Yamuna

GRAMS : DIGITALS

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YAMUNA DIGITAL ELECTRONICS (P) LTD.

8-2-629, ROAD NO. 1, BANJARA HILLS

HYDERABAD-500034 (A.P.)

With Best wishes to Chitra from Bhavaji.

With best compliments from :

Book No. 8

Grams : 'DIGITALS'

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Yamuna Digital Electronics Private Limited

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DIGITAL & ANALOG INSTRUMENTS AND SYSTEMS
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Summary

(1, 2, 3, 4) — 6 cases
(1, 2, 3, 4, 5) — 8 "
(1, 3, 4, 5) — 2 cases
(1, 3, 5, 7) — 5 cases
(1, 4, 5, 6) — 2 cases
(1, 5, 6, 7) — 3 cases
(1, 6, 7, 8) — nil
(1, 7, 8, 9) — 2 cases
(1, 8, 9, 10) — nil
(1, 9, 10, 11) — 3 cases
(1, 10, 11, 12) — nil
(1, 14, 15, 16) — 2 cases
(1, 15, 16, 17) — 3 cases
(1, 16, 17, 18) — 1 case

(1, 18, 19, 20) up to (1, 22, 23, 24) — nil

Total = 29 × 7 = 203 cases.

37 × 7 = 259 cases

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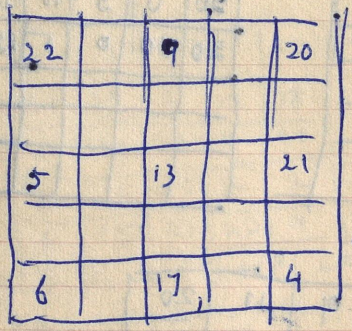
Friday 2

4, 5, 6, 9

$f + g + h = 49$ or 29

Take 2 reversals cases & (2)
test by this method

Eg. 104, f. 358 g main both



$a+b = 14$.
$c+d = 32$
$f+g+h+(a-b) = 39$
$e+f-h+(c-d) = 13$
$a+b = 2+12 = 3+11$.
$c+d = 7+25 = 8+24$
$= 14+18 =$

1, 2, 3, 7, 8, 10, 11, 12
14, 15, 16, 18, 19, 23, 24, 25

(1) $a+b = 2+12$
$c+d = 7+25$

3, 8, 10, 11
15, 16, 18, 23

$f+g+h = 49$ or 29.
$e+f-h \pm 18 = 13$

f, g, h = 15, 16, 18
8, 10, 11 ✗

(2) $a+b = 2+12$
$c+d = 14+18$ ✗ this or Eg. 104 or f. 358

(3) $a+b = 3+11$
$c+d = 7+25$
2, 8, 10, 12 all even ✗

$f+g+h = 47$ or 31

Wednesday 7

$a+b=3+11$ | 1, 2, 7, 10
$c+d=14+18$ | 16, 19, 24, 25

$f+g+h=47 \Rightarrow 31$

$f, g, h = 3, 10, 19$
$7, 16, 25$

$e+f-h+4=13$ $\quad 2e+24-16+4=13$, $e=1$, $g=7$.

2	3	4	1	5
4	2	1	5	3

20	0	5	10	15
20	10	0	5	15

22	3	9	11	20
			10	12
18	24	1	20	
5	7	13	19	21
14	16	25	2	8
6	15	17	23	4

this is fig. 104 on p. 358

Splitting index (P) + (R)

1, 3, 4, 1, 5
3, 4, 1, 5, 2
5, 2, 3, 4, 1

20, 0, 5, 10, 15
15, 20, 0, 5, 10
0, 5, 10, 15, 20

This is 4 variable index type

(3)

(4) $a+b = 3+11$ } [illegible], 7, 10, 12 / 14, 16, 19, 25 } $f+g+h = 47$ or 31

$c+d = 8+24$

$e+f-h+16 = 13$

$f, g, h = 12, 16, 19$ or $10, 12, 25$

$e+12-16+16 = 13$

$e = 1,\ g = 19.$

22	3	9	11	20
24	12	1	10	18
5	19	13	7	21
8	16	25	14	2
6	15	17	23	4

Splitting this into (P) + (R) we don't have different cyclic [illegible] type

A mistake fig. 107, p. 359 with skeleton (5, 20, 19, 2)

77
33

6		5		24
19		13		7
2		21		20

$a+b = 30$

$c+d = 38$

1, 3, 4, 8, 9, 10, 11, 12
14, 15, 16, 17, 18, 22, 23, 25.

$a+b = 8+22 = 12+18$
$= 14+16$

$c+d = 15+23 = 16+22$

Friday 9

(1)

1, 3, 5, 2, 4
3, 2, 4, 5, 1
4, 5, 3, 1, 2
5, 1, 2, 4, 3
2, 4, 1, 3, 5

5, 5, 0, 20, 20
20, 10, 5, 5, 10

9, 4, 5, 6
5, 20, 19, 2

(2)

6	12	5	18	24
23	4	17	10	11
19	25	13	1	7
15	16	9	22	3
2	8	21	4	20

(3)

h = 359.

(1) 39 T 14 Sat 10/Sun 11

$a+b = 8+22$ | {1, 9, 10, 12}
$c+d = 15+23$ | {1, 9, 14, 16, 17, 25}

$f+g+h = 53$ or 25

12, 16, 25

$e+f-h \pm 8 = 13$

$e+12-16+8 = 13$

$e = 9, g = 25$

6	8	9	22	24
23	12	9	10	11
19	25	13	1	7
15	16	17	14	3
2	4	21	18	20

Not the fastest solution

(2) $a+b = 12+18$ } 1, 4, 9, 10
$c+d = 15+23$ } 16, 17, 22, 25

$f+g+h = 45$ or 33.

4, 16, 25

$e+f-h \pm 8 = 13$

$e+4-16+8 = 13, e = 17, g = 25$

(3) $a+b = 12+18$ | 1, 3, 9, 11
$c+d = 16+22$ | 15, 17, 22, 25

$f+g+h = 45$ or 33, 3, 17, 25

$e+f-h \pm 6 = 13$ $e = 11, g = 3$.

$e+25-17-6 = 13$

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Monday 12

So corresponding to Fig. 104 we get one more not of the variable indices type

& corresponding to Fig. 107, we get two more of the additive indices type.

3	1	4	2	5
5	3	1	4	2
2	5	3	1	4
4	2	5	3	1
1	4	2	5	3

$q = 1$

6	12	5	18	24
16	25	11	9	4
19	3	13	23	7
22	17	15	1	10
2	8	21	14	20

Splitting into (P) + (R)

1, 2, 5, 3, 4
1, 5, 1, 4, 4

5, 10, 0, 15, 20
15, 20, 10, 15, 0

not of the ~~Za~~ additive indices type

Let us take a regular cyclic square which is associated

15	0	20	5	10
0	20	5	10	15
20	5	10	15	0
5	10	15	0	20
10	15	0	20	5

$q = 4$

18	1	24	7	15
5	23	6	14	17
22	10	13	16	4
9	12	20	3	21
11	19	2	25	8

Here the skeleton is (24, 8, 22, 11).

$a + b = 8$ { 1, 3, 5, 6, 7, 9, 10, 12

$c + d = 14$ } 14, 16, 17, 19, 20, 21, 23, 25

Wednesday 14

(2) $a+b = 8+21,\ c+d = 10+23 \rightarrow 7\ 9(A)$

$a+b = 8+24$
$c+d = 12+21$ } $f+g+h = 55$ or 23
$e+f-h \pm g = 13$

3, 6, 7, 10 ~~16, 19, 20~~, $f = 16,\ h = 19,\ e = 7,\ g = 20$ } ✗

16, 19, 20, 23, $f = 20,\ h = 19,\ (+9)$
$e = 3,\ g = 16$ ✓

17	8	1	24	15
21	~~16~~	7		14
4	20	13		22
12	19		10	5
11	2	25	18	9

17	8	1	24	15
21	20	3	7	14
4	16	13	10	22
12	19	23	6	5
11	2	25	18	9

2, 3, 1, 4, 5 15, 5, 0, 20, 10
1, 5, 3, 2, 4 20, 15, 0, 5, 10

~~with~~ neither continuous step nor cycle, nor reversible index, nor additive index types

R.M's. (−1, 1), (1, −2), (−2, −1), (−1, −1)

(0, 2), (−2, 1), (−2, 1), (−1, 2) 0. (−1, 0) (2, −2)

(2, 1), (2, 1), | (2, 1), (0, 1) (2, −2)

(−1, 2), (−2, 1), (−2, 1), (0, 2) (−1, 0)

(−1, −1), (−2, −1), (1, −2), (−1, 1).

$a+b = 1+7 = 3+5$

$c+d = 5+9$

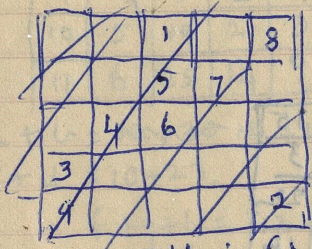
$a+b = 1+7,\ c+d = 5+9 \longrightarrow$ cyclic square

$a+b = 3+5$ } ✓

$c+d = 5+9$ } ✗

So only one case by the framework method exactly same as the cyclic square

Take a continuous step consecutive square



17	24	1	8	15
23	5	7	14	16
4	6	13	20	22
10	12	19	21	3
11	18	25	2	9

(A)

Skeletons (1, 9, 4, 11), (25, 17, 2, 15

$a+b = 32$ } 2, 3, 5, 6, 7, 8, 10, 12

$c+d = 33$ } 14, 16, 18, 19, 20, 21, 23, 24

$a+b = 8+24 = 12+20 = 14+18$

$c+d = 10+23 = 12+21 = 14+19$ (*)

Friday 16

(*)

2, 2, 1, 5, 5 — 15, 10, 0, 15, 10
3, 4, 2, 1, 1 — 20, 20, 5, 20, 15

neither cyclic nor either of 2 mason, but
A M/g & B M/g symmetrically
distributed

(*)(*)

17	14	1	18	15
10	21	7	24	3
4	20	13	6	22
23	2	9	5	16
11	8	25	12	9

2, 4, 1, 3, 5 — 15, 10, 0, 15, 10
5, 1, 3, 4, 2 — 5, 20, 5, 20, 0

neither cyclic nor either of the
pair of Mason's types

Sat 17/Sun 18

$a+b = 8+24$ } 3, 5, 6, 10 $f+g+h = 55$ or 23
$c+d = 14+19$ } 16, 20, 21, 23 $e+f-h \pm 5 = 13$

no 1, 7, h number

$a+b = 12+20$ } 2, 5, 7, 8 $f+g+h = 47$ or 31
$c+d = 10+23$ } 18, 19, 21, 24 $e+f-h \pm 13 = 13$

5, 18, 24. $f = 24, h = 5, e = 7$
$g = 18$

17	12	1	20	15
23	24	7	21	16
4	18	13	8	22
10	5	19	2	3
11	6	25	14	9

(*) not C-S

$a+b = \cancel{12+20}\ 14+18$ } 2, 5, 6, 7,
$c+d = 10+23.$ 19, 20, 21, 24

$f+g+h = 43$ or 35

$e+f-h \pm 13 = 13.$

$f, g, h = 2, 20, 21,$ $f = 21, h = 2, e = 7. g = 20$

(*) (*)

Try another cyclic arrangement square & see if framework will lead to length of it.

Monday 19

5	10	15	20	0
15	20	0	5	10
0	5	10	15	20
10	15	20	0	5
20	0	5	10	15

$q=3$

$a+b=34$
$c+d=30$
3, 4, 5, 6, 8, 9, 11, 12
14, 15, 17, 18, 20, 21, 22, 23

$a+b = 11+23 = 12+22 = 14+20$

$c+d = 8+22 = 9+21 = 12+18$

(1) $a+b = 11+23$ } 5, 6, 9, 12
$c+d = 8+22$ } 12, 17, 20, 24

$f+g+h = 51$ or 27

14, 17, 20

3 ~ 11

~ 11

$e+f-h = 14 = 13$.

$e+20-14 = 14 = 13$, $e=21$, $g=17$

$e+14-20+14 = 13$, $e=5$, $g=17$ ✓

this one

5	1	4	3	2
3	2	5	1	4
1	4	3	2	5
2	5	1	4	3
4	3	2	5	1

q = 2

10	11	19	23	2
18	24	5	6	14
1	9	13	17	25
12	20	21	4	8
24	3	7	15	16

(N)

*

3

associate & hamilt walk

(60)

framework 19, 16, 1, 24
2, 25, 10, 7.

Wednesday 21

5	1	4	3	2
3	5	1	2	4
1	2	3	4	5
2	4	5	1	3
4	3	2	5	1

5	10	15	20	0
5	15	20	10	0
0	15	10	5	20
20	10	0	5	15
20	0	15	10	15

(M) is not cyclic.

10	11	19	23	2
8	20	21	12	4
1	17	13	9	25
22	14	5	6	18
24	3	17	15	16

(M)

or

10	11	19	23	2
22	14	5	6	18
1	17	13	9	25
8	20	21	12	4
24	3	7	15	16

(2)

A → L by 2nd row ↔ 4th row

Friday 23

10	20	15	5	0
0	10	20	15	5
5	0	10	20	15
15	5	0	10	20
20	15	5	0	10

$q=1$

2	5	1	4	3
5	1	4	3	2
1	4	3	2	5
4	3	2	5	1
3	2	5	1	4

$q=2$

$q=4$

5	1	4	3	2
3	2	5	1	4
1	4	3	2	5
2	5	1	4	3
4	3	2	5	1

$q=2$

→

15	21	19	8	2
3	12	25	16	9
6	4	13	22	20
17	10	1	14	23
24	18	7	5	11

Semi-magik

Suppose it is just associative without being nasik like the one on p. 5

12	25	16	9	3
5	11	24	18	7
6	4	13	22	20
19	8	2	15	21
23	17	10	1	14

41 = 24

(59)

Skeleton is (16, 14, 6, 23)

$a+b = 34$ | 1, 2, 4, 5, 7, 8, 9, 11, 22, 24, 25
$c+d = 24$ | 15, 17, 18, 19, 21

$a+b = 9+25 = 15+19$

$c+d = 2+22 = 5+19 = 7+17 = 9+15$,

(1) $a+b = 9+25$ | 5, 7, 8, 11
$c+d = 2+22$ | 15, 18, 19, 21

3

$f+g+h = 55$ or 23

15, 19, 21

$c+f-h \pm 20 = 13$

X

Monday 26

15, 18, 22

(X) $a+f-h \pm 14 = 13$

$a+18-15-14=13$, $a=24$, $g=22$.

$a+15-18+14=13$, $a=2$, $g=22$.

12	9	16	25	3
5	18	24	11	7
6	22	13	4	20
19	15	2	8	21
23	1	10	17	14

This is same as the non-magic associated square of p.10 with 2nd & 4th cols interchanged

It looks as if in the pure associate cyclic square the skeleton method finds the same square or one obtained from it by interchange of 2nd & 4th cols or rows or 1st & 5th rows or cols

(2) $a+b = 9+25$ | 2, 4, 8, 11 — 39, 16
$c+d = 5+19$ | 15, 18, 22, 24
$f+g+h = 55$ or 23 — $e+f-h = 14 = 13$

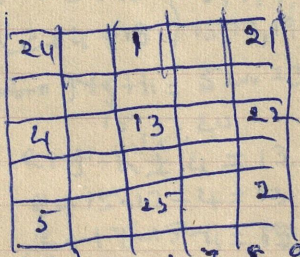
15, 18, 22, ~~e+f-h = 16 = 13~~

(3) $a+b = 15+19$ | 1, ~~2~~, 5, 8, 9
$c+d = 2+22$ | 17, 18, 21, 25
$f+g+h = 43$ or 35

~~8, 17, 18~~ not 1, 9, 11.

(4) $a+b = 15+19$

what about 1, 2, 4, 5



$a+b = 19$ } 3, 6, 7, 8, 9, 10, 11, 12
$c+d = 32$ } 14, 15, 16, 17, 18, 19, 20, 23

$a+b = 3+16 = 7+12 = 8+11 = 9+10$

$c+d = 9+23 = 12+20 = 14+18 = 15+17$.

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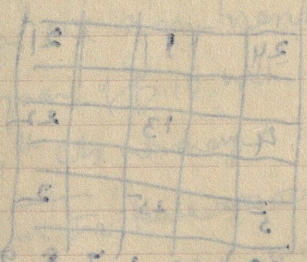
Wednesday 28

(1)

(2)

(3)



(1) $a+b = 3+16$ } 7,8,9,11
$c+d = 12+20$ } 15,17,18,19
$f+g+h = 52$ or 26
15,18,19 $e+f-h \pm 8 = 13$

$e+18-15-8$, $e=18$, $g=19$
or $e=8$, $g=19$

$e+19-15-8=13$
$e=17$, $g=18$
or $e=9$, $g=18$

2 cases

(2) $a+b = 3+16$ } 7,8,9,11
$c+d = 12+20$ } 15,17,18,19
$f+g+h = 52$ or 26.

(2) $a+b = 3+16$ } 6,7,9,11
$c+d = 14+18$ } 15,17,19,20
$f+g+h = 52$ or 23
15,17,20
$e+f-h \pm 4 = 13$.
$e+15-17-4=13$, $e=19$, $g=20$
$e+17-15-4=13$, $e=15$, $g=20$.
$e+15-17+4=13$, $e=11$, $g=20$
$e+17-15+4=13$, $e=7$, $g=20$.

2 cases

$e+17-20-4=13$, $e=20$, $g=15$
$e+17-20+4=13$, ✗
$e+20-17+4=13$, $e=6$, $g=15$.
$e+20-17-4=13$ ✗

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Friday 30

(3) $a+b = 3+16$ } 6, 7, 8, 13 ~~X~~ 13
$c+d = 15+17$ } 14, 18, 19, 20

$f+g+h = 52$ or 26
14, 18, 20

$e+f-h \pm 2 = 13$

$e+20-18+2 = 13$ X

$e+18-20-2 = 13$ X

$e+20-18-2 = 13$ X

$e+18-20+2 = 13$ X

$e+18-14+2 = 13$, $e=7$, $g=20$

$c+14-18-2 = 13$, ~~$e=$~~ X

1 Case: $e+18-14-2 = 13$, ~~$e=$~~ X

$e+14-18+2 =$ ~~X~~

39

(4) $a+b = 7+12$ } 6, 8, 10, 11
$c+d = 9+23$ } 15, 16, 18, 20.

$f+g+h = 44$ or 34

$f, g, h = 8, 16, 20$

$e+f-h \pm 14 = 13$

1 Case $e+20-8-14 = 13$, $e=15$, $g=16$. ✓

$e+8-20+14 = 13$, $e=11$, $g=16$

(5) $a+b = 7+12$ } 3, 6, 8, 10
$c+d = 15+17$ } 16, 18, 20, 23

$f+g+h = 44$ or 34.

8, 16, 20. $e+f-h \pm 2 = 14$ X

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Monday 2

(6) $a+b = 8+11$ } 6, 7, 10, 12
$c+d = 9+23$ } 14, 16, 19, 20

$f+g+h = 42$ or 36.

10, 12, 20, $e+f-h \pm 14 = 13$

$e+20-12-14 = 13$

1 Case

or $e=7, g=10$ $e=19, g=10$.

(7) $a+b = 8+11$ } 3, 7, 9, 10
$c+d = 12+20$ } 16, 17, 19, 23

$f+g+h = 42$ or 36.

9, 10, 23 $e+f-h \pm 8 = 13$

$e+23-9-8 = 13$, $e=7, g=9$.

1 Case

or $e=19, g=9$

(8) $a+b =$ ~~8 9~~ $+10$ } 3, 7, 8, 11
$c+d = 12+20$. } 15, 18, 19, 23

$f+g+h = 40$ or 38.

(9) $a+b = 9+10$ 3, 18, 19. $e+f-h \pm 8 = 13$ ✗
} 3, 6, 7, 11
$c+d = 14+18$ } 15, 19, 20, 23

$f+g+h = 40$ or 38

6, 15, 19. $e+f-h \pm 4 = 13$ ✗

15(a)

Wednesday 4

4+25 8+21

a+b = ~~5+24 = 8+21~~ = 12+17 =

c+d = 3+17 = 4+16 = 8+12

(1) a+b = 4+25 } 5, 8, 10, 12
c+d = 3+17 } 14, 16, 18, 21

f+g+h = 60 or 18 ~~not~~ f, g, h possible

(2) a+b = 4+25 } 3, 5, 9, 10
c+d = 8+12 } 16, 17, 21, 23

f+g+h = 60 or 18

f, g, h = 16, 21, 23, e+f-h ± 4 = 13

e+23-16-4 = 13, e = 10, ✗ g = 21 ✓

15	4	19	25	2
9	23	10		14
6	21	13		20
12	16			18
24	1	7	22	11

(3) a+b = 8+21 } 1, 4, 10, 12
c+d = 3+17 } 14, 16, 22, 25

f+g+h = 52 or 26

14, 16, 22

e+f-h ± 14 = 13

e+14-16+14 = 13,

e = 1, g = 22

(9)

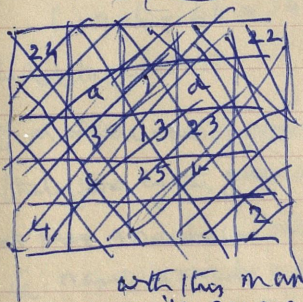
$a+b = 9+10$ } 3, 6, 7, 11
$c+d = 14+18$ } 15, 19, 20, 23

$f+g+h = 40$ or 38.

6, 11, 23 $e+f-h \pm 4 = 13$ ✗

~~6, 15, 19~~

8 cases in all



I think I had better stop here - 36

with this matrix skeleton method.

Take again - varied square on p. 10 (a)

15	8	19	21	2
17	14	1	10	23
6	22	13	4	20
3	16	25	12	9
24	5	7	18	11

$a+b = 29$ }
$c+d = 20$ }

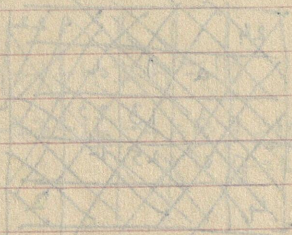
~~$f+g+h$~~

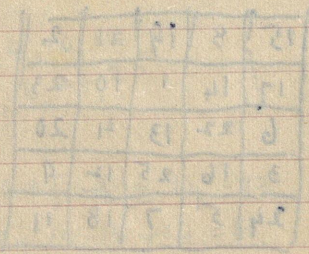
1, 3, 4, 5, 8, 9, 10, 12

14, 16, 17, 18, 21, 22, 23, ~~24~~

Same as above - result will be
2nd & 4th rows & 2nd & 4th cols interchanged

Friday 6





(4) $a+b = 8+21$ } 1, 3, 9, 12
$c+d = 4+16$ } 14, 17, 23, 25

$f+g+h = 52$ or 46.

12, 17, 23 $e+f-h \pm 12 = 13$

$e + \underline{12} - 23 + 12 = 13$, $c = \underline{12}$
$g = 17$ ✗

(5) $a+b =$ ~~[illegible]~~ $12+17$ } 1, 3, 5, 8
$c+d = 41+16$ } 18, 21, 23, 25

$f+g+h = 44$ or 34. no f, g, h possible

(~~[illegible]~~ $12+17$

if in semi-magic associated the only one is that given by the given square with rows $\pm$ cols interchanged

we have associated case only give with rows or cols "

if magic associated " ~~other~~ cases other than the given one are possible.

Rebetez method of 9ij. 104. p. 358.

$a+b = 2+12 = 3+11$

$c+d = 7+25 = 8+24 = 14+18$

$a+b = \overset{3+11}{\cancel{2+12}}$, $c+d = 14+18 \rightarrow$ 9ij. 104

$a+b = 3+11 = c+d = 8+24 \rightarrow$ another case

FEBRUARY 1976

$a+a' = c$
$a' = c-a$

Monday 9

$(a, b), (a^2+a', b+b')$

$(0, -1)$

$(1-a-a')2$

$(1-a+a^2-c)2$ $= 4$

$5-9+2$

$i = (1-1+2+1+1-2-1-1-2-1-1)$

$a' = -1$
$b' = -2$

$a+a' = 0$
$b+b' = -1.$

$(1+1-2)2 = 0$

$(1,1), (1,1), (1,1), (1,1)$ ——— $(0,-1)$.

$(1,1), (1,1), (1,1), (1,1)$ ——— $(0,-1)$

$(1,1), (1,1)$ | $b+b' = 0$, $b' = 1$. $c = (1-1+1)2 = 2$

$b = -1$, $f = (1-1+2)2 = 4$ (2)

$a' = 4$

$-1+1-2-1 = -3.$

$a+a' = -1$
$b+b = 0$

$-3+a' = -1$
$a' = 2.$

-4
$4-2-2-1$
$= -5$
$-5+b' = 2$
$b' = 7$

$(a, b) = (-1, -1)$
$a+a' = -1$
$b+b = 0$

$a' = 0$
$b' = 1$

$a+a' = 2$
$b+b' = -2$

$a' = 2+1 = 3$
$b' = -4$

(2) $= 4$

10 − 3 − 2

~~10 − 3~~ ~~(7 − 2) 2~~ − 10 = 0 //

$i = (1 + 1 - 1 + 2 + 1 + 0 + 2 + 2 + 1 + 0 + 0 - 2$
$+ 1 - 2) 2$

$= ~~(13 - 3) 2 = 20~~ . (11 - 5) 2 = 12 \equiv 2.$

$j = (1 - 1 + 2 + 1 + 1 - 2 - 1 - 1 - 2 - 1 - 1 + 0 + 2)^2$

$= (7 - 9) 2 = -4 \equiv 1$ X   −8 $(5 - 9)^2$

$(5 - 8 + 4) 2 = 14 \equiv 4$

$i = (1 + 1 - 1 + 2 + 1 - 0 + 2 + 2 - 2 - 0 - 2)^2$

$(9 - 5) 2 = 8 = 3$ // X

$i = (10 - 3 + x) 2 = (7 + x) 2$ 0 + 2

$j = (5 - 9 + y) 2 = (y - 4) 2$

~~(y − 4) 2 = 4~~
~~2y − 8 = 4~~
~~4y = 12~~
~~y = 3.~~

$14 + 2x = 2, \; 2y - 8 = 4.$

(2) ~~2x = −12~~ ~~x = −6~~ $\equiv 0 - 1$ 1

~~2y = 12, y = 6~~ $\equiv 1.$

$-2c_1 - 2c_2 = -2.$

−2 −4

$1 - 1 + 2 + 1 + 1 - 2 - 1 - 1 - 2 - 1 - 1$ −1 1

(2) $(5 - 9 + y) 2 \equiv 4.$

$(-4 + y) 2 \equiv 4.$

$2y = 12 \quad y \equiv 6 = 1.$

$u + u' = -2$
$u' = -2 - 2$
$= -4 \equiv 1.$ $(-8 + y) 2 = 4$
$2y = 20$ $y = 10 \equiv 0$ //

Wednesday 11

1 - 2 Σ a

4	7	23	25	6
2	10	17	12	24
18	15	13	11	8
21	14	9	16	5
20	19	3	1	22

6	7	23	25	4
24	10	17	12	2
8	15	13	11	10
5	14	9	16	21
22	19	3	1	20

20	19	3	1	22
21	14	9	16	5
18	15	13	11	8
2	10	17	12	24
4	7	23	25	6

22	19	3	1	20
24	10	17	12	2
8	15	13	11	18
5	14	9	16	21
6	7	23	25	4

10
15
4

4	25	23	7	6
2	12	17	10	24
18	11	13	15	8
21	16	9	14	5
20	1	3	19	22

4	25	23	7	6
21	16	9	14	5
18	11	13	15	8
2	12	17	10	24
20	1	3	19	22

Borders

23	1	2	20	19
22	12	11	16	4
5	17	13	9	21
8	10	15	14	18
7	25	24	6	3

11	4	10	22	18
19	15	2	8	21
25	17	13	1	9
7	23	16	14	5
3	6	24	20	12

cyclic
neither a knight
Steps 4 & 1

$i = 2+1-1+2+1+1+0+2+2+1-2-8-2$
$= 12 - 5 = 7 \equiv 2.$

$j = 2-1+2+1+1-0-2-1-1-2+2-1-1$
$= 8 - 9 = -1 \equiv 4$ $(i,j) = (2,4)$ Correct. for

8	25	23	7	4
5	16	9	14	21
8	17	13	15	18
24	12	17	10	2
22	1	3	19	20

22	1	3	19	20
5	16	9	14	21
8	17	13	15	18
24	12	17	10	2
6	25	23	7	4

Tuesday 17

4	19	25	15	2
20	10	5	18	12
3	17	13	9	23
14	8	21	16	6
24	11	1	7	22

Arrow

23	16	15	7	4
9	3	21	20	12
17	14	8	1	25
5	22	19	13	6
11	10	2	24	18

Semi-
magic
cyclic
$q = 1 +$
$q = 2$

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Wednesday 18

$b' = 1$

$a + a' = -1,\ a' = -3$

$(2, 7, 10, 1)$

$a, a+a', a+2a', a+3a'$

$(2, -1), (-1, 0)$

$i = (1 - 20 + 2) = 0,\ 19 - x = 0,\ x = 19 = 4$

$(1, -2, 2)$

$* (1 - 18 + 4 - 3)$

$(1 - 17)2 = -32$

$a'' = -4$

$b'' = 3$

$(+19 + 24)2$

$i + a_1,\ i + a_1 + a_2,\ i + a_1 + a_2 + a_3,\ i + a_1 + a_2 + a_3 + a_4$

$j + b_1,\ j + b_1 + b_2,\ j + b_1 + b_2 + b_3,\ j + b_1 + b_2 + b_3 + b_4$

$\begin{pmatrix} i + a_1 + \dots + a_6 + c_1 \\ j + b_1 + \dots + b_6 + d_1 \end{pmatrix} \begin{pmatrix} i + a_1 + \dots + a_5 + c_1 \\ j + b_1 + \dots + b_5 + d_1 \end{pmatrix}$

$\begin{pmatrix} i + a_1 + \dots + a_8 + c_1 \\ j + b_1 + \dots + b_8 + d_1 \end{pmatrix}, \begin{pmatrix} i + a_1 + \dots + a_8 + c_1 + d_2 \\ j + b_1 + \dots + b_8 + d_2 \end{pmatrix}$

$\begin{pmatrix} i + a_1 + \dots + a_8 + c_1 + d_2 \\ i + a_1 + \dots + a_8 + c_1 + d_2 \end{pmatrix}$

$j + a_1 + \dots + a_{10} + c_1 + d_2 \equiv 2$

$i = 2 - a_1 - \dots - a_{10} - c_1 - d_2 = (2 - 20 + 1 + 2) = -15 \equiv 0$

$j = 2 - b_1 - \dots - b_{10} - d_1 - d_2 = 2 + 10 + 0 - 2) - 10 \equiv 0$

$(4, 8\ 20$

BM I p. 87

Big

19	8	2	11	25
12	21	20	9	3
10	4	13	22	16
23	17	6	5	14
1	15	24	18	7

n = a

Style R.M (2, -1)

Work 2 B.M's (-1, 0) & (-2, 2)

$(i, j) = (0, 0)$

$i = 2 - a - b$
$= 2 - a - a - a'$
$= 2 - 2a - a'$
$= 2(1 - a - a')$

$a + a' = c$

$2 - 10a - 2c$
$2 - 10a - 2a - 2a'$
$= 2 - 12a - 2a'$
$\equiv 2 - 2a - 2a' = 2(1 - a - a')$

$12a \equiv 2a$

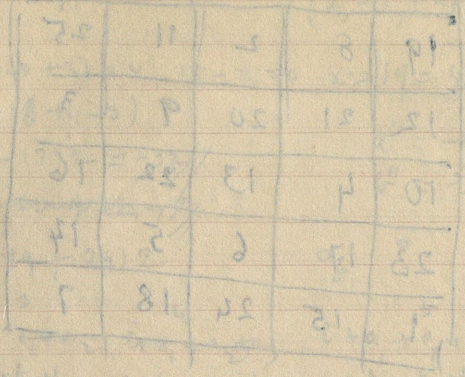
$a + a' = 0$
$b + b' = -1$

Take (1), $(1, -2)$, $(0, 1)$, $(-2, 2)$

$i = 2 - 10 - 0 + 2 = -6 \equiv 4$
$j = 2 + 20 - 1 - 2 = 19 \equiv 4$

FEBRUARY 1976

Friday 20



19	12	10	23	1
8	21	4	17	15
2	20	13	6	24
11	9	22	5	18
25	3	16	14	7

(2) Take RM = (1, 0), B.M's, (0, 1), (0, 2)

$i = 2 - 10 - 0 - 0 = -8 \equiv 2$

$j = 2 - 0 - 1 - 2 = -1 \equiv 4$

4	5	1	2	3

So we cannot R M's & B M's arbitrarily

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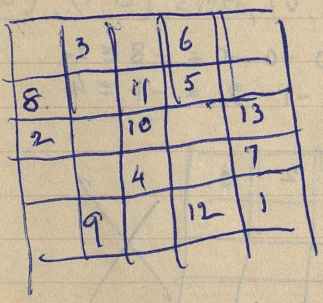
Monday 23



(a) $4+10+0-2=2 \quad 10 \equiv 0$ ✓

$0+20+1+1=2 \quad 20 \equiv 0$ ✓

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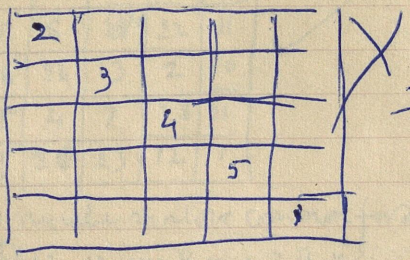
Tuesday 24

(3) Try RM (1,-1)
B.M's (-2,1), (0,1)

$i = 2 - 10 + 2 = -6 \equiv 4$

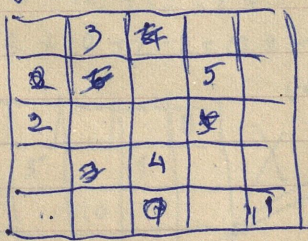
$j = 2 + 10 - 1 - 1 = 10 \equiv 0$



(4) Try RM (1,2), BM's (-2,1) & (0,1)

$i = 2 - 10 + 2 + 0 = -6 \equiv 4$

$j = 2 - 20 - 1 - 1 = -20 \equiv 0$



(5) Try RM (1,2), BM's (0,1), (-2,1)

$i = 2 - 10 + 2 = -6 \equiv 4$

$j = 2 - 20 - 1 - 1 = -20 \equiv 0$

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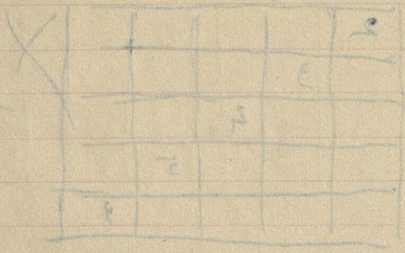
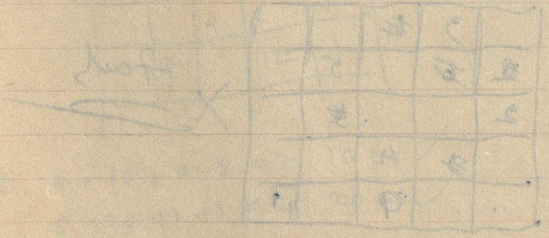
Wednesday 25





(5) Try R.M $(-1, 2)$, B.M's $(-2, 1), (0, 1)$

$i = 2 + 10 + 2 = 14 \equiv 4$

$j = 2 - 20 - 1 - 1 = 20 \equiv 0.$

25	14	3	6	17
5	8	~~19~~ 9	22	11
16	24	13	2	10
15	4	7	18	21
9	20	23	12	1

✓

ie no number should be common for all the three ie one R.M & 2 B.M's.

~~(b) Try R.M~~ (b) R.M should not have a 0.

(b) Try R.M $(1, -1)$, B.M's $(0, -2), (-1, 2)$

$i = 2 - 10 + 1 = -7 \equiv 3$

$j = 2 + 10 + 2 - 2 = 12 \equiv 2$

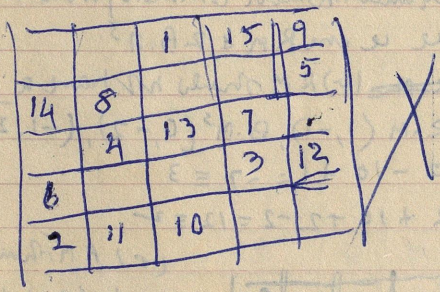
4				8
	5		9	
		10	1	
	6	2		
7	3			

X

(c) R.M should not be $(1, 1), (1, -1)$ $(2, 2), (2, -2)$ etc.

FEBRUARY 1976

Friday 27

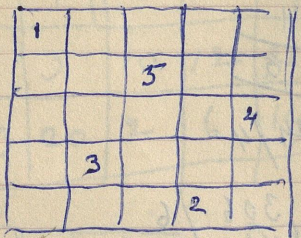


(1, -2)
(-1, 0)
(-1, 0)
(1, -2)

(7) Try $Rm(-2,1)$, $BM^3(0,-1),(2,-1)$

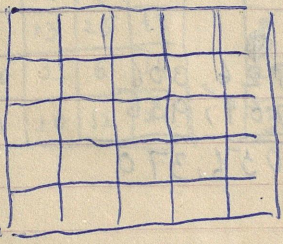
$i = 2 + 20 - 2 = 20 \equiv 0$

$j = 2 - 10 + 1 + 1 = -6 \equiv 4$



(d) $b+c, \neq 0$
$b+d, \neq 0.$

(8) Try $RM(-2,1)$, $BM^a(1,-2),(-1,0)$



X fail

$i = 2 + 20 - 1 + 1 = 22 \equiv 2$

$j = 2 - 10 + 2 + 0 = -6 \equiv 4$

No general rule can be evolved

MARCH 1976

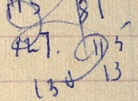
Monday 1

cyclic —

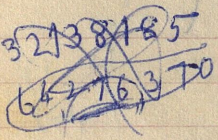
6,624
174,240
6'144
187,008

275,305,224/4

= 68,826,306/6
= 11,471,051



68,826,306
4,769,936
64,056,370



Sep. 18

MARCH 1976

Tuesday 2

15	22	16	4	8
7	11	24	18	5
1	9	13	25	17
19	3	10	12	21
23	20	2	6	14

11	4	10	22	18
19	15	2	8	21
25	17	13	1	9
7	23	16	14	5
3	6	24	20	12

7	11	24	18	5
15	22	16	4	8
1	9	13	25	17
23	20	2	6	14
19	3	10	12	21

11	7	24	5	18
22	15	16	8	4
9	1	13	17	25
20	23	2	14	6
3	19	10	21	12

MARCH 1976

Wednesday 3

8	7	23	25	4
24	10	17	12	2
6	15	13	11	18
5	14	9	16	21
22	19	3	1	20

22	19	3	1	20
24	10	17	12	2
8	15	13	11	18
5	14	9	16	21
6	7	23	25	4

1 ↔ 2 4 ↔ 5

5-2-3-4-1

4	16	15	7	23
12	3	21	20	9
25	14	8	1	17
6	22	19	13	5
18	10	2	24	11

→

16	10	2	24	11
12	3	21	20	9
25	14	8	1	17
6	22	19	13	5
14	16	15	7	23

18	10	2	24	11
16	22	19	13	5
25	14	8	1	17
12	3	21	20	9
4	16	15	7	23

1-4-3-2-5

18	24	2	10	11
6	13	19	22	5
25	1	8	14	17
12	20	21	3	9
4	7	15	16	23

2-1-3-5-4

5-4-3-2-1

4-5-3-2-1

(26)

Border square completion

MARCH 1976

Thursday 4

4	7	23	25	6
2	10	17	12	24
18	15	13	11	8
21	14	9	16	5
20	19	3	1	22

with

Apply to this [illegible] isomorphism ...

(A)

23	16	15	7	4
9	3	21	20	12
17	14	8	1	25
5	22	19	13	6
11	10	2	24	18

2 – 1 – 3 – 5 – 4

(A)

9	3	21	20	12
23	16	15	7	4
17	14	8	1	25
11	10	2	24	18
5	22	19	13	6

3	9	21	12	20
16	23	15	4	7
14	17	8	25	1
10	11	2	18	24
22	5	19	6	13

5 – 4 – 3 – 2 – 1

2 – 1 – 3 – 5 – 4

1 – 4 – 3 – 2 – 5

5 – 4 – 3 – 2 – 1

2 – 1 – 3 – 5 – 4

MARCH 1976

Friday 5

Take

25	16	15	7	4
9	3	21	20	12
17	14	8	1	25
5	22	19	13	6
11	10	2	24	18

12	20	21	3	9
4	7	15	16	13
25	1	8	14	17
18	24	2	10	11
6	13	19	22	5

3	9	21	12	20
16	23	15	4	7
14	17	8	25	1
10	11	2	18	24
22	5	19	6	13

5-4-3-2-1

MARCH 1976

Sat 6/Sun 7

4	7	15	16	23
12	20	21	3	9
25	1	8	14	17
6	13	19	22	5
18	24	2	10	11

18	24	2	10	11
6	13	19	22	5
25	1	8	14	17
12	20	21	3	9
4	7	15	16	23

6	13	19	22	5
18	24	2	10	11
25	1	8	14	17
4	7	15	16	23
12	20	21	3	9

13	6	19	5	22
24	15	2	11	10
1	25	8	17	14
7	4	15	23	16
20	12	21	9	3

4	7	15	18	23
12	20	21	24	19
25	1	8	14	17
6	13	19	22	5
18	24	2	10	11

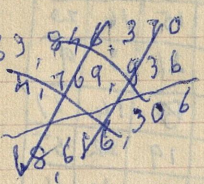
18	24	2	20	12
6	13	19	7	4
25	1	8		

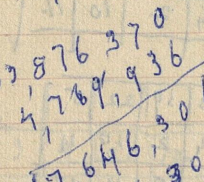
18	24	2	10	11
6	13	19	22	5
25	1	8	14	17
12	20	21	3	9
4	7	15	16	23

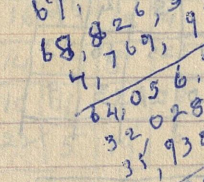
MARCH 1976

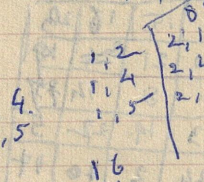
Monday 8

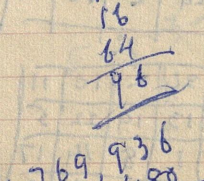
3,784,618
3,933,818
3,344,034
3,472,540
3,112,161
3,076,881
2,600,879
2,431,806
1,958,537
1,914,984
1,366,179
1,001,448











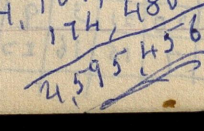


Table 7, p. 137 q B & S

(1)

5	1	2	3	4
3	4	5	1	2
1	2	3	4	5
4	5	1	2	3
2	3	4	5	1

q = 2

5 1 2 3 4
1 2 3 4 5

5	10	15	20	0
15	20	0	5	10
0	5	10	15	20
10	15	20	0	5
20	0	5	10	15

q =>

10 15 20 0 5
15 20 0 5 10
20 0 5 10 15
0 5 10 15 20

1, 2, 3, 5, 4 | 0, 5, 10, 15, 20
1, 2, 3, 5 5, 10, 15, 20, 0

14

174
161
13

198
16
182
14
168

1, 2, 4
3, 5, 6

MARCH 1976

Wednesday 10

(1) 1, 2, 3, 4, 5
(2) 1, 2, 3, 5, 4
(3) 1, 2, 4, 3, 5
(4) 1, 2, 4, 5, 3
5 1, 2, 5, 3, 4
(6) 1, 2, 5, 4, 3

0, 5, 10, 15, 20 (1)
0, 5, 10, 20, 15 (2)
0, 5, 15, 10, 20 (3)
0, 5, 15, 20, 10 (4)
0, 5, 20, 10, 15 (5)
0, 5, 20, 15, 10 (6)

$q = 2$

1, 2, 3, 4, 5, ...

(1,1) — $q = 2$
(1,2) — $q = 2$
(1,3) — $q = 3$
(1,4) — $q = 2$
(1,5) — $q = 3$
(1,6) — $q = 3$

(2,1) — $q = 2^1$
(2,2) — $q = 2$
(2,3) — $q = 3$
(2,4) — $q = 2$
(2,5) — $q = 3$
(2,6) — $q = 3$

(3,1) — $q = 2$
(3,2) — $q = 2$
(3,3) — $q = 3$
(3,4) — $q = 2$
(3,5) — $q = 3$
(3,6) — $q = 3$

(4,1) — $q = 2$
(4,2) — $q = 2$
(4,3) — $q = 3$
(4,4) — $q = 2$
(4,5) — $q = 3$
(4,6) — $q = 3$

S_1, S_2, S_3, S_4 (29)

MARCH 1976

Thursday 11

(5,1) — $q=2$	(6,1) — $q=2$
(5,2) — $q=2$	(6,2) — $q=2$
(5,3) — $q=3$	(6,3) — $q=3$
(5,4) — $q=2$	(6,4) — $q=2$
(5,5) — $q=3$	(6,5) — $q=3$
(5,6) — $q=3$	(6,6) — $q=3$

This is an alternate way of putting B & J's Table 7, p. 137

Now to deduce 4 basic squares from Index 36.

(1,1)

5	1	2	3	4
3	4	5	1	2
1	2	3	4	5
4	5	1	2	3
2	3	4	5	1

5	10	15	20	0
15	20	0	5	10
0	5	10	15	20
10	15	20	0	5
20	0	5	10	15

Friday 12

(1,1)

10	11	17	23	4
18	24	5	6	12
1	7	13	19	25
14	20	21	2	8
22	3	9	15	16

(-2, -1), (1, 0)

~~(-2, -1), (1, 0)~~

C-5

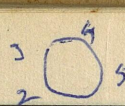
(4, 3)

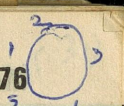
2	4	5	3	1
5	3	1	2	4
1	2	4	5	3
21	5	3	1	2
3	1	2	4	5

20	0	5	15	10
15	10	20	0	5
0	5	15	10	20
10	20	0	5	15
5	15	10	20	0

22	4	10	18	11
20	13	21	2	9
1	7	19	15	23
14	24	3	6	17
8	16	12	24	5

not C.S





Sat 13/Sun 14

For $O \to 1-5-4-3-2$ (cross rows)

$O' \to$ " (cols).

For $S_2 \to 1-4-2-5-3$. (" & cols

$S_3 \to 1-3-5-2-4$ (" "

$S_4 \to 1-5-4-3-2$ (" "

$OO' = S_4$

$(1,1)$

1, 2, 3, 4, 5	0, 5, 10, 15, 20
5, 1, 2, 3, 4	5, 10, 15, 20, 0
3, 4, 5, 1, 2	15, 20, 0, 5, 10
1, 2, 3, 4, 5	0, 5, 10, 15, 20
4, 5, 1, 2, 3	10, 15, 20, 0, 5
2, 3, 4, 5, 1	20, 0, 5, 10, 15

10	11	17	23	4
18	24	5	6	12
1	7	13	19	25
14	20	21	2	8
22	3	9	15	16

$(1,1)$ is associated $\left.\begin{matrix} \\ \\ \\ \end{matrix}\right\}$
& by C.S. method
with R.M $(-2,-1)$
& B.M $(1,0)$

MARCH 1976

Monday 15

(2, 2)

4	1	2	3	5
3	5	4	1	2
1	2	3	5	4
5	4	1	2	3
2	3	5	4	1

5	10	20	15	0
20	15	0	5	10
0	5	10	20	15
10	20	15	0	5
15	0	5	10	20

9	11	22	18	5
23	20	4	6	12
1	7	13	25	19
15	24	16	2	8
17	3	10	14	21

not associated
nor C.S.

[So actually N but N_n also may contain non-associate squares with 3 in each]

(3, 3)

2	4	3	5	1
3	5	1	2	4
1	2	4	3	5
4	3	5	1	2
5	1	2	4	3

20	0	5	15	10
15	10	20	0	5
0	5	15	10	20
10	20	0	5	15
5	15	10	20	0

22	4	8	20	11
18	15	21	2	9
1	7	19	13	25
14	23	5	6	17
10	16	12	24	3

not C.S.

(1, 2)

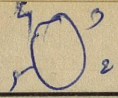
5	1	2	3	4
3	4	5	1	2
1	2	3	4	5
4	5	1	2	3
2	3	4	5	1

5	10	20	15	0
20	15	0	5	10
0	5	10	20	15
10	20	15	0	5
15	0	5	10	20

10	11	22	18	4
23	19	5	6	12
1	7	13	24	20
14	25	16	2	8
17	3	9	15	21

not associated ~~with R.M~~
~~not of~~ C.S. ~~into~~
~~(x2, 118 B.M~~ (1, 0)
not C.S.
Simple R-M's
~~[illegible] B.M's~~
(+, 0), (1, 1)

different B.M's



Wednesday 17

(2,1)

4	1	2	3	5
3	5	4	1	2
1	2	3	5	4
5	4	1	2	3
2	3	5	4	1

$\gamma = 2$

5	10	15	20	0
15	20	0	5	10
0	5	10	15	20
10	15	20	0	5
20	0	5	10	15

$\gamma = 3$

9	11	17	23	5
18	25	4	6	12
1	7	13	20	24
15	19	21	2	8
22	3	10	14	16

not associated
nor C-S

out of $(1,1), (1,2), (2,1), (2,2)$

only $(1,1)$ is associated C-S.

Let us consider the 4 basic squares (A), (B), (C) & (D) of Bratchell (Bk-12, p. 1329)

1, 2, 3, 4, 5
1, 2, 3
4, 5, 1, 2, 3

Barcagrae(A) **MARCH 1976**

Thursday 18

3	4	5	1	2
5	1	2	3	4
2	3	4	5	1
4	5	1	2	3
1	2	3	4	5

$v = 3$

15	20	0	5	10
5	10	15	20	0
20	0	5	10	15
10	15	20	0	5
0	5	10	15	20

$v = 2$

Cyclic

0, 5, 10, 15, 20

Using L, we can transform these also

1, 2, 3, 4, 5

2, 4, 1, 5, 3

2	3	4	5	1
4	5	1	2	3
1	2	3	4	5
3	4	5	1	2
5	1	2	3	4

1	2	3	4	5
3	4	5	1	2
5	1	2	3	4

1	2	3	4	5
4	5	1	2	3
2	3	4	5	1
5	1	2	3	4
3	4	5	1	2

5	1	2	3	4
3	4	5	1	2
1	2	3	4	5
4	5	1	2	3
2	3	4	5	1

MARCH 1976

Friday 19

1	2	3	4	5
4	5	1	2	3
2	3	4	5	1
5	1	2	3	4
3	4	5	1	2

1	2	3	4	5
3	4	5	1	2
5	1	2	3	4
2	3	4	5	1
4	5	1	2	3

1 2 3 4 5
3 4

5, 1, 2, 3, 4
3, 3, 4, 5, 1
4, 5, 1, 2, 3
1, 2, 3, 4, 5
3, 4, 5, 1, 2.

1, 2, 3, 4, 5
5, 1, 2, 3, 4.
1 2 3 4, 5
3, 4 5 1, 2

2	4	5	1	3
4	1	2	3	5
1	3	4	5	2
3	5	1	2	4
5	2	3	4	1

2, 3, 4, 5, 1
4, 5, 1, 2, 3
1, 2, 3, 4, 5
3, 4, 5, 1, 2
5, 1, 2, 3, 4

$q = 3$

Sat 20/Sun 21

1	2	3	4	5
4	5	1	2	3
2	3	4	5	1
5	1	2	3	4
3	4	5	1	2

4 5 1 2 3
2 3 4 5 1
5 1 2 3 4
3 4 5 1 2
1 2 3 4 5

2 3 4 5 1
5 1 2 3 4
3 4 5 1 2
1 2 3 4 5
4 5 1 2 3

5 1 2 3 4
3 4 5 1 2
1 2 3 4 5
4 5 1 2 3
2 3 4 5 1

It appears difficult to vary (A) under one of the 36 cases

22	3	9	15	16
14	20	21	2	8
1	7	13	19	25
18	24	5	6	12
10	11	17	23	4

(A')

Apply L^2 to (A) to make the bottom row 1, 7, 13, 19, 25 & the central row. Then (A) becomes (A') which is associated and is equivalent to (1, 1) with 1st & 5th rows, 2nd & 4th rows interchanged

Monday 22

(B) of Trawbridge

18	21	4	7	15
2	10	13	16	24
11	19	22	5	8
25	3	6	14	17
9	12	20	23	1

→ M L

9	12	20	23	1
18	21	4	7	15
2	10	13	16	24
11	19	22	5	8
25	3	6	14	17

4, 2, 5, 3, 1
3, 1, 4, 2, 5
2, 5, 3, 1, 4
1, 4, 2, 5, 3
5, 3, 1, 4, 2

1 - 3 - 5 - 2 - 4

Apply M^2 to (D)

4	7	15	18	21
13	16	24	2	10
22	5	8	11	19
6	14	17	25	3
20	23	1	9	12

4	2	5	3	1
3	1	4	2	5
2	5	3	1	4
1	4	2	5	3
5	3	1	4	2

+

0	5	10	15	20
10	15	20	0	5
20	0	5	10	15
5	10	15	20	0
15	20	0	5	10

Let us form all the 36 & **MARCH 1976**

Tuesday 23

find which are of the C-S type

(1,1) is C.S — (1)

(1,2) is not — (2)

(1,3) is found

2	3	4	5	1
4	5	1	2	3
1	2	3	4	5
3	4	5	1	2
5	1	2	3	4

+

20	0	5	15	10
15	10	20	0	5
0	5	15	10	20
10	20	0	5	15
5	15	10	20	0

=

22	3	9	20	11
19	15	21	2	8
1	7	18	14	25
13	24	5	6	17
10	16	12	23	4

(3)

Simple A.M diff-B.M not C.S.

(4) (1,4)

5	1	2	3	4
3	4	5	1	2
1	2	3	4	5
4	5	1	2	3
2	3	4	5	1

5	15	20	10	0
20	10	0	5	15
0	5	15	20	10
15	20	10	0	5
10	0	5	15	20

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Wednesday 24

(4)

10	16	22	13	4
23	14	5	6	17
1	7	18	24	15
19	25	11	2	8
12	3	9	20	21

(1,0)
(2,2)
(2,2) } B.M's

not C-S (1,0)

Simple R.M

only B.M's

(5) (1,5)

2	3	4	5	1
4	5	1	2	3
1	2	3	4	5
3	4	5	1	2
5	1	2	3	4

+

15	0	5	20	10
20	10	15	0	5
0	5	20	10	15
10	15	0	5	20
5	20	10	15	0

(5)

17	3	9	25	11
24	15	16	2	8
1	7	23	14	20
13	19	5	6	22
10	21	12	18	4

not C-S: (-2,1)

Simple R.M's

but only 2 M's (1,0), (-1,-1), (0,1), (-2,-2)

(6) (1,6)

2	3	4	5	1
4	5	1	2	3
1	2	3	4	5
3	4	5	1	2
5	1	2	3	4

10	0	5	20	15
20	15	10	0	5
0	5	20	15	10
15	10	0	5	20
5	20	15	10	0

12	3	9	25	16
24	20	11	2	8
1	7	23	19	15
18	14	5	6	22
10	21	17	13	4

(6) (1,4)

not C.S
Simple R.M (-3,1)
Diff BM's
(1,0), (2,-2), (0,2), (0,2)
(7) (2,1) not C.S
(8) (2,2) not C.S

(9) (2,3)

2	3	5	4	1
5	4	1	2	3
1	2	3	5	4
3	5	4	1	2
4	1	2	3	5

20	0	5	15	10
15	10	20	0	5
0	5	15	10	20
10	20	0	5	15
5	15	10	20	0

22	3	10	19	11
20	14	21	2	6
1	7	18	15	24
13	25	4	6	17
9	16	12	23	5

not C.S

(10) (2,4)

4	1	2	3	5
3	5	4	1	2
1	2	3	5	4
5	4	1	2	3
2	3	5	4	1

5	15	20	10	0
20	10	0	5	15
0	5	15	20	10
15	20	10	0	5
10	0	5	15	20

MARCH 1976

Friday 26

(10)
(2,4)

9	16	22	13	5
23	15	4	6	17
1	7	18	25	14
20	24	11	12	8
12	3	10	19	21

not C-S.

(11) (2,5)

2	3	5	4	1
5	4	1	2	3
1	2	3	5	4
3	5	4	1	2
4	1	2	3	5

15	0	5	20	10
20	10	15	0	5
0	5	20	10	15
10	15	0	5	20
5	20	10	15	0

(11) (2,4)

17	3	10	24	11
25	14	16	2	8
1	7	23	15	19
13	20	4	6	22
9	21	12	18	5

not C.S

(12) (2, 6)

(3 6)

2	3	5	4	1
5	4	1	2	3
1	2	3	5	4
3	5	4	1	2
4	1	2	3	5

10	0	5	20	15
20	15	10	0	5
0	5	20	15	10
15	10	0	5	20
5	20	15	10	0

(12)

12	3	10	24	16
25	19	11	2	8
1	7	23	20	14
18	15	4	6	22
9	21	17	13	5

not C.S

(13), (3, 1)

5	1	2	4	3
4	3	5	1	2
1	2	4	3	5
3	5	1	2	4
2	4	3	5	1

5	10	15	20	0
15	20	0	5	10
0	5	10	15	20
10	15	20	0	5
20	0	5	10	15

(13)

10	11	17	24	3
19	23	5	6	12
1	7	14	18	25
13	20	21	2	9
22	4	8	15	16

not C.S

common OM
[illegible]

Monday 29

(14) (3, 2)

5	1	2	4	3
4	3	5	1	2
1	2	4	3	5
3	5	1	2	4
2	4	3	5	1

5	10	20	15	0
20	15	0	5	10
0	5	10	20	15
10	20	15	0	5
15	0	5	10	20

(14)

10	11	22	14	3
25	18	5	6	12
1	7	14	23	20
13	25	16	2	9
17	4	8	15	21

not C-S

(15) (3, 3) — not C/S

(16) (3, 4)

5	1	2	4	3
4	3	5	1	2
1	2	4	3	5
3	5	1	2	4
2	4	3	5	1

5	15	20	10	0
20	10	0	5	15
0	5	15	20	10
15	20	10	0	5
10	0	5	15	20

(16)

10	16	22	14	3
24	13	5	6	17
1	7	19	23	15
18	25	11	2	9
12	4	8	20	21

not C-S

(17) (3, 5)

2	4	3	5	1
3	5	1	2	4
1	2	4	3	5
4	3	5	1	2
5	1	2	4	3

15	0	5	20	10
20	10	15	0	5
0	5	20	10	15
10	15	0	5	20
5	20	10	15	0

(17)

17	4	8	25	11
23	15	16	2	9
1	7	24	13	20
14	18	5	6	22
10	21	12	19	3

not C.S :

(18) (3, 6)

2	4	3	5	1
3	5	1	2	4
1	2	4	3	5
4	3	5	1	2
5	1	2	4	3

10	0	5	20	15
20	15	10	0	5
0	5	20	15	10
15	10	0	5	20
5	20	15	10	0

(18)

12	4	8	25	16
23	20	11	2	9
1	7	24	18	15
19	13	5	6	22
10	21	17	14	3

not C.S

Wednesday 31

1	5	4	3	2
3	2	1	5	4
5	4	3	2	1

5	10	15	20	0
15	20	0	5	10
0	5	10	15	20

(19) (4, 1)

3	1	2	4	5
4	5	3	1	2
1	2	4	5	3
5	3	1	2	4
2	4	5	3	1

5	10	15	20	0
15	20	0	5	10
0	5	10	15	20
10	15	20	0	5
20	0	5	10	15

Thursday 1

(19) (4,11)

8	11	17	24	5
19	25	3	6	12
1	7	14	20	23
15	18	21	2	9
22	4	10	13	16

not C.S.

(20) (4,2)

3	1	2	4	5
4	5	3	1	2
1	2	4	5	3
5	3	1	2	4
2	4	5	3	1

5	10	20	15	0
20	15	0	5	10
0	5	10	20	15
10	20	15	0	5
15	0	5	10	20

(20) (4,2)

8	11	22	19	5
24	20	3	6	12
1	7	14	25	18
15	23	16	2	9
17	4	10	13	21

not C.S

Friday 2

(21) (4, 3)

2	4	5	3	1	20	0	5	15	10
5	3	1	2	4	15	10	20	0	5
1	2	4	5	3	0	5	15	10	20
4	5	3	1	2	10	20	0	5	15
3	1	2	4	5	5	15	10	20	0

(21)

22	4	18	18	11
20	13	21	2	9
1	7	19	15	23
14	25	3		

more is

(22) (4, 4)

3	1	2	4	5
4	5	3	1	2
1	2	4	5	3
5	3	1	2	4
2	4	5	3	1

5	15	20	10	0
20	10	0	5	15
0	5	15	20	10
15	20	10	0	5
10	0	5	15	20

(22)

8	16	22	14	5
24	15	3	6	17
1	7	19	25	13
20	23	11	2	9

not C.S – rather disappointed

(23) (4, 5)

2	4	5	3	1
5	3	1	2	4
1	2	4	5	3
4	5	3	1	2
3	1	2	4	5

15	0	5	20	10
20	10	15	0	5
0	5	20	10	15
10	15	0	5	20
5	20	10	15	0

(23)

17	4	10	23	11
25	13	16	2	9
1	7	24	15	18
14	20	3	6	22
8	21	12	19	5

not C.S

(24) (4, 6)

Monday 5

(24) (4, 6)

2	4	5	3	1
5	3	1	2	4
1	2	4	5	3
4	5	3	1	2
3	1	2	4	5

10	0	5	20	15
20	15	10	0	5
0	5	20	15	10
15	10	0	5	20
5	20	15	10	0

2

1

3

nor C.S

(25) (5, 1)

4	1	2	5	3
5	3	4	1	2
1	2	5	3	4
3	4	1	2	5
2	5	3	4	1

+

5	10	15	20	0 (3)
15	20	0	5	10
0 (4)	5	10	15	20
10	15	20	0 (2)	5
20	0	5	10	15

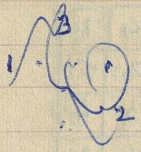
1 in (0, 2) + (0, 2)
2 in (3, 1) + (3, 1)
3 in (2, 3) + (2, 3)

nor C-S (-2, -1) nor C-S
(-1, 2)
0, 5, 10, 20, no

(26) (5, 2)

(26)

5	10	20	15	0 (3)
20	15	0	5	10
0 (1)	5	10	20	15
10	20	15	0 (2)	5
15	0	5	10	20



not C.S.

(27) (5, 3)

2	5	~~3~~	~~4~~	1
~~3~~	~~4~~	1	2	5
1	2	5	~~3~~	~~4~~
5	~~3~~	~~4~~	1	2
~~4~~	1	2	5	~~3~~

20	0	5	15	~~10~~
15	~~10~~	20	0 (2)	5
0 (1)	5	15	10	20
10	20	~~0~~	5	15
5	15	10	20	0 (3)

not C.S

(28) (5, 4)

4	1	2	5	3
5	3	4	1	2
1	2	5	3	4
3	4	1	2	5
2	5	3	4	1

5	15	20	10	0 (3)
20	10	0	5	15
0 (1)	5	15	20	10
15	20	10	0 (2)	5
10	0	5	15	20

not C.S

Wednesday 7

(29) (5, 5)

2	5	3	4	1
3	4	1	2	5
1	2	5	3	4
5	3	4	1	2
4	1	2	5	3

15	0	5	20	10
20	10	15	(2) 0	5
(1) 0	5	20	10	15
10	15	0	5	20
5	20	10	15	0 (3)

nor. S

(30) (5, 6)

10	0	5	20	15
20	15	10	0 (2)	5
(1) 0	5	20	15	10
15	10	0	5	20
5	20	15	10	0 (3)

nor C

(31) (6, 1)

3	1	2	5	4
5	4	3	1	2
1	2	5	4	3
4	3	1	2	5
2	5	4	3	1

5	10	15	20	0
15	20	0 (3)	5	10
(1) 0	5	10	15	20
10	15	20	0 (2)	5
20	0	5	10	15

nor C.S

(32) (6,2)

5	10	20	15	0
20	15	(3) 0	5	10
(1) 0	5	10	20	15
10	20	15	(2) 0	5
15	0	5	10	20

nor C.S

(34) (6,4)

5	15	20	10	0
20	10	(3) 0	5	15
(1) 0	5	15	20	10
15	20	10	(2) 0	5
10	0	5	15	20

nor C.S

(33) (6,3)

2	5	4	3	1
4	3	1	2	5
1	2	5	4	3
5	4	3	1	2
3	1	2	5	4

20	0	5	15	10
15	10	20	0 (2)	5
(1) 0	5	15	10	20
10	20	0 (3)	5	15
5	15	10	20	0

nor C.S

(35) (6,5)

15	0	5	20	10
20	10	15	0 (2)	5
(1) 0	5	20	10	15
10	15	0 (3)	5	20
5	20	10	15	0

nor C-S

10	0	5	20	15
20	15	10	0 (2)	5
(1) 0	5	20	15	10
15	10	0 (3)	5	20
5	20	15	10	0

nor C-S

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Friday 9

None of the 36 except (1, 1) is of the continuous-step or lattice type.

Consider (B) & its transform

15	18	21	4	7
24	2	10	13	16
8	11	19	22	5
17	25	3	6	14
1	9	12	20	23

L →

1	9	12	20	23
15	18	21	4	7
24	2	10	13	16
8	11	19	22	5
17	25	3	6	14

M ↓

9	12	20	23	1
18	21	4	7	15
2	10	13	16	24
11	19	22	5	8
25	3	6	14	17

is associated to Q

10	11	17	23	4
18	24	5	6	12
1	7	13	19	25
14	20	21	2	8
22	3	9	15	16

(1, 1)

Next Consider (C)

20	22	4	6	13
9	11	8	25	2
23	5	7	14	16
12	19	21	3	10
1	8	15	17	24

L^2 →

12	19	21	3	10
1	8	15	17	24
20	22	4	6	13
9	11	8	25	2
23	5	7	14	16

M

21	3	10	12	19
15	17	24	1	8
4	6	13	20	22
8	25	2	9	11
7	14	16	23	5

→ 2 lines to (1,1).

Finally (D)'

13	17	21	5	9
25	4	8	12	16
7	11	20	24	3
19	23	2	6	15
1	10	14	18	22

→ L

19	23	2	6	15
1	10	14	18	22
13	17	21	5	9
25	4	8	12	16
7	11	20	24	3

4-1-3-5-2

6	15	19	23	2
18	22	1	10	14
5	9	13	17	21
12	16	25	4	8
24	3	7	11	20

15	6	19	2	23
22	18	1	14	10
9	5	13	21	17
16	12	25	8	4
3	24	7	20	11

4, 12, 25, 8, 16

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Monday 12

6	18	5	12	24
15	22	9	16	3
19	1	13	25	7
23	10	17	4	11
2	14	21	8	20

now ⟷ ch

applies S_2

1 – 2 – 3 – 4 – 5

4 – 1 – 3 – 5 – 2

S_2

4 → 1

1 → 2

3 → 3.

5 → 4

2 → 5

18, 22, 1, 10, 14

24, 3, 7, 11, 20

5, 9, 13, 17, 21.

6, 15, 19, 23, 2

12, 16, 25, 4, 8

22	14	1	18	10
3	20	7	24	11
9	21	13	5	17
15	2	19	6	23
16	8	25	2	4.

23, 10, 17, 4, 11.
6, 18, 5, 12, 24
19, 1, 13, 25, 7.
2, 14, 21, 8, 20.
15, 22, 9, 16, 3

4
12
25
8
16 1-2-3-4-5
4-1-3-5-2

12, 16, 25, 4, 8
6, 18, 19, 23, 2
5, 9, 13, 17, 21.

18, 22, 1, 10, 14
24, 3, 7, 11, 20.
5, 9, 13, 17, 21.
6, 15, 19, 23, 2
12, 16, 25, 4, 8

22, 3, 9, 15, 16.

22 3 19 15 16
14, 20, 21 2 8
1, 7, 13 19 25
18, 24, 5 6 12
10, 11, 17 23 4

1-2-3-4-5
2-5-3-1-4

23, 10, 17, 4, 11.
6, 18, 5, 12, 24.
19, 1, 13, 25, 7.
2, 14, 21, 8, 20
15, 22, 9, 16, 3

15, 22, 9, 16, 3
2, 14, 21, 8, 20
19, 1, 13, 25, 7.
6, 18, 5, 12, 24.
23, 10, 17, 4, 11.

APRIL 1976

$n = 6$

$d = 2$

Wednesday 14

$n/6 \Rightarrow$

$$\sum_{i,j=1}^{3} A(i+2x, j+2y)$$

$x, y = 1, 2, 3.$

$x=1, y=1, 2, 3.$

$x=2, \quad " \quad "$

$x=3, \quad " \quad "$

$$A_{i+2,j+2} + A_{i+2,j+4} + A_{i+2,j+6}$$

$$+ A_{i+4,j+2} + A_{i+4,j+4} + A_{i+4,j+6}$$

$$+ A_{i+6,j+2} + A_{i+6,j+4} + A_{i+6,j+6}$$

$$A_{33} + A_{35} + A_{37}$$

$$+ A_{53} + A_{55} + A_{57}$$

$$+ A_{73} + A_{75} + A_{77}$$

$$A_{31} + A_{33} + A_{35} + A_{51} + A_{53} + A_{55}$$

$$+ A_{81} + A_{83} + A_{85}$$

$A_{34} + A_{36} + A_{38}$

$A_{54} + A_{56} + A_{58}$

$A_{74} + A_{76} + A_{78}$

$A_{32} + A_{34} + A_{36}.$

$A_{52} + A_{54} + A_{56}.$

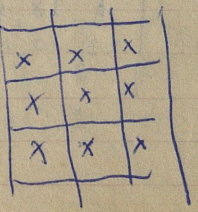
$A_{12} + A_{14} + A_{16}$

$j = 2$

$$\sum_{i=1} A(i, j+x)$$

$\Sigma(1,1,2) + \Sigma(1,2,2) + \Sigma(2,1,2).$

$$A_{i,j+1} + A_{i,j+2} + \cdots + A_{i,j+n}$$



(424)

$a_{11} + a_{62} + a_{53} + a_{44} + a_{35} + a_{26} = S$

$a_{31} + a_{22} + a_{13} + a_{64} + a_{55} + a_{46} = S$

$a_{51} + a_{42} + a_{33} + a_{24} + a_{15} + a_{66} = S$

$(a_{11} + a_{13} + a_{15}) + (a_{31} + a_{33} + a_{35})$

$+ (a_{51} + a_{53} + a_{55})$

$+ (a_{22} + a_{24} + a_{26}) + (a_{42} + a_{44} + a_{46})$

$+ (a_{62} + a_{64} + a_{66}) = 39$

APRIL 1976

Friday 16

$L(1,1,2)$

$$L_{ij} = \sum_{x,y=1}^{3} A_{2i-2+x,\, 2j-2+y}$$

$$L_{11} = (A_{11} + A_{13} + A_{15}) + (A_{31} + A_{33} + A_{35}) + (A_{51} + A_{53} + A_{55})$$

$$L_{12} = (A_{12} + A_{14} + A_{16}) + (A_{32} + A_{34} + A_{36}) + (A_{52} + A_{54} + A_{56})$$

$$L_{21} = (A_{21} + A_{23} + A_{25}) + (A_{41} + A_{43} + A_{45}) + (A_{61} + A_{63} + A_{65})$$

$$\left.\begin{aligned} L_{11} + L_{12} &= 39 \\ L_{12} + L_{21} &= 39 \\ L_{11} + L_{21} &= 39 \end{aligned}\right\} \quad L_{11} = L_{12} = L_{21} = 39/2$$

1	2	3	4
8	7	6	5
9	10	11	12
16	15	14	13

3	4
10	9
18	16
19	21
27	28
34	33

4	33
9	28
18	16
19	21
27	10
34	3

3	33
10	28
18	21
19	16
27	9
34	4

Paid Rs 9/- 27/8/84

[illegible]	3.20
[illegible]	0 80
	4 00
cucumber & coriander	4-00
Bal	8-00
	" =00


1 125 123 9 7 9 117 115 15
97 29 27 25 23 21 19 111
95 35 45 39 41 43 37 81
65 67 59 57 55 53 77 79
63 61 69 71 73 75 49
33 83 89 39 85 47
31 99 103 87 109 17
127 3 5 121 119 11 13 113 5 121 119 11 13 113 13 113

1	125	123	7	9	117	115	15
97	29	101	25	23	107	19	111
95	35	45	89	87	43	37	81
65	67	59	57	55	53	77	79
63	61	69	71	73	75	51	49
33	93	83	39	41	85	91	47
31	99	27	103	105	21	109	17
127	3	5	121	119	11	13	113

but to make it square

128
33
95

1	125	123	7	9	117	115	15
97	29	101	25	23	107	19	111
95	35	45	89	87	43	37	81
65	67	59	57	55	53	77	79
49	51	75	73	71	69	61	63
47	91	85	41	39	83	93	33
17	109	21	105	103	27	99	31
113	13	11	119	121	5	3	127

X

1	2	3	4	5	6	7	8
16	15	14	13	12	11	10	9
17	18	19	20	21	22	23	24
32	31	30	29	28	27	26	25
40	39	38	37	36	35	34	33
41	42	43	44	45	46	47	48
56	55	54	53	52	51	50	49
57	58	59	60	61	62	63	64

Reverse Reverse

Reverse Reverse

(6)

1	11	21	6	16
7	17	2	12	22
13	23	8	18	3
19	4	14	24	9
25	10	20	5	15

0, 1, 2, 3, 4

3, 4, 0, 1, 2

1, 2, 3, 4, 0

4, 0, 1, 2, 3

2, 3, 4, 0, 1

0, 1, 2, 3, 4

a_0, a_1, a_2, a_3, a_4

a_3, a_0, a_2, a_4, a_1

a_3, a_0, a_3

$2^0 = 1$

$2^1 = 2$ $a_3\ a_4\ a_0\ a_1\ a_2$

$2^2 = 4$

$2^3 = 3$

$2^4 = 1$

~~$a_0\ a_1\ a_2\ a_3\ a_4$~~ 2, 4, 6, 8, 10

2, 4, 1, 3, 0

(-1)

4, 0, 1, 2, 3.

4, andere 4

$a_2\ a_3\ a_1\ a_0\ a_4$

$a_1\ a_0\ a_4\ a_2\ a_3$

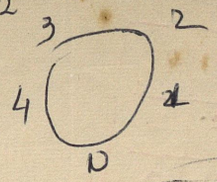
$a_1\ a_2\ a_3\ a_1\ a_0$.

3 2 5 1 4.

$a_3\ a_4\ a_0\ a_1\ a_2$

$a_0\ a_1\ a_2\ a_3\ a_4$

1	17	8	24	15
25	11	2	18	9
19	10	21	12	3
13	4	20	6	22
7	23	14	5	16



1. 2. 3. ~~4. 5~~

4. 5

0, 1, 2, 3, 4.

1	14	22	10	18
25	5	16	4	12
19	2	15	23	6
13	21	9	17	5
7	20	3	11	24

	2	4	2	3
5	1	3	0	2

+

1	4	2	0	3
0	3	1	4	2

0	13	21	9	17
24	7	15	3	11
18	1	14	22	5
12	20	8	16	4
6	19	2	10	23

=

0	2	4	1	3
4	1	3	0	2
3	0	2	4	1
2	4	1	3	0
1	3	0	2	4

+

0	3	1	4	2
4	2	0	3	1
3	1	4	2	0
2	0	3	1	4
1	4	2	0	3

3! (6) 1, 2, 3, 4, 5

1	4	2	5	3
5	3	1	4	2
4	2	5	3	1
3	1	4	2	5
2	5	3	1	4

(2,3)

0	10	20	5	15
20	5	15	0	10
15	0	10	20	5
10	20	5	15	0
5	15	0	10	20

(3,2) ~~360~~ 100

$2 \cdot 16 \cdot 25 = 100$

$\frac{1}{6}$ ·

$a = 1, b = -2$

$a + a' = 0, \quad b + b' = 1$

$a' = -1, \quad b' = 3$

$3 - 2 = 1$

$a + a' = -1$

$a' + a = 2$

(2,3) 6·60

1·10

7·70

0 1 2 3 4

0 3 1

8	1	6
3	5	7
4	9	2

7	0	5
2	4	6
3	8	1

$\frac{1}{2} n (n^2 - 1)$

$\frac{1}{2} n (n^2 - 1) + n$

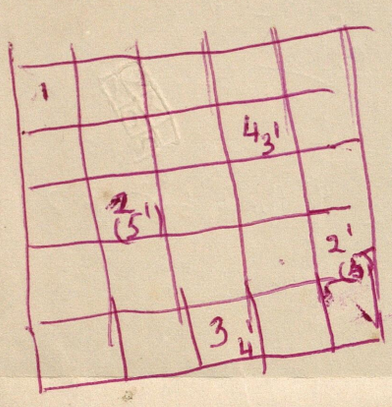
$\frac{1}{2} n (n^2 - 1 + 2)$

$\frac{1}{2} n (n^2 + 1)$

(2, 3) ~~2=3 (omits)~~.

(4, 6) (2, −2) // ~~−2+2=0~~ (1, −2)

(1, −1) (−1, 2).



16	23	0	7	14
22	4	6	13	15
3	5	12	19	21
9	11	18	20	2
10	17	24	1	8

0, 5, 10, 15, 20.

5	1	2	3	4
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5

3	4	0	1	2
4	0	1	2	3
0	1	2	3	4
1	2	3	4	0
2	3	4	0	1

⟷

1	3	0	2	4
2	4	1	3	0
3	0	2	4	1
4	1	3	0	2
0	2	4	1	3

0 1 2 3 4

~~0 1 2 3 4~~

~~3 4 0 1 2~~

1, 3, 0, 4, 2

0 1 2 3 4

1 2 3 4 0

2 3 4 0 1

3 4 0 1 2

4 0 1 2 3

0 1 2 3 4

1 2 3 4 0

2 3 4 0 1

3 4 0 1 2

~~0 1 2 3 4~~

~~1 2 3 4 0~~

3 4 0 1 2

1, 2, 3, 4, 0

3 4, 0, 1, 2

0 1 2 3 4

~~2 3 4 0 1~~

4 0 1 2 3

16, 22, 3, 9, 10

23, 4, 5, 11, 17

0, 6, 12, 18, 24

7, 13, 19, 20, 1

14, 15, 21, 2, 8

0 1 2 3 4

4 0 1 2 3

0 1 2 3 4

1.2.3.4.5

120 × 24

2880

4, 5, 11, 17, 23

0, 6, 12, 18, 24

33 + 3 + 27 + 10 + 70 + 58 + 80 + 50 + 38 = 369

C = 3, R = 1

C = 1, R = 3

36 × 96

216

324

3456

5

76 + 65 + 14 + 8 + 24 + 54 + 39 + 34 + 55 = 369

Abdul Khaliq Nasir

36 + 47 + 51 + 72 + 79 + 44 + 110 + 46 + 22 = 369

20 + 47 + 29 + 52 + 11 + 74 + 38 + 2 + 65

35	27	70	30	19	65	31	23	69
39	1	74	40	5	78	44	9	79
49	14	60	53	18	61	48	10	56
71	36	25	66	28	20	67	32	24
75	37	2	76	41	6	80	45	7
58	50	15	62	54	16	57	46	11
26	72	34	21	64	29	22	68	33
3	73	38	4	77	42	8	81	43
13	59	51	17	63	52	12	55	47

(3, 1, 2) (4, 5, 6) (8, 9, 7)

5	6	8	9	7	3	1	2	4
4	5	6	8	9	7	3	1	2
2	4	5	6	8	9	7	3	1
1	2	4	5	6	8	9	7	3
3	1	2	4	5	6	8	9	7
7	3	1	2	4	5	6	8	9
9	7	3	1	2	4	5	6	8
8	9	7	3	1	2	4	5	6
6	8	9	7	3	1	2	4	5

(1, 8) central nasik semi but final square no nasik.

3	1	4	2	5
5	3	1	4	2
2	5	3	1	4
4	2	5	3	1
1	4	2	5	3

5	6	4	9	7	8	1	2	3
1	2	3	5	6	4	9	7	8
9	7	8	1	2	3	5	6	4
5	6	4	9	7	8	1	2	3
1	2	3	5	6	4	9	7	8
9	7	8	1	2	3	5	6	4
5	6	4	9	7	8	1	2	3
1	2	3	5	6	4	9	7	8
9	7	8	1	2	3	5	6	4

(3, 6) nasik

72	54	63	0	9	18	36	45	27
0	9	18	36	45	27	72	54	63
36	45	27	72	54	63	0	9	18
72	54	63	0	9	18	36	45	27
0	9	18	36	45	27	72	54	63
36	45	27	72	54	63	0	9	18
72	54	63	0	9	18	36	45	27
0	9	18	36	45	27	72	54	63
36	45	27	72	54	63	0	9	18

(6, 3) nasik

(3, 1)

~~C = 3, r = 1~~

~~C = 3, R = 1~~

c = 3, r = 1

R = 3, C = 1.

C = 3, R = 1.

~~R = 3, C = 1.~~

108
324
45

adding by row
(P) + (P) → repetition

4	1	2	3	5
3	5	4	1	2
1	2	3	5	4
5	4	1	2	3
2	3	5	4	1

(2, 3, 1), (8

5	2	8	6	9	3	7	4	1
1	5	2	8	6	9	3	7	4
4	1	5	2	8	6	9	3	7
7	4	1	5	2	8	6	9	3
3	7	4	1	5	2	8	6	9
9	8	6	7	4	3	5	2	8
6	9	3	8	7	4	1	5	2
8	6	9	3	7	4	1	5	2
2	8	6	9	3	7	4	1	5

1, 2, 3, 4, 5, 6, 7, 8, 9

	8	9	7	3	1	2	4	5	6
	3	1	2	4	5	6	8	9	7
	4	5	6	8	9	7	3	1	2
✓	8	9	7	3	1	2	4	5	6
×	3	1	2	4	5	6	8	9	7
✓	4	5	6	8	9	7	3	1	2
×	8	9	7	3	1	2	4	5	6
✓	3	1	2	4	5	6	8	9	7
	4	5	6	8	9	7	3	1	2

sym. nesicans (6,3) (P)

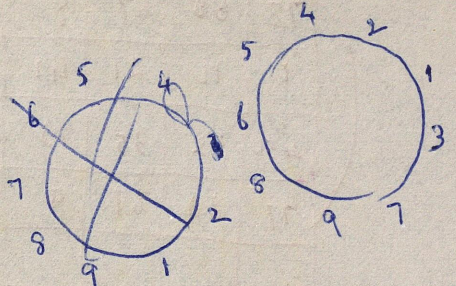
c = 3
r = 1

			✓	×	✓	×	✓	
27	36	45	63	72	54	18	0	9
18	0	9	27	36	45	63	72	54
63	72	54	18	0	9	27	36	45
27	36	45	63	72	54	18	0	9
18	0	9	27	36	45	63	72	54
63	72	54	18	0	9	27	36	45
27	36	45	63	72	54	18	0	9
18	0	9	27	36	45	63	72	54
63	72	54	18	0	9	27	36	45

(R) (3,6)

c = 3, R = 2

(3, 1, 2)(4, 5, 6) (8, 9, 7)



77	60	67	9	16	26	37	47	30
1	11	21	41	51	31	81	61	71
45	52	35	73	56	66	5	15	22
77	60	67	9	16	26	37	47	30

77	6	40	81	7	44	73	2	39
50	11	48	59	15	49	63	16	53
72	25	35	64	20	30	68	24	31
5	42	76	9	43	50	1	38	75
10	47	57	14	51	58	18	52	62
27	34	71	19	29	66	23	33	67
41	78	4	45	79	8	37	74	3
46	56	12	50	60	13	54	61	17
36	70	26	28	65	21	32	69	22

Adding (P1 + (R) by mod 4 and 3 → next