	19	25	23	301	285	286	37	43	41	283	2925
	143	184	137	186	191	134	161	166	155	168	173	152	71	256	65	258	263	62	2925
	138	185	144	183	189	136	156	167	162	165	171	154	66	257	72	255	261	64	2925
	188	139	182	141	197	128	170	157	164	159	179	146	260	67	254	69	269	56	2925
	181	142	187	140	135	190	163	160	169	158	153	172	253	70	259	68	63	262	2925
	130	129	198	192	132	194	148	147	180	174	150	176	58	57	270	264	60	266	2925
	195	196	127	133	131	193	177	178	145	151	149	175	267	268	55	61	59	265	2925
	125	202	119	204	209	116	107	220	101	222	227	98	89	238	83	240	245	80	2925
	120	203	126	201	207	118	102	221	108	219	225	100	84	239	90	237	243	82	2925
	206	121	200	123	215	110	224	103	218	105	233	92	242	85	236	87	251	74	2925
	199	124	205	122	117	208	217	106	223	104	99	226	235	88	241	86	81	244	2925
	112	111	216	210	114	212	94	93	234	228	96	230	76	75	252	246	78	248	2925
	213	214	109	115	113	211	231	232	91	97	95	229	249	250	73	79	77	247	2925
	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925

Bordered Magic Squares Multiples of 6, **Zenodo**,
July 25, 2023, pp. 1-32, *https://doi.org/10.5281/zenodo.8184983*

2.8 Magic Squares of Order 12

Below are three examples of magic squares of order 24 obtained from magic squares of order 24. It is obtained by the application of the formula $\frac{a^2-b^2}{2}$, $a>b$, i.e., subtract $\frac{24^2-12^2}{2} := 216$ from each entry of magic square order 24, we get the following three magic squares of order 12:

1	mgc	778	970	992	1084	490	870	850	826	992	1012	706	870
	1	143	142	141	2	6	19	125	124	123	20	24	870
	138	8	136	9	11	133	120	26	118	27	29	115	870
	132	131	15	16	128	13	114	113	33	34	110	31	870
	18	14	129	130	17	127	36	32	111	112	35	109	870
	7	134	10	135	137	12	25	116	28	117	119	30	870
	139	5	3	4	140	144	121	23	21	22	122	126	870
	55	89	88	87	56	60	37	107	106	105	38	42	870
	84	62	82	63	65	79	102	44	100	45	47	97	870
	78	77	69	70	74	67	96	95	51	52	92	49	870
	72	68	75	76	71	73	54	50	93	94	53	91	870
	61	80	64	81	83	66	43	98	46	99	101	48	870
	85	59	57	58	86	90	103	41	39	40	104	108	870
	870	870	870	870	870	870	870	870	870	870	870	870	870

2	mgc	1018	990	536	892	878	870	1018	1062	608	892	806	870
	140	138	3	144	4	6	122	120	21	126	22	24	870
	2	17	130	11	132	143	20	35	112	29	114	125	870
	8	12	131	18	129	137	26	30	113	36	111	119	870
	10	134	13	128	15	135	28	116	31	110	33	117	870
	136	127	16	133	14	9	118	109	34	115	32	27	870
	139	7	142	1	141	5	121	25	124	19	123	23	870
	86	84	57	90	58	60	104	102	39	108	40	42	870
	56	71	76	65	78	89	38	53	94	47	96	107	870
	62	66	77	72	75	83	44	48	95	54	93	101	870
	64	80	67	74	69	81	46	98	49	92	51	99	870
	82	73	70	79	68	63	100	91	52	97	50	45	870
	85	61	88	55	87	59	103	43	106	37	105	41	870
	870	870	870	870	870	870	870	870	870	870	870	870	870

3	mgc	904	728	886	870	998	870	976	656	814	870	998	870
	17	130	11	132	137	8	35	112	29	114	119	26	870
	12	131	18	129	135	10	30	113	36	111	117	28	870
	134	13	128	15	143	2	116	31	110	33	125	20	870
	127	16	133	14	9	136	109	34	115	32	27	118	870
	4	3	144	138	6	140	22	21	126	120	24	122	870
	141	142	1	7	5	139	123	124	19	25	23	121	870
	71	76	65	78	83	62	53	94	47	96	101	44	870
	66	77	72	75	81	64	48	95	54	93	99	46	870
	80	67	74	69	89	56	98	49	92	51	107	38	870
	73	70	79	68	63	82	91	52	97	50	45	100	870
	58	57	90	84	60	86	40	39	108	102	42	104	870
	87	88	55	61	59	85	105	106	37	43	41	103	870
	870	870	870	870	870	870	870	870	870	870	870	870	870

3 Author's Contribution to Magic Squares and Recreation Numbers

For author's contribution to **magic squares** and **recreation numbers** please see the links below:

- **Inder J. Taneja**, Magic Squares, *https://inderjtaneja.com/2019/06/27/publications-magic-squares/*
- **Inder J. Taneja**, Recreation of Numbers, *https://inderjtaneja.com/2019/06/27/publications-recreation-of-numbers/*

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- **Block-Wise Magic Squares**

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