ETTDC

1980

DIARY 1980

"Where the mind is without fear and the head is held high; where knowledge is free;
Where the world has not been broken up into fragments
by narrow domestic walls;
Where words come out from the depths of truth;
Where tireless striving stretches its arms towards perfection;
Where the clear stream of reason has not lost its way into the dreary desert sand of dead habit;
Where the mind is led forward by thee into ever-widening thought and action—
Into that heaven of freedom, my Father, let my country awake".

With best compliments from :

ETTDC

ELECTRONICS TRADE AND TECHNOLOGY DEVELOPMENT CORPORATION LIMITED

15/48, Malcha Marg,
NEW DELHI

1979

JANUARY

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FEBRUARY

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PERSONAL MEMORANDA

Name Mr. B. S. Madhava Rao

Residential Address No. 4 Kanakpura Road
Basavanagudi Bangalore - 4

Office Address

Telephone { Resi.
Business

Motor Car No.

Driving Licence No.

Telegraphic Address

Blood Group

Emergency No.

If this diary is found please return to the owner at the above address.

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FOREIGN TIME-TABLE

At 12 o'clock noon, Greenwich Mean Time, the standard time elsewhere is:

Argentina.....9 a.m.
Austria.....1 p.m.
Australia (Sydney).....10 p.m
Belgian Congo.....1 p.m.
Belgium.....1 p.m.
Brazil .....9 a.m.
Burma.....6.30 p.m.
Canada (Toronto).....7 a.m.
Canada (Vancouver) ...4 a.m.
China (Shanghai) .....8 p.m.
Columbia.....7 a.m.
Costa Rica..... 6 a.m.
Cuba.....7 a.m.
Czechoslovakia.....1 p.m.
Denmark.....1 p.m.
Dominican Republic ... 7 a.m.
Egypt .....2 p.m.
Eire.....12 noon
Finland.....2 p.m.
France.....1 p.m.
French West Africa ...12 noon
Germany.....1 p.m.
Gibraltar.....12 noon
Greece .....2 p.m.
Haiti.....7 a.m.
India.....5.30 p.m.
Indonesia (Java).....7.30 p.m.
Iran.....3.30 p.m.
Iraq.....3 p.m.
Italy.....1 p.m.
Jamaica .....7 a.m.
Japan.....9 p.m.
Malaya.....7.30 p.m.
Morocco.....12 noon
Netherlands.....1 p.m.
Neth. Antilles (Aruba, Bonaire, Curacao) 7.30 a.m.
(St. Martin).....8 a.m.
Neth. New Guinea...9.30 p.m.
New Zealand (Auckland).....12 midnight
Newfoundland .....8.30 a.m.
Nigeria.....1 p.m.
Norway.....1 p.m.
East Pakistan.....6 p.m.
West Pakistan.....5 p.m.
Philippine Islands.....8 p.m.
Portugal.....12 noon
Spain.....1 p.m.
St. Kitts.....8 a.m.
Surinam.....8.30 a.m.
Sweden.....1 p.m.
Switzerland.....1 p.m.
Thailand.....7 p.m.
Trinidad.....8 a.m.
Tunisia.....1 p.m.
Turkey.....2 p.m.
Union of S. Africa.....2 p.m.
Uruguay.....9 a.m.
U.S.A. (Chicago).....6 a.m.
U.S.A. (New York, Philadelphia, Washington).....7 a.m.
U.S.A. (S. Francisco)....4 a.m.
U.S.S.R. (Moscow, Leningrad).....3 p.m.
Venezuela.....7.30 a.m.

ELECTRONICS TRADE AND TECHNOLOGY DEVELOPMENT CORPORATION LIMITED

REGISTERED OFFICE/HEAD OFFICE

ETTDC LIMITED
15/48, Malcha Marg,
Chanakyapuri,
NEW DELHI-110021.

Telex : 031-3809 ETDC IN
Grams : TRADETECH, NEW DELHI
Tel. Nos. : 373831, 373296, 372640, 373979

REGIONAL OFFICES

ETTDC LIMITED
Air India Building (8th Floor)
Nariman Point,
BOMBAY-400021

Telex : 011-2745 ETDC IN
Grams : TRADETECH, BOMBAY
Tel.No. : 233080, 233893

ETTDC LIMITED
15, Shiv Darshan Co-operative Society Building,
Infantry Road,
BANGALORE-560001

Grams : TRADETECH, BANGALORE
Tel.No. : 578155

ETTDC LIMITED
C/o West Bengal Electronics Ind. Dev. Corpn Ltd.,
225-E, Acharya Jagdish Chandra Bose Road,
(5th Floor),
CALCUTTA-700020.

Telex : 021-2242 WBEIC
Tel.No. : 442645, 431981

ETTDC LIMITED
1-7-241/11 B & C
Sarojini Devi Road
SECUNDERABAD-500003.

Telex : 0155-237 ETDC IN
Grams : TRADETECH HYDERABAD
Tel.No. : 73360, 74430

ETTDC LIMITED
Administrative Block
Dr. Vikram Sarabhai Instronics Estate,
Thiruvanmiyoor,
MADRAS-600041.

Tel.No. : 413926
Grams : TRADETECH MADRAS

FOREIGN OFFICES

ETTDC LIMITED
Embassy of India
Ul. Rejtana 15, Mokotow,
WARZAWA,
(POLAND)

Telex : INDEM PL-814891
Grams : INDEMBASSY,
WARSAW
Tel.No. : 496257
494308

ETTDC LIMITED
Embassy of India
Vespolrni Predlock
MOSCOW (USSR)

Telex : INDEMB SU-7409
Grams : INDEMBASSY,
MOSCOW
Tel.No. : 2906505
: 2544630

ETTDC LIMITED
3001, Redhill Avenue,
Esplanade I, Suite 219,
Costa Mesa,
California-92626
(USA)

Telex : ETTDCUSA CSMA
678352
Tel.No. : 714-557-2703

IMPORTANT TELEPHONE NUMBERS

HEAD OFFICE—NEW DELHI

	Office	*Residence*
Shri R. M. Nayar Chairman-cum-Managing Director	374023	373482
Shri C. G. Subramanyan, Director (Technical)	375795	693409
Shri R. Venkatesan, Director (Finance)	372782	569297
Shri T. M. Subramanian Deputy General Manager	373789	623266
Shri K. Narayanan, Company Secretary	373789	582478
Shri S. Sundaresan, Chief Finance Manager	373326	
Shri K. C. Gowri Shankar Chief Marketing Manager	373296	

Exports Division

Shri P. K. Ramachandran Manager (ES)	372640	
Shri Arvind Narula, Assistant Manager	372640	
Shri L. K. Goel, Assistant Manager	372640	
Shri S. Natarajan, Assistant Manager	372640	
Shri Niraj Gupta, Assistant Manager	373979	
Shri M. Surya Rao Assistant Manager	373979	

	Office
Shri S. N. Chakravarty, Assistant Manager (MC)	373296

Imports Division

Shri B. A. Mylar Rao, Assistant Manager (Equipment)	372640
Shri E. Yeshwant, Assistant Manager (Computers)	372640
Shri V.W. Wadiwa, Assistant Manager (T), BMD	373979
Components & Materials Section	373831

Planning & Coordination

Shri Hari Bhaskaran Assistant Manager	373979

Administration & Personnel Division

Shri P. S. Venkatraman, Manager (Admin. & Pers.)	373789
Shri N. M. Gulrajani, Assistant Sectretary	373979
Administrative Officer	371486
Assistant Security Officer	373979

Finance & Accounts Division

Shri S. M. Kapoor, Assistant Manager (Accounts)	373326
Shri A. K. Khanna Assistant Manager	373326
Shri A Venkateswar Assistant Manager	375399

	Office	*Residence*
Shri T. Prabhakaran Assistant Manager	375399	
Materials Management Division		
Stores Officer	373831	
Assistant Purchase Officer	371486	
Technology Development Division		
Shri H. C. Agarwal, Assistant Manager (TD)	371486	
Shri G. A. Setty, Assistant Manager (T) (TD)	371486	
Shri M. Ishwar Dutt Assistant Manager (QC)	371486	
Technical & Trade Information Centre	373326	
REGIONAL OFFICES		
Bangalore		
Shri N. Srinivasan, Assistant Manager	578155	
Bombay		
Shri M. N. S. Rao, Regional Manager	233893	
Hyderabad		
Shri A. V. Rajabahadur, Deputy General Manager	74430	70406
Shri S. V. N. Murty, Manager (Equipment)	73360	
Shri S. Kailasanathan Manager (Computer Peripherals)	73360	

	Office	*Residence*
Shri K. V. Raghavan, Manager (Equipment Marketing)	73360	
Shri K. S. Rama Prasad Manager (TD)	73360	
Shri R. Srinivasan, Assistant Manager (Equipment)	73360	
Shri P. V. R. Nayar, Assistant Manager (Quality Control)	73360	
Calcutta		
Shri P. V. Ramachandran, Commercial Officer	442645 431981	
Madras		
Shri N. A. Mirza, Assistant Stores Manager	413296	
FOREIGN OFFICES		
Los Angeles		
Shri K. S. Sridharan, Branch Manager	714-557-2703	714-552-7036
Warsaw		
Shri K. N. R. Sastry, Deputy General Manager (Europe)	496257	494308
Shri R. Narayanan, Commercial Officer	496257	494341
Moscow		
Shri P. Guha Biswas Manager	29-06505	2544630

ABOUT OURSELVES

1. ETTDC was set up by the Department of Electronics, Government of India in 1974 with two main objectives viz. promotion of foreign trade and development of technology in the field of electronics. Its Head Office is located at Delhi with Branches at Bombay, Hyderabad, Bangalore, Madras and Calcutta. It has three foreign offices functioning at Moscow, Warsaw and Los Angeles.

2. During its first five years of existence, ETTDC's services have been made available to the electronics industry at large, particularly the small and medium scale sectors, Government user departments and R & D institutions in the country. Its turnover increased from a modest sum of Rs. 88 lakhs in the first year of operation to over Rs. 12 crores in the fifth year.

3. ETTDC has set up an Industrial Raw Material Assistance Centre (IRMAC) to serve as a Components and Materials Bank for the electronics industry and in particular the small scale units. In addition, Government utilises the services of this Corporation for arranging bulk import of selected components and materials to support the electronic industry. The items presently in this scheme include transistors, integrated circuits, rectifiers, special electronic valves, tape deck machanism, T.V. tubes, calculator chips, and various other components for the Consumer Electronics Industry. ETTDC also imports different kinds of measuring instruments for T & D Centres in various States, computer peripherals, magnetic tapes and disc packs for computers. Most of these items are on bulk purchase and warehousing basis for ready supply to actual users. ETTDC also imports computers from selected sources and arranges for their installation. It also imports and makes over materials and components against import licences of actual users on actual cost basis plus a nominal service charge.

4. In the area of exports, it renders marketing, technical, financial and quality control assistance to manufacturers in the country and undertakes continuous market development to export

new products to new markets. Unlike some other Corporations, ETTDC exports the goods on its own and handles all the connected documentation work, cash assistance, REP etc. Since its inception, it has participated in 34 exhibitions abroad and organised two exhibitions on its own in Eastern Europe. There are several schemes sponsored by ETTDC for establishing production of exportable goods. Through these efforts it is expected that ETTDC will soon become a major exporter of electronic products in the country.

5. In the area of technology development, it has already taken up turn-key projects, consultancy work and feasibility studies in the country and is also arranging for the transfer of know-how and monitoring of special projects for export production. ETTDC is a consultancy organisation approved by ADB and UNDP for technical co-operation between developing countries. Under this scheme, it offers consultancy to developing countries to set up exclusive electronic industrial estates, test and development centres, tool rooms, mechanical production centre and kit assembly units. ETTDC has just concluded a consultancy contract with Algeria. One of the unique features in the area of technology development is ETTDC's joint development ventures with manufacturing-cum-development units having R & D capability to develop new products to be exclusively marketed by it. ETTDC's funds have been deployed in a few such development ventures.

6. ETTDC's operations are fully supported in India by its valued clientele, its trade partners, Sales Promotion and Service Agents, Development Agencies, Central and State Government Departments etc. ETTDC's trade partners abroad comprise various government and State trading organisations in the Socialist Countries and reputed manufacturing and marketing organisations in Europe, USA and the Far East.

Translations
from
Narayana Pannoithās
Ganita Kaumudi
relating to Bhadraganitham
(magic squares)
made by
Dr. K. S. Nagarajan

Notes from

Padmakar Dwivedi's Introduction

Magic Squares

The construction of these containing an odd or even number of cells had been known to the Hindus for quite a long time. In Tantra Sastra they are called Yantras. As they were supposed to possess mystical properties, they were kept secret, and were not dealt with in Arithmetic by Indian mathematicians. But, Narayana, defying this superstitious belief, touched upon the subject of magic squares under the heading of Bhadraganitha, and gave definite rules for Constructing them in the last Chapter (XIV) of his Ganitha Kaumudi, which as being unearthed now corroborates the fact that India invented magic squares which had already been dealt with in Bhairava and Siva Tandava Tantras prior to Ganitha Kaumudi. This book composed in 1356 A.D precedes all treatises on magic squares written by Europeans.

NOTES

31 Days **JANUARY 1980** 1st Month

मंगलवार १ जनवरी **TUESDAY 1** पौष शुदी १४ सं० २०३६

pp. 353 onwards

Stanzas (1)d (2). Then I explain that essence of the mathematics called Bhadra Ganita which was first revealed to Manibhadra who was full of curiosity by Lord Siva the preceptor of the three worlds in order to show the skill of good mathematics to satisfy those who know machines, and to destroy the pride of bad mathematicians. This branch of mathematics is related closely to progressions and series. The technical terms used are given below.

(3) – (5): There are three kinds of Bhadraganitas namely Samagarbha or even centred Visamagarbha or odd-centred and Visama or odd. Those squares which are a mixture of the two are called Upabhadra.

That magic square which is Niragraka is called even-centred; that which is Dvyagraga is odd-centred, and that which is Tryagra is odd. The mathematics of all three squares is in accordance with the rules in Progressions. When the sum is given, the first term and the common difference should be calculated. When the sum is divided by the number of squares in a row the result is the sum of the numbers in a row or a column

(6) and (7) – Griha or Pada is the term used for the total number of houses in a given square. Charana or Pada is the term used for the square root of the number of houses in a magic square. These are the technical terms used in this Chapter by Narayana Pandita on magic squares.

The rule (formula) in addition (sum)

(8) The square of the number of houses together with the number of houses - half of this is the sum of all the numbers in the houses. When this total sum is divided by the square root of the number of houses the result is the sum of the numbers in a row or column or diagonal.

Example (1).

Tell quickly the total sum and the sum in each row or column or diagonal in a square of sixteen houses or 36 or 9 houses separately

(i) $\frac{16^2+16}{2} = \frac{272}{2} = 136$, $\sqrt{16} = 4$, $136/4 = \underline{34}$

(ii) $\frac{36^2+36}{2} = \frac{1296+36}{2} = 666$, $\sqrt{36} = 6$, $666/6 = 111$

(iii) $\frac{81+9}{2} = 45$, $\sqrt{9} = 3$, $45/3 = 15$.

Rule for finding out the first term & common difference

(9). The dividend is half the product of the number of squares and number less by one, the divisor is the number of squares and sum is the Kotepa; then the two products obtained by solving the indeterminate eqn along with the Kotepa are the first term and the common difference.

Explanation. Let the first term be a, common difference d, and the number of squares n.

S = Sum to n terms

$$S = \frac{n}{2}\{2a + (n-1)d\}.$$

If $\frac{n(n-1)}{2} = P$

$S = na + Pd$

or $a = (S - Pd)/n$

Therefore in the Kuttaka

P is dividend

S = Ishtaphala

x = divisor

The Labdhi (x) in Kuttaka is a

and the Guna (y) " d

Example (2) Oh! Scholar! In the squares marked before P = 120, S = 400, n = 16; if you are really interested in magic squares tell quickly the first term and the common difference the Kuttaka is

$16x + 120y = 400$

$2x + 15y = 50.$

Solving this we get $x = 25, y = 0$ or $x = 10, y = -2, x = -5, y = +4$ and so on

In the same manner the first term and the common difference for the second are $x = 1, y = 3, x = -24, y = 4$ and so on for the third $x = 20, y = 0, x = 16, y = 1, x = 12, y = 2, x = 8, y = 3, x = 4, y = 4, x = 0, y = 5$ and so on

The rule for constructing a magic square of 16 squares.

(10), (11) & (12): After placing two numbers of the series in the same manner as the movement of the horse in a chessboard both upwards and downwards with a single

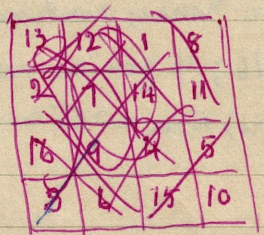
(*) This square is also nasik & jaina like the Khajuraho magic square

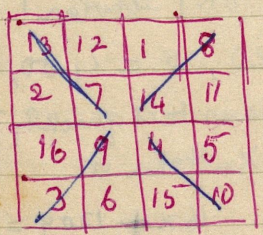
7	12	1	14
2	13	8	11
16	3	10	5
9	6	15	4.

Given in Fig. 220, p. 125 of Andrews.

~~In fact~~ The ~~above~~ square ~~can be~~ constructed by Narayana's method of Knight moves starting with 1 as the 3rd element in first row and using Knight moves (2, −1) & (2, 1) successively would be

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





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

& is again 2×2 jaina & since it is nasik it can be transformed to (1) by making the first & 2nd cols the 3rd & 4th by (a rolling process). Also note that we can get the Khajuraho square from the above by the interchanges marked.

In fact, taking the general form for a nasik square of order 4

viz

a_1	a_2	a_3	a_4
b_1	b_2	b_3	b_4
a_3'	a_4'	a_1'	a_2'
b_3'	b_4'	b_1'	b_2'

b_2	a_2	a_3	b_3
b_1	a_1	a_4	b_4
a_3'	b_3'	b_2'	a_2'
a_4'	b_4'	b_1'	a_1'

the transformation of diagonal interchanges leads to ↑ which is still nasik.

house in between and forward and backward the houses should be filled by numbers moving as the horse moves in a chess board. This is the rule for an even square of 16 houses. The sum of the numbers in the rows, columns and diagonals is the same. The same rule as for 16 (4^2) holds good even for other even-numbered squares ~~36 (6^2)~~, 64 (8^2), etc..

Example (3): Oh! friend! if you happen to know the rule for magic squares viz that the sum of the numbers in rows, cols and diagonals is the same, tell me the arrangement of numbers in four squared (16 houses) if the first term is 1 and common difference is 1.

No. of squares 16. Total sum is $\frac{16^2+16}{2} = \frac{16 \cdot 17}{2} = 136 = \frac{1}{2} n(n+1)$

The common sum = 136/4 = 34.

(1) (*)

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

or

or (2)

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

(*) → (2) by interchange of rows & cols

Another rule is as follows:-

(13) In the quarter beginning with the first house filled with pairs of numbers there are twenty four different kinds and similarly with others separately.

Example (4): Oh! best of mathematicians, if you are proud of your knowledge in magic squares, please tell me how many different arrangements in a square of sixteen houses can be made with numbers commencing with 1 and common difference 1

The quarters are in rows and columns and diagonals. The numbers in the 16 houses are 1, 2, 3, 4 which is the first quarter and there the pair is 2, 4. 5, 6, 7, 8 form the second quarter where the pair is 6, 8. In the same manner the other two quarters are 9, 10, 11, 12 (pair 10, 12), and 13, 14, 15, 16 (pair 14, 16).

Thus, here, by the numbers arising out of pairs in the quarters, by sum of the houses and difference and by the order and reverse order twenty four different kinds ~~are got. Thus by the four pairs~~ pairs are obtained. Thus separately by numbers arising out of other pairs also, twenty four different kinds are got. Thus by the four pairs, in each of the twenty four kinds, sixteen different varieties arise. ∴ The ~~total~~ different arrangements are 24 × 16 = 384

Everything is clear by the Example. First pair of the two numbers each is

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

The twenty four varieties arising out of the pairs are shown. Thus by the other pairs twenty four varieties are got separately.

Thus by the four pairs of the squares of 16 houses, 384 different arrangements are got.

And another example (5):

Tell me quickly the first term and the common difference in a square of 16 houses, where the common sum in each row or column or diagonal is 40 or 64.

On the first example the indeterminate equation is

$$16x + 120y = 160$$

or $2x + 15y = 20$.

Solving $x = 160 - 15t$, $y = 2t - 20$

$x = 10$, $y = 0$ or $x = -5$, $y = 2$

Therefore the magic squares are given in the next page.

In the second example

$$16x + 120y = 256$$

or $2x + 15y = 32$

Solving $x = 256 - 15t$, $y = 2t - 32$

$t = 16$, $x = 16$, $y = 0$

$t = 17$, $x = 1$, $y = 2$

$t = 18$, $x = -14$, $y = 4$, and so on.

The squares are given below

1)

10	10	10	10
10	10	10	10
10	10	10	10
10	10	10	0

or

-5	9	19	17
21	15	-3	7
1	3	25	11
23	13	-1	5

2)

16	16	16	16
16	16	16	16
16	16	16	16
16	16	16	16

or

1	15	25	23
27	21	3	13
7	9	31	17
29	19	5	11

or

-14	14	34	30
38	26	-10	10
-2	2	46	18
42	22	-6	6

Thus endless numbers of squares can be obtained.

or the rule is as follows :-

(14) or in every quarter the first term is different for filling up and the common difference is the same for all. The number of boxes in the square is obtained by the quarters. Thereby knowing the first term and the common difference in each quarter, the numbers in the boxes can be filled as per rules mentioned before in all the squares.

In the first example cited above, the common sum of each row or column is 40. The quarters here are

(1, 6, 11, 16); or (1, 5, 12, 16); or (2, 6, 11, 15)

The squares arising from these arrangement are shown in the next page. The numbers in the four quarters are

(1, 2, 3, 4), (6, 7, 8, 9), (11, 12, 13, 14), (16, 17, 18, 19)

or (1, 2, 3, 4), (5, 6, 7, 8), (12, 13, 14, 15), (16, 17, 18, 19)

or (2, 3, 4, 5), (6, 7, 8, 9), (11, 12, 13, 14), (15, 16, 17, 18)

(1)

1	9	16	14
17	13	2	8
4	6	19	11
18	12	3	7

(2)

1	8	16	15
17	14	2	7
4	5	19	12
18	13	3	6

(3)

2	9	15	14
16	13	3	8
5	6	18	11
17	12	4	7

In the second example cited above the common sum of each row or columns is 64. Here the quarters are

(7, 12, 17, 22); or (4, 11, 18, 25); or (6, 10, 19, 28).

The squares arising from the above arrangements are as follows : The numbers in the quarters are

(7, 8, 9, 10), (12, 13, 14, 15), (17, 18, 19, 20), (22, 23, 24, 25) or

(4,5,6,7); (11,12,13,14); (18,19,20,21); (25,26,27,28) or
(1,2,3,4); (10,11,12,13); (19,20,21,22); (28,29,30,31)

(1)

7	15	22	20
23	19	8	14
10	12	25	17
24	18	9	13

(2)

4	14	25	21
26	20	5	13
7	11	28	18
27	19	6	12

(3)

1	13	28	22
29	21	2	12
4	10	31	19
30	20	3	11

(16). The rule or the formula for calculating quarters and others:

Here, the first term and the common difference should be taken for calculating quarters and others. First, the first term should be written and in front the common difference and its multiples and the quarter.

Explanation

If the first terms are a_1, a_2, a_3 respectively of the three squares and a is the first term of the fundamental, x and y are the common differences and n is the number of numbers in the quarter, n_1 in the first etc.

$a_1 = a + x$

$a_2 = a + x + y + nn_1$

$a_3 = a + x + 2y + 2nn_1$

Let us try four sets of four numbers in A.P with C.D = 1 and the first terms of the four sets having C.D = d

ie $a, a+1, a+2, a+3$

$a+d, a+d+1, \ldots a+d+3$

$a+2d, a+2d+1, \ldots$

$a+3d, a+3d+1 \ldots$

Adding all the terms

$16a + 24d + 24 = 160$ or 256.

i.e. $2a + 3d = 17$ or 29

or $2a+3d = 17$ (3−2 = 1) or 29 (3−2 = 1)

or $2(34-a) = 3(17+d)$ or $2(58-a) = 3(29+d)$

$34-a = 3t$, $17+d = 2t$ or $58-a = 3t$, $29+d = 2t$

$a = 34-3t$, $d = 2t-17$ or $a = 58-3t$, $d = 2t-29$

$2(17+a) = 3(17-d)$

$17+a = 3t$

$17-d = 2t$

$a = 3t-17$, $d = 17-2t$

$t \geq 6$. $t = 6, 7, 8$.

$t = 9$, $a = 7$, $d = 1$; $t = 15$, $a = 13$, $d = 1$.

$t = 10$, $a = 4$, $d = 3$; $t = 16$, $a = 10$, $d = 3$

$t = 11$, $a = 1$, $d = 5$; $t = 17$, $a = 7$, $d = 5$

$t = 18$, $a = 4$, $d = 7$; $t = 19$, $a = 1$, $d = 9$

$a = 1, d = 5$; $a = 4, d = 3$; $a = 7, d = 1$

(1, 6, 11, 16) (p.7)

1, 2, 3, 4
6, 7, 8, 9
11, 12, 13, 14
16, 17, 18, 19

} 4 terms p.7

7, 12, 19, 22
4, 11, 18, 25
1, 10, 19, 28

} p.7.

$a, a+1, a+2, a+3$

$a+x, a+x+1, \ldots$

$a+x+y, a+x+y+1, \ldots$

$a+2x+y, a+2x+y+1, \ldots$

$x = 4$, $y = 7$ (160 or 256)

1, 5 ; 12, 16

The total of all the numbers in the squares is

$16a + 16x + 8y + 24 = 160$ or 256

$2a + 2x + y = 17$ or 29

$a = 1, 2, \ldots 7$ & $1, 2, \ldots 13$

$x = 3$ } $16 \times 24 = 384$

$y = 3$ } $384/8 = 48$.

(17) While three places in the quarter (one less than the number in the quarter) shall be placed in order along with the term before its own, the four series is obtained, and then the other which is different should be reduced by one and one-fourth should be taken and added to the last number.

(18) This added to the first and multiplied by half the number of numbers in the quarter is the sum of the numbers in the full quarter. Subtracting this from the original sum we get the Kshetraphala.

(19) After having obtained the first term and the common difference by the number of numbers in the quarter and their Kshetraphala when they are the two ~~numbers~~ unknown x and y the numbers so obtained should gradually be abraided in the numbers of the full quarter.

I Half:

(20) In this manner the quarters and others will be got of all the magic squares

Explanation: (1) The quarter should be up to one less

than the Numbers of numbers in it.

2) The last number which has been placed should be multiplied by the number one less than in the quarter together with the first and multiplied by half the number in the quarter. This alone is the result of the explanation.

In the two examples cited before, the sum of the numbers in each line (row or col) is 40 or 64. Here the first term and the C.D. are respectively 1 and 1. According to the rule "At first the first should be written" the four series that is got is (1, 5, 9, 13). The last number of this quarter is 13. One less than this is 13 − 1 = 12. ¼ of this is ¼ × 12 = 3. ~~This multiplied by 2 (half the number of numbers in the quarter) we get~~ This multiplied by the common difference is 3. This added to the last number 13 + 3 = 16.

Adding the first term 1 to this we get 16 + 1 = 17

This, if multiplied by 2 (half the number of numbers in the quarter) we get

$$17 \times 2 = 34.$$

This is the sum in the ~~field~~.

Subtracting this from 40 the required sum, we get

$$40 - 34 = 6$$

This is called the Kshepaphalam.

First term and C.D. are unknown, the sum is 4, and the Kshepaphalam is 6. The equation is

$4x + 6y = 6$

or $2x + 3y = 3$ for which the solutions are

$x = 0, y = 1$ or $x = -3, y = 3$.

The two series are 0, 1, 2, 3 and −3, 0, 3, 6 resply

Adding them in the full series we get the quarters and others as (1, 6, 11, 16) or (−2, 5, 12, 19)

In the second example the sum is 64. The two series that is got as before is ~~34~~ (1, 5, 9, 13). The full sum as before is 34.

Therefore the Kshetraphala is $64 - 34 = 30$

The equation is $4x + 6y = 30$

or $2x + 3y = 15$

$x = 6, y = 1$; $x = 3, y = 3$; $x = 0, y = 5$

The series respectively are

(6, 7, 8, 9) or (3, 6, 9, 12) or (0, 5, 10, 15)

Therefore the quarters are respectively

(7, 12, 17, 23) or (4, 11, 18, 25) or (1, 10, 19, 28)

other quarters can be obtained by other first terms and common differences

Thus many solutions are got. or a short formula for finding the first term and common difference of each quarter.

II half:

20) The quotient obtained by dividing the Kshetraphalam by the number of terms in the quarter together with one will be the number of terms in the magic square.

(21) or if the part is without the first term, then the

remainder must always be half the number of terms in the quarter. If the remainder is otherwise, the magic becomes empty or nothing.

22) If the first two terms are zero and half of kshepaphala and the C.D's are +ve & -ve the two kshepas are in the first half of the full series and in places of the second half.

23) first half: In this manner the quarters and others will be, both in even and odd magic squares.

Explanation

In the two examples furnished before the full series obtained from one and others is (1, 5, 9, 13). In the first example phalam or the sum of the numbers in each row or col. is 40, and the kshepaphalam is 6.

Half of kshepaphalam = 3

The first two terms are 0, 3

Positive and negative terms with addition of one or subtraction of one are −1, 3

Adding 0 and 3 to the I and II halves of the full series respectively we get the quarter as (1, 5, 12, 16) & adding as before one to the I half and subtracting one from the second half of this we get the quarter as (2, 6, 11, 15)

In the second example phalam or the sum of the numbers in each row or col. is 64 and the kshepaphalam is 30.

Half of this is 15

The first two terms are 0 / 15. Adding one to the first and

subtracting me from this and set in order 1/14, 2/13, 3/12, 4/11 5/10, 6/9, 7/8 etc

The quarters and others are obtained as before.

In this manner there are many selections as indicated below:

1	5	24	28
2	6	23	27
3	7	22	26
4	8	21	25
5	9	20	24
6	10	19	23
7	11	18	22
8	12	17	21

Total of each row is 58

All squares are obtainable from the four square.

or the formula is as follows:—

23) 2nd Half

Taking a given magic square and the sum of the numbers in a row of it and the difference between this and the required sum is placed in one quarter; then the required magic square is got because the first number is got.

Example (6)

A magic square with sixteen horses is given. By what numbers of it is a square with 100 as the sum of any row formed? If you are a sailor of the boat of

of magic squares tell me quickly the various solutions
Explanation and solution:

In the houses of the magic square 16 numbers are placed. even then their result is the same. Therefore the difference between the sums of the given and the required squares is to be first found out and placed in the first quarter. Then by simple rule of three the magic square can be formed. When the houses are determined by quarters the remaining numbers can be easily determined in all the houses.

In the given magic square of 16 houses the sum of numbers in any row is 34. The sum in the required square is 100. The difference is 66. This divided by the quarter (i.e. 4) is 33/2. Therefore the magic square with 100 as the sum in any row or column is

35/2	49/2	59/2	57/2
61/2	55/2	37/2	47/2
41/2	43/2	65/2	51/2
63/2	53/2	39/2	45/2

100 is the sum.

or in a given square of 16 houses with sum of numbers in a row or column as 64, the required magic square with 100 as the sum of numbers in each row is

1	15	25	23
27	21	3	13
7	9	31	17
29	19	5	11

sum is 64.

10	24	34	32
36	30	12	22
16	18	40	26
38	28	14	20

Sum is 100.

working

$100 - 64 = 36$

$36/4 = 9,\ 9+1,\ 9+15$, etc.

In this manner from a given ~~square~~ magic square we can get endless number of magic squares.

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24) I Half. — Formula for adding 2 even squares.

When the two even magic squares are given one of them is called the Chadaka (coverer).

Explanation:

When the two even magic squares are given one of them is called chadaka (coverer) and the other Chadya (covered)

25) The other is called Chadya (covered); the addition or combination of the two is ~~known~~ to be known as similar to folding of hands. The first is called Mahapunkti and consists of a series formed by the given first term and the common difference.

26) In the same manner the other is called Para with the required full series. The sum of the numbers in the row is reduced by the sum of the numbers in the

Mahapunkti and divided by the sum in the Para and multiplied by the quotient is called the series of the product called Gunaja.

27) The two series Moola and Guna which are obtained from half the magic square.

28) By the numbers of those which separately belong to Chedaka and Chedya and which are above and ~~below in~~ the others which are below in the other

29) Half the magic square should be filled in order and in the reverse order. Thus the construction of magic squares has been explained by Narayana Pandita son of Narahari

Explanation

Here the construction is exactly like the folding hands i.e. first as the right thumb, right forefingers etc ~~etc~~ fall on the left thumb, left forefingers etc in the same manner this also should be done.

By the first term of the given square and its common difference the first line called the Mahapunkti should be formed. In the same manner the parapunkti of the square should be formed by the first term and common difference of the other square. The required sum of the numbers — the row formed by the sum of the numbers in ~~Parapunkti and the quotient multiplied by the numbers in the parapunkti~~ in the Mahapunkti and divided by the sum of the numbers in the parapunkti; the series of those

numbers is called Guna. In the half of one square the Mahapankti and in the half of the other the Gunapankti should be placed. In the two given magic squares viz the covered and the covered in one the numbers of the Mahapankti and in the other the numbers of the Gunapankti should be placed in the following manner:—

The numbers of the Mahapankti which are below should be placed above and those which are in the upper houses should be placed in the lower ones. Thus in the first half of the magic square the placing of the numbers, and in the second half the placing of the same numbers should be in reverse order. Those two numbers which are in the first half in the first upper and lower houses should be placed in the second half of the second upper and lower houses. After filling the houses in the houses of the covered and covers squares, the required even magic square with the sum of the numbers in the row is obtained by addition or combination.

In the Chaturabhadra or square to be covered the sum of the houses in the upper, lower, diverse and diagonal-wise is even is let us say b and that in the Chadaka square or coverer is a. The difference is (a−b). Therefore by summing up these two squares, the square that is obtained the corresponding sum is a+b−b = a.

Everything mentioned above is clear by the following Example:—

In the two magic squares already dealt with in

which the sum of the numbers in row or col are 40 and 64, let us take the first first.

In it the two series with one as the first term and common difference one and 0 as the first term and common difference one are (1, 2, 3, 4), (0, 1, 2, 3).

(1) the sum of the numbers in the first series = 10

(2) sum of nos. in row or col = 40

(3) (2) − (1) = 30.

(4) Sum of numbers in the second series = 6

(5) (3) ÷ (4) = 30 : 6 = 5.

Multiplying each number of the second series by 5, the series is (0, 5, 10, 15) is obtained.

Moolapankthi is (1, 2, 3, 4)

Gunapankthi is (0, 5, 10, 15)

Placing them in the upper and lower halves of the magic square, we get

First

1	2
4	3

and second

0	5
15	10

By placing them in the reverse order the Chadya (covers) and Chadaka (one covering the first) by the second we get

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

(Chadya)

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

Chadaka

the square as follows as by folding of hands

17	13	2	8
1	9	16	14
18	12	3	7
4	6	19	11

or covering the second by the first we get

8	2	13	17
14	16	9	1
7	3	12	18
11	19	6	4

That is the same as the first in the reverse order, or, say the first Moolapankti is (1, 2, 3, 4) and the second is also (1, 2, 3, 4) the chadya and the chadaka are

[$40 - 10 = 30$

& $\frac{30}{10} = 3$ ie Gunapankti is 3, 6, 9, 12]

[P.T.O

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

6	3	9	12
9	12	6	3
6	3	9	12
9	12	6	3

~~Causing of~~ The two magic squares obtained by combination of these two are as follows:-

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

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

[Repetitions unfortunately]

Then in the second example the first Moolapankthi is (1,2,3,4) and the second is (0,1,2,3)

$64 - 10 = 54$ & $54 \div 9 = 6$

∴ Gunapankthi is 0, 9, 18, 27. The Chadya and Chadakam

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

9	0	18	27
18	27	9	0
9	0	18	27
18	27	9	0

The two squares formed by addition are

29	21	2	12
1	13	28	22
30	20	3	11
4	10	31	19

12	2	21	29
22	28	13	1
11	3	20	30
19	31	10	4

Two more examples

7) In a magic square of eight houses the sum of the numbers in each row is 260 or in a similar square in which the sum is 400, O friend if you are the first among ~~them~~ those who knows the mathematics of magic squares, tell me the numbers obtained by a combination of these two.

(a) (1) Moolapankti as before is 1, 2, 3, 4, 5, 6, 7, 8

(2) The second pankti is 0, 1, 2, 3, 4, 5, 6, 7

(3) $260 - 36 = 224$

(4) $224 \div 28 = 8$

∴ The Gunapankthi is

0, 8, 16, 24, 32, 40, 48, 56

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

Chadya

The Chadya & Chadaka got by them are

(*) This magic square is nasik but not associated, and it is 2 × 2 Jaina. It also does not appear to be knight-nasik

24	16	8	0	32	40	48	56
32	40	48	56	24	16	8	0
24	16	8	0	32	40	48	56
32	40	48	56	24	16	8	0
24	16	8	0	32	40	48	56
32	40	48	56	24	16	8	0
24	16	8	0	32	40	48	56
32	40	48	56	24	16	8	0

Chadaka

The square (magic) got by Combination is (Physically combine as in fingers of hands)

(*)

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

(4) In the second example sum is 400

As before 1) Moolapankthi is 1, 2, 3, 4, 5, 6, 7, 8

2) 2nd " is 0, 1, 2, 3, 4, 5, 6, 7

3) 400 − 36 = 364

4) 364 ÷ 28 = 13

∴ Gunapankthi is 0, 13, 26, 39, 52, 65, 78, 91

(†) This is the case where Q_1 & Q_4 have all odd nos.
& Q_2 & Q_3 " even nos
But the magic square is not normal.
~~There is no rigorous way in which this square can be~~
~~constructed by~~

From half the magic square the first is

1, 2, 3, 4 and the second 0, 13, 26, 39

from these two the chadya ~~& Chadaka are found~~ is the same as given for (a) & the chadaka is

39	26	13	0	52	65	78	91
52	65	78	91	39	26	13	0
39	26	13	0	52	65	78	91
52	65	78	91	39	26	13	0
39	26	13	0	52	65	78	91
52	65	78	91	39	26	13	0
39	26	13	0	52	65	78	91
52	65	78	91	39	26	13	0

The magic square obtained by construction is as follows :-

95	83	69	57	4	18	30	44
3	19	29	45	94	84	68	58
93	85	67	59	2	20	28	46
1	21	27	47	92	86	66	60
96	82	70	56	5	17	31	43
6	16	32	42	97	81	71	55
98	80	72	54	7	15	33	41
8	14	34	40	99	79	73	53

Q1 Q2 Q3 Q4

The other case can be obtained by the other manner

(+) There is an ingenious way in which this square can be constructed, Take the fundamental square 1 to 64

1, - - 8
9, 16
- - - - - -
57 - - 64

Take the last two cols & ~~divide them in~~ and arrange the numbers as in Q_1.

~~take~~	1, 8, 9, 16	2, 7, 10, 15
	17, 24, 25, 32	18, 23, 26, 31
	33, 40, 41, 48	16, 39, 42, 47
Q_1	49, 56, 57, 58	50, 55, 58, 63
	4, 5, 12, 13	3, 6, 11, 14
	20, 21, 28, 29	19, 22, 27, 30
Q_4	36, 37, 44, 45	35, 38, 43, 46
	52, 53, 60, 61	51, 54, 59, 62

Since take the numbers of the 2nd & 7th cols & Arrangement as in Q_2 Again take numbers as in Q_2, Arrange the 3rd & 6th cols and arrangement as in Q_3.

& Finally arrange the elements of the 4th & 5th columns as in Q_4.

From these numbers in Q_1, Q_2, Q_3, Q_4 build up 4 x 4 magic squares following Narayana's Knight-move method with the same Knight move (2, -1) in all four squares. We get this 8 x 8 magic square which is neither associated nor nasik but has all the subsquares magic & nasik with S = 130 and ~~also~~ 2 x 2 gains

This gives another ~~method of direct~~ ~~consti~~ continuous method of construction of an 8 x 8 square.

except for 2 cols
viz: 56 + 16 + 26 + 34 = 132
and 53 + 13 + 27 + 35 = 128

as before.

30) who takes four house magic squares are there in an even eight house ~~square~~ magic square, in those squares the numbers in the series 31) should be placed in the regular and reverse orders in every square, and this is the ~~procedure~~ simple procedure in all even magic squares of eight houses.

In the first example mentioned before the sum of the numbers in a row or column is 260. Here the first term and common difference are (1,1). Working out as per formula mentioned above the eight house magic square is

(4)

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

Q_1 Q_2 Q_3 Q_4

In the second example the first term and common difference are $\frac{37}{2}$ and 1 respectively. Working out as per the procedure mentioned in the formula the eight house magic square is obtained as shown below

(4) This problem can be formulated in a different and interesting manner viz

"Out of the numbers 1 to 32 form two magik squares of order 4 having the same magic constant"

Soln.: If S be the magic constant

$$8S = \frac{1}{2} \cdot 32 \cdot 33 = 528 \quad \text{ie } S = 66.$$

Write the numbers 1 to 32 ~~as follows~~

1, 2, 3, 4, 5, 6, 7, 8
9, 10, 11, 12, 13, 14, 15, 16
17, 18, 19, 20, 21, 22, 23, 24
25, 26, 27, 28, 29, 30, 31, 32

Divide them into two ~~pairs~~ sets of 16 numbers as

1, 4, 5, 8	2, 3, 6, 7
9, 12, 13, 16	and 10, 11, 14, 15
17, 20, 21, 24	18, 19, 22, 23
25, 28, 29, 32	26, 27, 30, 31

and build up magik squares from them following Narayana's rule of Knight-moves.

~~Quite~~ Quite an interesting problem. //

- The fractional representation as on p. 380 of G.K.

Example.

(8) Where there is a pair of four house magic squares tell me quickly the ~~whole~~ two inside squares and their sum with numbers in series with one as the first term, and common difference also one

First term is 1

Com. diff is 1

The total number of houses 32. The two magic squares obtained by the procedure indicated in the —

1	16	25	24
28	21	4	13
8	9	32	17
29	20	5	12

2	15	26	23
27	22	3	14
7	10	31	18
30	19	6	11

The sum is 528 as follows

$$= \frac{32}{2}\{2+31\} = 16 \times 33 = 528 \quad \left[\text{ie } \frac{1}{2}\cdot 32 \cdot 33 = 528\right]$$

In this manner 12 square houses, 16 square and 20 square even magic squares can be formed by the first term and the common difference

Thus ends the chapter on characteristics of even squares

---

* Odd magic squares — must be (singly-even magic squares)

(32) Half the difference of half the number of squares in each row or column and one is what is called the Slishta Koshta miti or the measurement of the associated houses. The numbers in should be placed in the diagonal movement above and below and in regular and reverse orders.

(*)

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

Narayana's rule is as follows & not in the manner given by Cammans (who has not got the translation correctly & makes his own imaginary construction):—

(i) Form the square from 1 to 36 by construction numbering. This gives all the columns correct.

The upper diagonal sums to 114 while the lower sums to 108. To set this right

(ii) interchange the third and sixth elements in the middle two rows. ~~After (i)~~ Thus the cols. & diagonals are correct. After (i) & (ii) the square would be

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

To make the rows magic

(iii) Interchange the associated elements or complements in the

(33) In the associated houses of the magic square and in the two middle rows of the square, the numbers in the houses should be ~~~~ reversed in the penultimate houses or interchanged.

(34) By the rule of the associated house the numbers should be filled. Then the right half of the magic square should be

(35) interchanged mutually with the numbers in the houses associated with the diagonal in the left half of the magic square.

(36) The two numbers in the associates with the diagonal in the right half should also be interchanged in accordance with the seeing each row and column.

In this manner the rule for simple odd (singly even) magic squares is given by Narayana. (*) See p. (33)'

Example

(9) Oh friend, form a magic square of six houses in each row and column in which the sum of the numbers is ~~~~ in each row or column is 111. In the same manner construct the six house magic square the sum of the numbers in each row or column of which is 132.

In the first example the sum is 111. Here the full series as before is (1, 7, 13, 19, 25, 31). The Kshetraphala is 0. Thus the foot series etc. is also (1, 7, 13, 19, 25, 31). By proceeding in the manner indicated above the six house magic square is as follows:- (*)

∴ The full series is (1, 7, 13, 19, 25, 31). Sum of the numbers in row or column is $\frac{1}{2}n(n^2+1) = \frac{1}{2} \cdot 6 \cdot 37 = 111$

Ishtaphala = Antityaphala - Mukhaphala = 111 - 111 = 0

first and last columns (without disturbing diagonals), and also the top & bottom elements of the second and fifth columns. Now the middle two rows become magic.

(iv) Interchange 3 and 4 ~~in the first~~ middle col row followed by interchange of 3 with 33 in the bottom row. Now interchange 9 and 10 in the middle cols. of the second row followed by interchange of 10 with 28 in the fifth row. This makes the square magic in all its rows & cols and the two diagonals.

[Note that the interchange of $3 \leftrightarrow 4$ & $9 \leftrightarrow 10$ will not alter the column sums].

(†) This magic square is not magic in the middle two rows the sums being 131 & 133.

What Narayana has done is to find out six sets of ~~numbers~~ consecutive numbers. viz 2 to 7, 9 to 15, 16 to 21, 23 to 28, 30 to 35, & 37 to 42. to construct the magic square with $S = 132$. In fact, using six such sets $(a, a+1 \ldots a+5)$, $(a+d, a+d+1 \ldots (a+d+5)$, $\ldots (a+5d, \ldots a+5d+5)$ he gets the diophantine equation $36a + 90d + 90 = 6 \times 132$

or $6a + 15d = 117$

& takes the solution $a = 2, d = 7$. giving the above six sets. Writing them in the boustrophedon formation viz 1 to 7, 9 to 15, etc we get the columns all right. Also interchange of 3rd & 6th terms of the middle rows also makes the diagonals magic. But the further interchange of complementaries (i.e adding to 44) in the first & ~~6th~~ last columns does not make the middle rows magic.

We have tried to take 6 sets of numbers with $c \cdot d = 7$ viz e.g. $(2, 9, 16, 23, 30, 37), (3, 10, \ldots 38), \ldots$

In the second example the sum of the numbers in the row or column is 132. Therefore the full series is (1, 7, 13, 19, 25, 31)

∴ Kshastraphala is 21

As before the first term and common difference with kshepa and

Kshepa −5 ; 2

Rupa 1, 1.

1st term 1, c.d = 1. No of houses 6. The foot and others according to the procedure laid down in the formula

(2, 9, 16, 23, 30, 37) 32, 39

No. of houses in each row or column is 6

$\frac{1}{2}$ of this is 3. Less 1 = 3 − 1 = 2

$\frac{1}{2}$ of this is 1

∴ The measurement of associated houses is 1

∴ The required magic square is as follows in accordance with the procedure laid down in the rule:

(†)

2	41	5	39	38	7	
30	13	11	33	10	35	
28	17	21	19	20	26	→ 131
16	27	23	25	24	18	→ 133
14	31	32	12	34	9	
42	3	40	4	6	37	

[Poor Narayana is wrong here].

Example (10) 1 Tell quickly the magic square of ten houses in each row or column with numbers from 1 to 100 if you know how to construct such a square or the magic square of fourteen houses in each row or column if you

and construct the magic square following Narayana's rule but here again the middle rows are not magic. In fact taking the sets $(a, -a+5)$, $(a+d, -a+d+5)$, etc, constructing the square by b-numbering & making the diagonals correct, we get that the interchange of complementaries in the first & last cols of the middle two rows fixes the correct 5^1 only if $d = 6$. i.e with $a=1$, the normal case. Varying a does not lead to any possibility since we refer instead of 36 nos from 1 to 36, 36 numbers from a to $a+35$.

(*) For the tenth order square Narayana's procedure is as follows:-

(i) Start the b-numbering from 1 to 100 starting with 1 in the top of the first column — this will make all the cols. magic

(ii) Interchange the 5th & 10th numbers in each of the middle two rows — this will make the diagonals also magic

(iii) In the first & last columns, interchange all the associate (complementary) elements except those on the diagonal. In the second & 9th cols also interchange all the associates. In the 3rd and 8th cols interchange the associates of the two top and bottom elements. Leave the 4th & 7th cols. unchanged. Now leave only the 5th & 6th or the middle two cols to deal with.

(iv) Interchange 5 & 6 in the first row followed by interchange (a) of 5 and 95 (2nd bottom element of 6th row).

(b) Interchange 15 and 16 in the second row followed by interchange of 16 and 86 (second element from bottom element of 6th row)

(c) Interchange 25 & 26 in the third row followed by interchange of 25 & 75 (third element from bottom)

can construct a big boat to cross the ocean of magic squares.

In the first example 1st term is 1 and C.d is one and the number of houses is 100. Here, as before, the measurement of associated houses is $\frac{1}{2} \times 10 = 5$, $5-1=4$, $\frac{1}{2} \times 4 = 2$

The total sum in each row or col. is

$$\frac{1}{2} \times 10 \times (100+1) = 505.$$

The required magic square is as before

unchanged unchanged

1	99	98	4	6	95	7	93	92	10
81	19	83	17	15	86	14	88	12	90
80	79	23	24	26	75	27	28	72	71
61	62	38	37	35	66	34	33	69	70
60	59	43	44	50	46	47	48	52	56
41	42	58	57	51	55	54	53	49	45
40	39	63	64	65	36	67	68	32	31
21	22	78	77	76	25	74	73	29	30
20	82	18	84	85	16	87	13	89	11
100	2	3	97	96	5	94	8	9	91

In the second example 1st term is 1 & C:d is 1, the number of is 196. The measurement of the associated houses here is

$\frac{1}{2} \times 14 = 7$, $7-1=6$, $\frac{1}{2}$ of $6 = 3$

The following is the fourteen house square obtained by the procedure mentioned above.

The sum of the numbers in each row or column is 1379.

$$\left[= \frac{1}{2} \times 14 \times (14^2+1) = 7 \times 197. \right]$$

(d) Interchange 35 and 36 in the fourth row followed by interchange of 36 and 66 (fourth element from bottom).

These rules will make the square magic.

(*) (1) b – numbering giving cols. magic

(2) Interchange 7th & 14th elements in the middle two rows. This makes the diagonals magic

(3) (a) ~~In~~ the first three and last three cols. interchange complementaries (without disturbing diagonals)

(b) In the 4th & 11th cols, interchange the three complementaries above the diagonals with the three below the diagonals

(c) ~~(d)~~ Leave the ~~5th~~ 5th, 6th, 9th & 10th ~~& 10th~~ cols. as they are.

(d) ~~(e)~~ In the middle two cols. carry out 6 interchanges just as is done ~~for the 10 x 10 square~~ for the 4 interchanges of the 10 x 10 square.

For the square ~~after~~ obtained after processes (1) & (2) and the final square/ ~~pages~~ see pp. (30') & (31).

~~(e) In the 5th & 10th cols interchange only the top & bottom elements.~~

गुरुवार २८ फरवरी १९८० THURSDAY 28 फागुन शुदी १३ सं० २०३६

(X)

1	195	194	193	5	6	190	7	9	10	186	185	184	14
169	27	171	25	24	23	175	22	20	178	18	180	16	182
166	167	168	32	33	34	162	35	37	38	39	157	156	155
141	142	143	53	52	51	147	50	48	47	46	152	153	154
140	139	138	60	61	62	134	63	65	66	67	129	128	127
113	114	115	81	80	79	119	78	76	75	74	98	125	126
				89	90								
				108	107								
				117	118								
				136	135								
				145	146								
				164	163								
				173	174								
				192	191								

[There are lots of mistakes in Narayana's 14 × 14 square.
For the correct procedure see the left page]

See pp. (30') & (31)

14 × 14 square

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
28	27	26	25	24	23	22	21	20	19	18	17	16	15	14
29	30	31	32	33	34	35	36	37	38	39	40	41	42	
56	55	54	53	52	51	50	49	48	47	46	45	44	43	
57	58	59	60	61	62	63	64	65	66	67	68	69	70	
84	83	82	81	80	79	78	77	76	75	74	73	72	71	
85	86	87	88	89	90	98	92	93	94	95	96	97	91	
112	111	110	109	108	107	99	105	104	103	102	101	100	106	
113	114	115	116	117	118	119	120	121	122	123	124	125	126	
140	139	138	137	136	135	134	133	132	131	130	129	128	127	
141	142	143	144	145	146	147	148	149	150	151	152	153	154	
168	167	166	165	164	163	162	161	160	159	158	157	156	155	
169	170	171	172	173	174	175	176	177	178	179	180	181	182	
196	195	194	193	192	191	190	189	188	187	186	185	184	183	

after processes (1) & (2)

1	195	194	193	5	6	8	189	9	10	186	185	184	14
169	27	171	172	24	23	21	176	20	19	179	180	16	182
168	167	31	165	33	34	36	161	37	38	158	40	156	155
141	142	143	53	52	51	49	148	48	47	46	152	153	154
140	139	138	60	61	62	64	133	65	66	67	129	128	127
113	114	115	81	80	79	77	120	76	75	74	124	125	126
112	111	110	88	89	90	98	92	93	94	95	101	100	106
85	86	87	109	108	107	99	105	104	103	102	96	97	91
84	83	82	116	117	118	119	78	121	122	123	73	72	71
57	58	59	137	136	135	134	63	132	131	130	68	69	70
56	55	54	144	145	146	147	50	149	150	151	45	44	43
29	30	166	32	164	163	162	35	160	159	39	157	41	42
28	170	26	25	173	174	175	22	177	178	18	17	181	15
196	2	3	4	192	191	190	7	188	187	11	12	13	183

Find square after processes 3 (a), (b), (c) & (d).

We can raise the question as to whether Narayana's method leads to correct magic squares when (for $n = 6$) we take a permutation of the numbers 1 to 6, and similar permutations in the remaining 5 sextuples.

Let us try 1, 5, 4, 3, 2, 6.
7, 11, 10, 9, 8, 12
13, 17, 16, 15, 14, 18
19, 23, 22, 21, 20, 24
25, 29, 28, 27, 26, 30
31, 35, 34, 33, 32, 36

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

(1) After by-numbering the columns are all magic
The upper diagonal sums to 118 and the lower to 104

(2) Interchanging 16 & 23 and 14 & 21, we get the diagonals correct without disturbing the two middle column sums

(3) To make the rows magic the following is the procedure:
(a) Interchange 12 & 25 in 1st column;
18 & 19 and 7 & 30 in the last column
(b) Interchange 5 & 32, 17 & 20 in the 2nd column
and 2 & 35 in the last 5th column

Now the four odd squares are dealt with

(41) There are two punkthis namely Mula punkthi and Gunap unkthi as already dealt with before. They should be formed first. The first number in the Moolapunkthi should be taken and placed in the middle house of the top row in the first: Below the
(42) numbers in the rows in order and the remaining numbers from the top in order should be written. From the second of the coverer the square can be constructed as before by combination.

Example (11). In the three, five and seven have magic squares the sums of the numbers in the rows or cols. are respectively 24, 98 and 238. Quickly show me their form.

In the 9-house square the sum or phalam is 24. The Moolapunkthi with 1 as the first term and C.D. 1 is 1/2/3. The second commencing with 0 and C.D. 1 is 0/1/2. Therefore the gunapunkthi is 0/6/12.

From the Moolapunkthi, the Chadya or the covered is obtained and for the procedure indicated in the rule :-

3	1	2
1	2	3
2	3	1

The coverer is obtained from the Gunapunkthi as

12	0	6
0	6	12
6	12	0

(c) In the middle two columns interchange 3 and 4 followed by interchange of 4 and 34.

Interchange 9 & 10 followed by interchange of 9 and 27

The square as below is now magic

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

Thus we now make a

Conjecture - for every permutation of the numbers 1 to 6 and similar permutation of the remaining five sextuples one can always construct a 6 × 6 magic square using Narayana's method.

Thus we would get 6! = 720 such squares.

Perhaps the same is true for squares of orders 10 & 14, etc.

Take a cyclic permutation 4, 5, 6, 1, 2, 3 & similar ones in the other five sextuples. After numbering the cols. will be magic. The upper diagonal sums to 108 and the L.d to 114. Interchanging 14 & 11, and 23 & 26 in the fifth col. will make the diagonals also make.

Now in the middle two cols. interchange 6 and 1 in the 1st row followed by interchange of 6 & 36. Similarly in the second row interchange 7 and 12 followed by interchange of 7 and 36.

By combination of the Chadya & Chadaka, the magic square of three houses is obtained as follows:

9	1	14
13	8	3
2	15	7

—.

Since Narayana uses the actual covering and not the usual summing up of (P) and (R) we have to modify the rectangle (R) as

6	0	12
12	6	0
0	12	6

and then add. Note that this is equivalent to taking (P) as derived from the end step (2,1) and (R) as derived from the step (1,2) In fact taking R as below

6	12	0
0	6	12
12	0	6

and adding it to (P) we get

9	13	2
1	8	15
14	3	7

Which is same as Narayana's final square with rows & cols

After these operations the square would be

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

Finally to make the rows magic make the following interchanges

(a) In the fourth & last rows interchange 5 & 35, 2 & 32;

(b) In the second & 5th rows interchange 12 & 28; 10 & 27;

(c) In the 3rd & 4th rows interchange 16 & 21, 11 & 20, 15 & 22.

The magic square obtained

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

B/M 5/8/84

opposite rows appear rather tough

Leave it at that

Narayana's method can be used for any 36 numbers in A.P. Thus for example we can construct a square of the first 36 odd numbers. Following this method we get the square

Page (34)'

interchanged]

If Guna punkthi be 14/3, 18/3, 22/3 (summing to 18), then as before the covered and the coverer are

3	1	2
1	2	3
2	3	1

22/3	14/3	18/3
14/3	18/3	22/3
18/3	22/3	14/3

By the combination of these, we get

27/3	17/3	28/3
25/3	24/3	23/3
20/3	31/3	21/3

$B_{3,3}$

The sum of the numbers in the rows and columns is 24. In this manner a single infinity of solutions can be obtained by different series

[Quite trivial]

In the second example the sum is 90. As before the Moola punkthi is (1, 2, 3, 4, 5) and the guna punkthi with first term 1 and common difference 1 is (5, 10, 15, 20, 25). The chadya and the chadaka, the covered and the coverer are

P. T. O

1	69	7	65	63	11
49	21	17	55	15	59
47	27	35	31	33	43
25	45	37	41	39	29
23	51	53	19	57	13
71	3	67	5	9	62

In fact Nārāyaṇa's b-numbering method can be used to construct any even order magic square. Consider for example the 8th order square of the first 64 odd numbers. Here the b-numbering is followed by interchange of the 3rd & 7th elements in the 3rd & 6th rows so as to make the diagonals magic. Having thus made the cols. & diagonals magic the rows can be made magic by suitable interchanges simpler than in the case of singly-even order square. Thus the 8th order square is obtained as

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

$S = 512.$

We have not given details as regards interchanges making the rows magic, but it can be easily seen when we write out the square after making diagonals & columns magic.

P.T.O

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

Step (4,1)

20	25	5	10	15
25	5	10	15	20
5	10	15	20	25
10	15	20	25	5
15	20	25	5	10

Also Step (4,1)

The five horse magic square obtained by combination is

19	15	6	27	23
25	16	12	8	29
26	22	18	14	10
7	28	24	20	11
13	9	30	21	17

In the third example the Moola punkthi is (1, 2, 3, 4, 5, 6, 7), the second punkthi is (0, 1, 2, 3, 4, 5, 6) : Phala or sum is 238

238 - 28 = 210

210/21 = 10

The Guna punkthi is

(0, 10, 20, 30, 40, 50, 60)

As before the chadya and the chadaka are

P.T.O

Benson & Jacoby (p.154) have considered the problem of constructing an 8th order magic square formed by the first 64 odd numbers. They want, however, to construct such an associated square; but Narayana's method does not give an associated square. It is to be examined if the square on p. (34)' can be converted into an associate square. This appears rather difficult.

[For continuation See Book No. x, p. 64 onwards.]

(*) Note that this square is formed from

(1, 2, - 7)
(11, 17) (21, - 27), (31, - 37)
(41, - 47), (51, 57), (61, - 67)

starting from 1 the regular moves are (-3, 3) and the break move from (7, to 11), (17 to 21) - etc is (0, -1)
ie this is a ~~regular square~~ unit diff square

Aradya

5	6	7	1	2	3	4
6	7	1	2	3	4	5
7	1	2	3	4	5	6 ✓
1	2	3	4	5	6	7 ✓
2	3	4	5	6	7	1 ✓
3	4	5	6	7	1	2 ✓
4	5	6	7	1	2	3

Step (6,1)

40	50	60	0	10	20	30
50	60	0	10	20	30	40
60	0	10	20	30	40	50 ✓
0	10	20	30	40	50	60 ✓
10	20	30	40	50	60	0 ✓
20	30	40	50	60	0	10 ✓
30	40	50	60	0	10	20

Step (6,1)

By combination of these we get the magic square of 7 houses as

35	26	17	1	62	53	44
46	37	21	12	3	64	55
57	41	32	23	14	5	66
61	52	43	34	25	16	7
2	63	54	45	36	27	11 ✓
13	4	65	56	47	31	22
24	15	6	67	51	42	33

P. T. O

Narayana Pandithas treatment of squares of odd order by using auxiliary squares viz (P) and (R) is unsatisfactory, unlike the treatment of even order squares which is quite interesting. I wonder if this be due to the prejudice against odd numbers.

All that he has done for the cases of ~~3,5~~ $n = 3, 5, 7$ is to take in the middle rows of (P) $(1,2,3), (1,2,3,4,5), (1,2,3,4,5,6,7)$ and then construct (P) by using the end step $(6,1)$. Next instead of considering the normal case by taking the middle row of the root square (R) as $(0,3,6), (0,5,10,15,20)$ and $(0,7,14,21,28,35,42)$ he has taken suitable rows corresponding to the magic constants $S = 24, 98, 238$ instead of the usual $S = 15, 65, 175$ for the normal case. Also his Chadya & Chadaka business necessitates the taking of the same end step $(n-1, 1)$ for the root squares also.

Abandoning this covered & covered notation if we take the usual addition of auxiliary squares, what he has done amounts to considering only the end steps $(6,1)$ and $(1,6)$ for (P) & (R). He has not noticed that the final squares are associated because the middle row is ~~cent~~ a central symmetric series.

Further there is no mention at all of the middle steps (2,3) & (3,2) for $n = 5$ and (2,5), (3,4), (4,3), (5,2) for $n = 7$ leading to nasik squares.

I think he knew nothing about nasik and associated squares. So when highlighting his work the only idea of a nasik square appears in his 4th order square constructed by the knight-move method.

X Rather disappointed. Anyway I must ~~mention some~~ attribute to him some ideas not contained in his book but following some ideas suggested by his work.

The same is stated in another way by a shorter & simpler method.

(43) The rule is as follows:-

Any desired number of the series should first be placed in the first house. Then in the house near the last house in the opposite direction. Then numbers commencing from one should be placed in the houses of small diagonals. When the diagonal house is with number in front filling the pada

(45) And again in this manner the numbers behind should be placed and the padas should be filled in order. Or in this way odd magic squares in different forms can be obtained.

Example:

(12) Oh! best of experts, tell me soon the three house magic squares by numbers commencing from one and common difference one. Oh! friend if you know the even and odd magic squares mentioned before

The sum of the numbers in each row or column or diagonal is $\frac{1}{2} \times 3 \times 10 = 15$

Proceeding in the way described in the foregoing stantzas the different magic squares are obtained as given below:-

6	7	2
1	5	9
8	3	4

8	3	4
1	5	9
6	7	2

8	1	6
3	5	7
4	9	2

6	1	8
7	5	3
2	9	4

4	3	8
9	5	1
2	7	6

2	7	6
9	5	1
4	3	8

2	9	4
7	5	3
6	1	8

4	9	2
3	5	7
8	1	6

In the earlier examples the sums of the numbers in the rows or cols or diagonals in the cases of three house, five house and seven house squares respectively are 24, 90, and 238.. Here also the first number should be written and in front of that the full series obtained by multiplication of the common difference etc as before are in the

3 house case: (1, 4, 7)
5 " : (1, 6, 11, 16, 21)
7 " (1, 8, 15, 22, 29, 36, 43)

The kshepa-palas are respectively

3 house: −1, 3 1, 0
5 " −2, 5 1, 0
7 " −3, 9 1, 0

Working as before the first term and common difference are

3 house : 2, 1
5 " : 3, 1
7 " : 6, 1

Adding the numbers of the series to the numbers in the respective full series the first and others are obtained as follows;

3 houses : (3, 7, 11)
5 " : (4, 10, 16, 22, 28)
7 " (7, 15, 23, 31, 39, 47, 55)

The magic squares are formed as follows :-

7	5	12
13	8	3
4	11	9

[S = 24]

16	14	7	30	23
24	17	10	8	31
32	25	18	11	4
5	28	26	19	12
13	6	29	22	20

[S = 90]

[P. T.O

(*) "endless number" has no meaning if we confine ourselves to +ve integral values of a and d which satisfy the diophantine eqns $a+d=7, a+2d=16 \& a+3d=31$ for the cases $n=3, 5, 7$.

Of course if we take higher values of n like 11, 13, ... etc we have an endless number.

31	29	20	11	58	49	40
41	32	23	21	12	59	50
51	42	33	24	15	13	60
61	52	43	34	25	16	7
8	55	53	44	35	26	17
18	9	56	47	45	36	27
28	19	10	57	48	39	37

[S = 238]

a square is associated

Thus there is an endless number* of such squares by taking different series. Thus the chapter on odd squares ends.

[The simple method that Narayana Pandita mentions is obviously the Indian continuous method, but his rule appears utterly ununderstandable. I don't know if the translation is correct. Anyway his derivation of the 5 & 7 third order squares is something he can be proud of. Refusing the 5th & 7th order squares instead of taking the normal case he considers the cases of S = 90 & S = 238 which he has obtained by the Chadya-Chadaka method and wants to show that they can also be obtained by the continuous method. He has done the same thing for the 3rd order square with S = 24,

To choose the series $a, a+d, a+2, -$

$a+d, a+d+1, a+d+2, -$

$a+2d, a+2d+1, -$

we have for $n = 3$, $\frac{1}{3}(9a+9d+9) = 24$.

$\therefore a + d = 7.$

For $n = 5$, $\frac{1}{5}(25a+50d+50) = 90$ i.e. $a+2d = 16$

for $n = 7$, $\frac{1}{7}(49a + 147d + 147) = 238$

i.e. $a + 3d = 31$.

Narayana Pandithā has chosen

for $n = 3$, $a = 3, d = 4$

$n = 5$, $a = 4, d = 6$

$n = 7$, $a = 7, d = 8$

getting the series $(3, 4, 5), (7, 8, 9), (11, 12, 13)$ for $n = 3$

$(4, 5, 6, 7, 8), (10, 11, 12, 13, 14), (16, 17, 18, 19, 20)$.
$(22, 23, 24, 25, 26), (28, 29, 30, 31, 32)$ } for $n = 5$

$(7, 8, 9, 10, 11, 12, 13), (15, 16, 17, 18, 19, 20, 21)$.
$(23, 24, 25, 26, 27, 28, 29), (31, 32, 33, 34, 35, 36, 37)$
$(39, 40, 41, 42, 43, 44, 45), (47, 48, 49, 50, 51, 52, 53)$
and $(55, 56, 57, 58, 59, 60, 61)$ } for $n = 7$.

He has then constructed in each case using the Indian continuous method by taking (i, j) as the middle number of the last column, the regular move as $(1, -1)$ and the break move as $(-1, 0)$

Suppose we rotate his square for $n = 3$ by 90° contra-clockwise, we then get

12	3	9
5	8	11
7	13	4

[$S = 16$ a square associated]

which is exactly the square obtained by the S.D.M with $(i, j) = (1, 2)$ regular move $(1, 1)$, & break move $(0, -1)$

The same rotation by 90° counterclockwise of the squares for $n = 5$ and $n = 7$ reduces them to the standard cases of the S.D.M. construction for these orders. I wonder why

$3u^2+1,\ 3u^2+2,\ \ldots\ 3u^2+u^2$

$3u^3+\frac{1}{2}u(u^2+1)$

$u^2+1,\ \ldots\ 2u^2+u^2 = u^3+\frac{1}{2}u(u^2+1)$

$2u^3+\frac{1}{2}u(u^2+1)$

$3u^3+\frac{1}{2}u(u^2+1$

$3u^3+u(u^2+1)=4u^3+u.$

$Q_1 : \frac{1}{2}u(u^2+1),\quad Q_2 : 2u^3+\frac{1}{2}u(u^2+1).$

$u=5$ $\quad \frac{1}{2}u(u^2+1)+$

$[3u^2]$ $\quad \frac{1}{2}u(u^2+1)+m\cancel{u}\cdot 3u^2$

$3u^3+\frac{1}{2}u(u^2+1)-m\cancel{u}\cdot 3u^2$

$\frac{1}{2}u(u^2+1)+3mu^2$

$+\ 2u^3+\frac{1}{2}u(u^2+1)-(m-1)u^2$

$u=2m+1$

$2(m-1)$

$2u^3+u(u^2+1)+3u^3.$

$\frac{1}{2}u(u^2+1)+m\cdot 3u^2$

u^3

$2u^3+\frac{1}{2}u(u^2+1)-(m-1)u^2.$

$2u^3+u(u^2+1)-u^3$

$4u^3+u$

$3u^3+\frac{1}{2}u(u^2+1)-m\cdot 3u^2$

$+u^3+\frac{1}{2}u(u^2+1)+(m-1)u^2$

$4u^3+u^3+u-u^3=4u^3+u$

96 69

15 15

111 111

15+69

96+42

96 69

u^3 u^2

$m=2,\ u=5$

$mu($

$1+6+27=34$

$65+27$

$3m-(m-1)$

$2m+1.$

$3m+(m-1)$

$-2m-1.$

$-u^2\{3(m+1)+(m-1)$

$-u^2\{4m+2$

$-2u^3$

$3u^2$

8

Narayana dabbled in this curious gymnastics. Perhaps it is implicit to be implicitly assumed that he was aware of the Indian continuous method.

[If these squares are turned ~~the~~ contra clockwise through 90°, we have the Indian diagonal method with principal move (1,1) & breakmove (0,−1)

	(8)	1	6	26	19	24	69
	3	(5)	7	21	23	25	
Q_1	(4)	9	2	22	27	20	Q_2
	(35)	28	33	17	10	15	42
Q_3	30	(32)	34	12	14	16	Q_4
	(31)	36	29	13	18	11	

$\frac{1}{2}$ to 101 $\frac{1}{2}$ sms

(4½) (9 6) Q_1 $\frac{1}{2}u(u^2+1)$.

$\frac{1}{2}\cdot 2u^2(4u^2+1) - \frac{1}{2}u(u^2+1)$

$4u^3+u^2-\frac{1}{2}u^3-\frac{1}{2}u$.

$u^2+1,\ u^2+2,\ \ldots\ u^2+u^2$ $3u^3+\frac{1}{2}u(u^2+1)+\frac{1}{2}u(u+1)$

Q_4 $u^3+\frac{1}{2}\cdot u(u+1)$ $\frac{7}{2}u^3+\frac{1}{2}u+\frac{1}{2}u^2+\frac{1}{2}u$

$2u^2+1,\ \ldots\ 2u^2+u^2$ $3u^2+\ldots$ $3u^2+u^2$

Q_2 $2u^3+\frac{1}{2}u(u+1)$.

Q_3 $3u^3+\frac{1}{2}u(u+1)$

$3u^3+u+\frac{1}{2}u(u^2-1) = 3u^3+\frac{1}{2}u^3+\frac{1}{2}u$.

$3u^3+\frac{1}{2}u(u^2+1)+(m+1)u^2+2u^3+\frac{1}{2}u(u^2+1)+(m-1)u^2$

$5u^3+u(u^2+1)$

बुधवार २६ मार्च १९८० **WEDNESDAY 26** चैत्र शुदी १० सं० २०३७

2-1-4-3-6-5

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

Jensalis primitive square

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

Wonderful

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

X

36	11	33	10	8	31
25	29	4	3	26	6
		22	21		
		16	15		
1	5			2	
12		9			7

not every permutation but only symmetrical permutations

गुरुवार २७ मार्च १९८० **THURSDAY 27** चैत्र शुदी ११ सं० २०३७

6-2-3-4-5-1 6-5-4-3-2-1

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

(A)

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

Excellent ✓

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

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

Excellent ✓

Symmetrical interchanges of rows } apply same scheme
+ same symmetrical " cols }

Should we have same symmetrical permutation of the columns also.

Try 6-2-3-4-5-1 in each rows
followed by 6-2-4-3-5-1

This is given by row (A) above

रविवार ३० मार्च १९८० **SUNDAY 30** चैत्र शुदी १४ सं० २०३७



X	–	X			X	1		X			X	–	X
1	X	–	X			X	X			X	–	X	
X	1	X	–	X					X	–	X		X
	X	1	X	–	X			X	–	X		X	
		X	1	X	–	X	X	–	X		X		
X			X	1	X	–	–	X		X			X
–	X			X	1	X	X		X			X	–
		X			1	X	X				X		
	X		X	1	X	X	X	X		X		X	
X		X	1	X							X		X
	X	1	X		X			X		X		X	
	1	X		X		X	X		X		X		
1	X		X		X			X		X		X	
X				X		1			X				X

Q_1 Q_2 Q_3 Q_4

Q_2 is reflection of Q_1 about central vertical

Q_3 " Q_1 " horizontal

Q_4 " Q_2 " "

Notably that = & 1 have no horizontal & vertical reflection

For 10 & 14 we have a

secondary of bulbing index scheme

Rom index – square Q_1

197
55
142

197
153
44

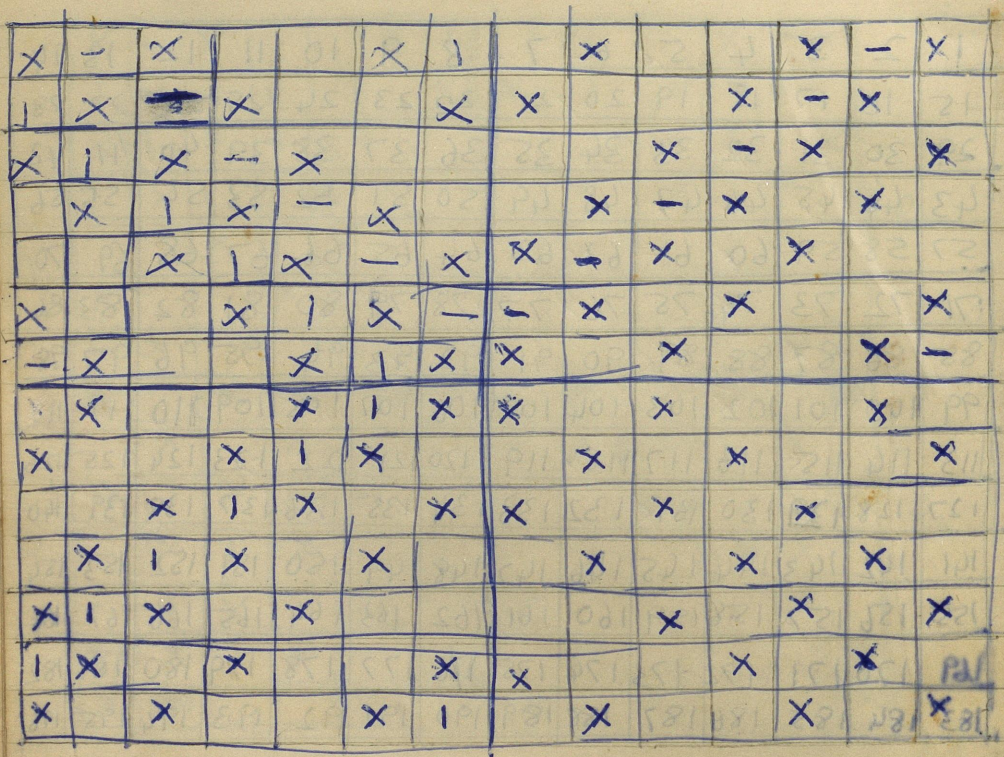
सोमवार ३१ मार्च १९८० **MONDAY 31** चैत्र सुदी १५ सं० २०३७

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96	97	98
99	100	101	102	103	104	105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154
155	156	157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180	181	182
183	184	185	186	187	188	189	190	191	192	193	194	195	196

Anju

30 Days **APRIL 1980** 4th Month

मंगलवार १ अप्रैल १९८० **TUESDAY 1** बैशाख बदी १ सं० २०३७



×	–	×			×	1		×			×	–	×
1	×	–	×			×	×			×	–	×	
×	1	×	–	×					×	–	×		×
	×	1	×	–	×			×	–	×		×	
		×	1	×	–	×	×	–	×		×		
×			×	1	×	–	–	×		×			×
–	×			×	1	×	×		×			×	–
	×			×	1	×	×		×			×	
×			×	1	×			×		×			×
		×	1	×		×	×		×		×		
	×	1	×		×			×		×		×	
×	1	×		×					×		×		×
1	×		×			×	×			×		×	
×		×			×	1		×			×		×

Sonali & Bapu

197
51
146

30 Days 197 59 **APRIL 1980** (117) 4th Month

बुधवार २ अप्रैल १९८० **WEDNESDAY 2** बैशाख बदी २ सं० २०३७

196	13	194	4	5	191	189	8	188	10	11	185	2	183
169	181	26	179	19	20	176	175	23	24	172	17	170	28
168	156	166	39	164	34	35	36	37	159	32	157	41	155
43	153	143	151	52	149	49	50	146	47	144	54	142	56
57	58	138	130	136	65	134	133	62	131	67	129	69	70
126	72	73	123	117	121	78	77	118	80	116	82	83	113
98	111	87	88	108	104	106	105	93	103	95	96	100	85
99	97	101	102	94	90	92	91	107	89	109	110	86	112
84	114	115	81	75	79	119	120	76	122	74	124	125	71
127	128	68	60	66	132	64	63	135	61	137	59	139	140
141	55	45	53	145	51	147	148	48	150	46	152	44	154
42	30	40	158	38	160	161	162	163	33	165	31	167	29
15	27	176	25	179	174	22	21	177	178	15	180	16	182
11	184	12	186	187	9	7	190	6	192	193	3	195	1

Verified with Fig. 580, p. 302 of Andrews & found correct.

Bapu.

30 Days

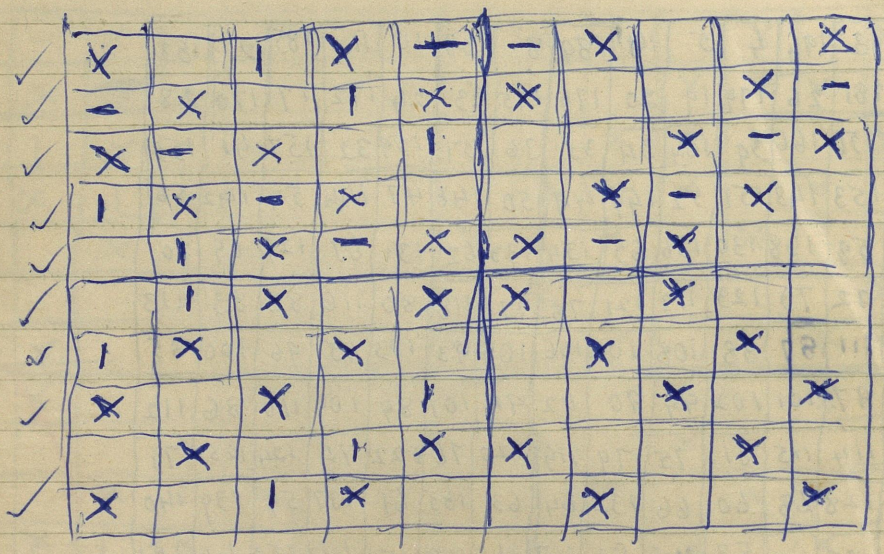
APRIL 1980

4th Month

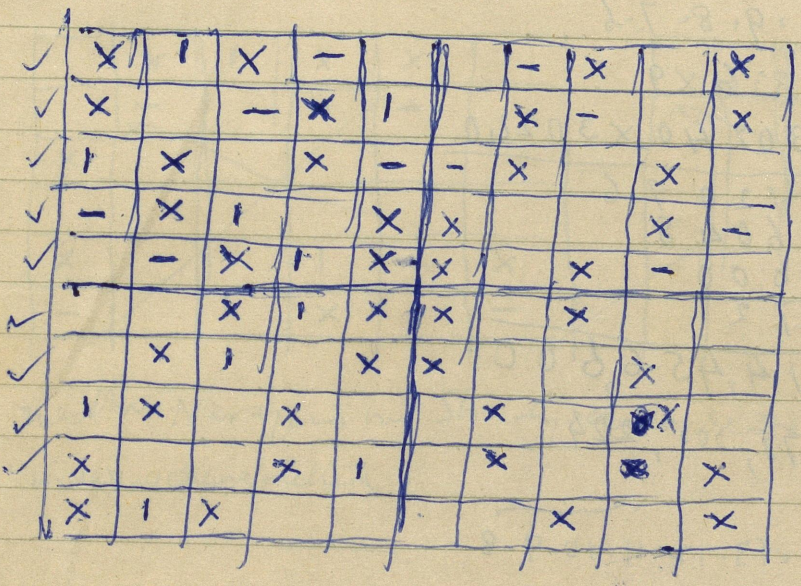
गुरुवार ३ अप्रैल १९८०

THURSDAY 3

बैशाख बदी ३ सं० २०३७



100	2	93	97	6	5	94	8	9	91
20	89	13	84	86	85	17	18	82	11
80	29	78	24	75	26	27	73	22	71
61	64	38	67	35	36	64	33	62	40
41	52	58	47	56	55	44	53	49	50
51	42	48	54	46	45	57	43	59	60
31	39	63	37	65	66	34	68	32	70
30	72	28	74	25	76	77	23	79	21
81	19	83	14	16	15	87	88	12	90
10	92	3	7	95	96	4	98	99	1



100	92	98	7	5	6	4	93	9	91
90	12	18	87	85	16	84	13	19	81
71	79	23	77	26	25	74	28	72	30
40	69	63	34	66	65	37	38	62	31
41	49	58	54	56	55	47	53	42	50
59	52	48	44	46	45	57	43	59	60
61	39	33	64	36	35	67	68	39	70
21	29	73	27	75	76	21	78	22	80
20	82	83	17	15	86	14	88	89	11
10	2	8	94	95	96	97	3	99	1

10 · 9 · 8 · 7 · 6

336 × 9

30240 × 30240

12096

6048

0000

9072

914,456,800

$n = 5$ 275, 305, 224

14 · 13 · 12 · 11 · 10 · 9 · 8

720 × 11 = 7920

6 792 × 12 = 9504

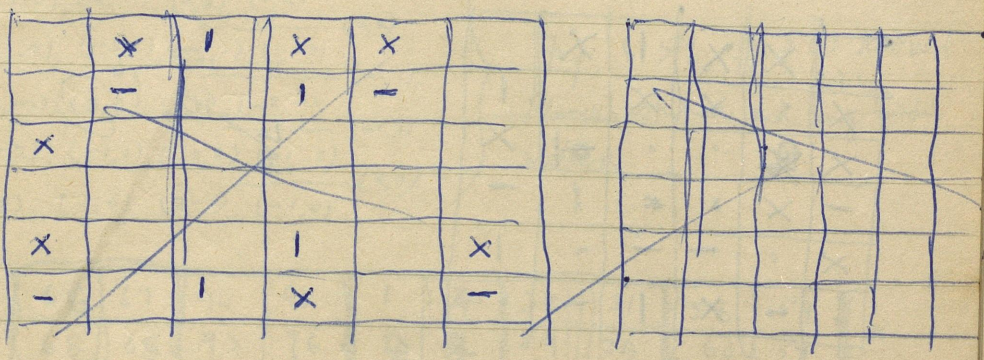
9504 × 13 = 123552

123552 × 14 = 1719728

$(1719728)^2$

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

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

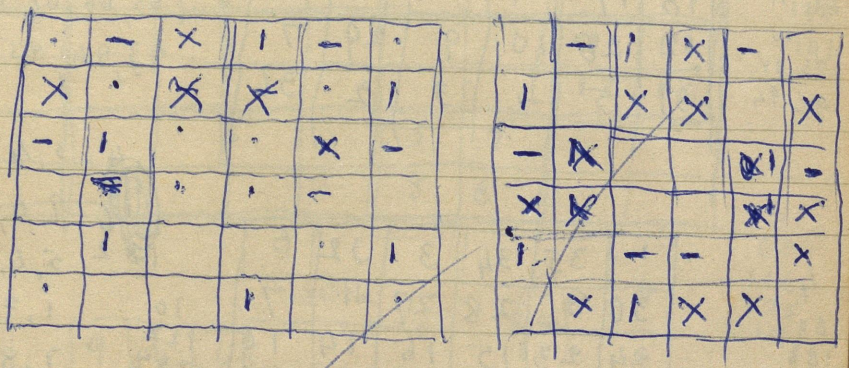


	×	1	×	×	
	—		1	—	
×					
×			1		×
—		1	×		—

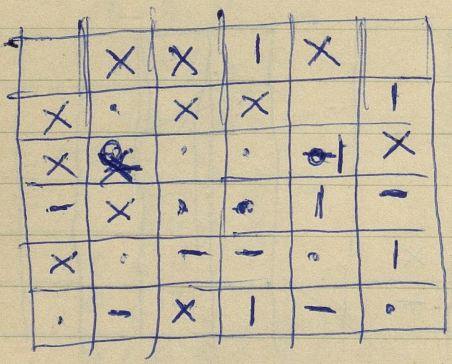
neither Narayana nor Shrinkhy can be deduced from the index-scheme method.

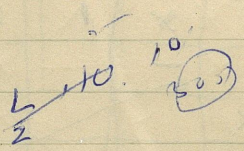
·	—	×	1	—	·
×	·	×	×	·	1
—	1	·	·	×	—
	×	·	·	—	
	1			·	1
·			1		·

	—	1	×	—	
1		×	×		×
—	×			×	—
×	×			×	×
1		—	—		×
	×	1	×	×	



1	32	4	33	35	6
12	8	28	27	11	25
18	20	15	16		13
	14	21	22		
30	26			29	
31		34			36





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

(1, 2, 3, 4), (29, 30, 31, 32)

(57, 58, 59, 60) (3)

(65, 66, 67, 68) (1)

(93, 94, 95, 96) (2)

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

		60	59	1	3			66	67
		58	58	4	2			65	66

3, 4, 5, 6, 7

9, 0, 1, 2, 3

5, 6, 7, 8, 9

1, 2, 3, 4, 5

7, 8, 9, 0, 1

5, 5, 5, 5

7, 6, 5, 4, 3

3, 2, 1, 0, 9

9, 8, 7, 6, 5

5, 4, 3, 2, 1

1, 0, 9, 8, 7

(50)

(-3, -1) (2, 4)

मंगलवार ८ अप्रैल १९८० **TUESDAY 8** बैशाख बदी ८ सं० २०३७

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

Fig. 459, p. 263 Andrews' Planck's stupid and long-winded method. Got by

66	67	94	95	1	4	30	31	58	59
68	65	93	96	2	3	29	32	60	57
		17	19						
		20	18						
13	15								
16	14								
								9	11
								12	10
						5	7		
						8	6		

4
63
116
132
191

4
63
116
135
191

3	4	4
	60	59
	59	58

9	6	6
	29	31
	32	30

18032 31
29 30

4, 6
63 60, 62
116, 115
132, 131
190, 188
505

4
44
63

4

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

32 31
29 30
57 59
59 58
60 59
57 58

65 67
68 66

96 95
93 94

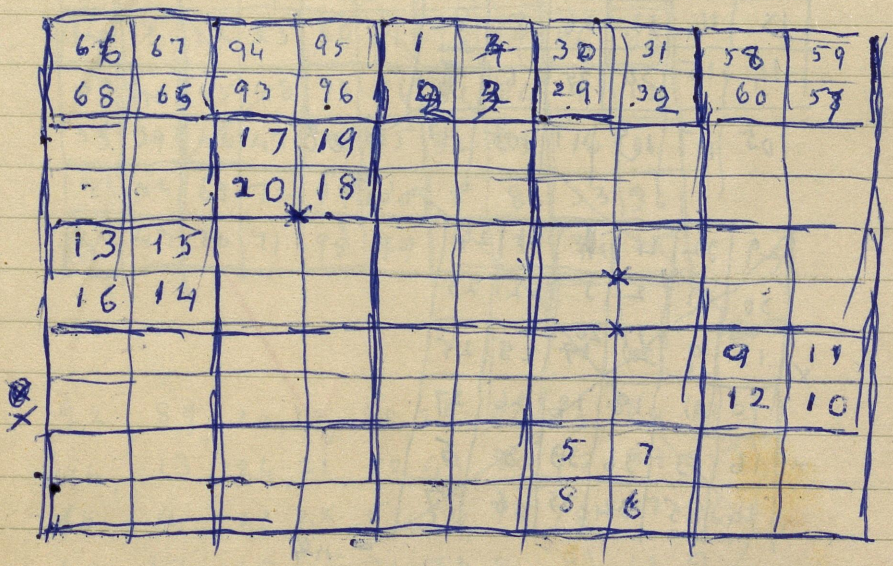
4
60
119
132
191

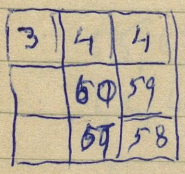
94, 96
93 95
196 95
93 94
57 59
60 58 68 67
65 60

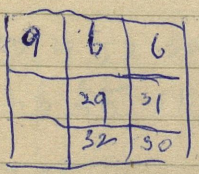
65 67
68 66
96 95
93 94

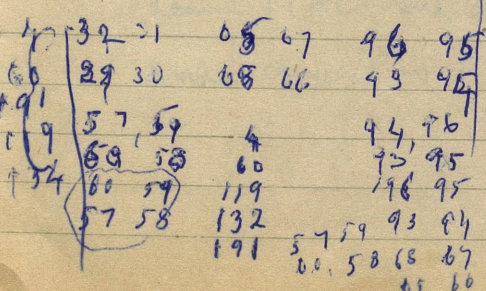
4
63
116
191
132

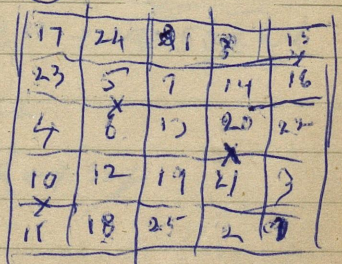
4
63
119
132











बुधवार ९ अप्रैल १९८० WEDNESDAY 9 बैशाख बदी ९ सं० २०३७ गुरुव

29	32	1	4	21	24
30	31	2	3	22	23
9	12	17	20	25	28
10	11	18	19	26	27
13	16	33	36	5	8
14	15	34	35	6	7
105	117	105	117	105	117

114

108

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

114

495 515 510

65	68	93	96	1	4	29	32	57	60
66	67	94	95	2	3	30	31	58	59
89	92	17	20	25	28	53	56	61	64
90	91	18	19	26	27	54	55	62	63
13	16	21	24	49	52	77	80	85	88
14	15	22	23	50	51	78	79	86	87
37	40	45	48	73	76	81	84	9	12
38	39	46	47	74	75	82	83	10	11
41	44	69	72	97	100	5	8	33	36
42	43	70	71	98	99	6	7	34	35

92, 89, 20, 17, 28, 25, 56, 53, 64, 61
16, 13, 24, 21, 52, 49, 80, 77, 88, 85
15, 14, 23, 22, 51, 50, 79, 78, 87, 86
40, 37, 48, 45, 76, 73, 84, 81, 12, 9

65, 67, 20, 19, 52, 50, 81, 83, 33, 35 → 505 1-1

42, 44, 45, 45, 51, 49, 54, 53, 58, 60 → 501 4-1

Leave 17 & 20 and 53 & 56 as they are

& write change in 1st row 93 ↔ 96 & 29 ↔ 32

शुक्रवार ११ अप्रैल १९८० **FRIDAY 11** बैशाख बदी ११ सं० २०३७

1	5	4	3	2	6
6	2	4	3	5	1
6	5	3	4	2	1
1	5	3	4	2	6
6	2	3	4	5	1
1	2	4	3	5	6

1	5	4	3	2	6
6	2	4	3	5	1
6	5	3	4	2	1
1	5	3	4	2	6
6	2	3	4	5	1
1	2	4	3	5	6

+

0	30	30	0	30	0
24	6	24	24	6	6
18	18	12	12	12	18
12	12	18	18	18	12
6	24	6	6	24	24
30	0	0	30	0	30

=

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

x	-	1
1	x	-
-	1	x

27
84
111

1	5	4	3	2	6
6	2	4	3	5	1
6	5	3	4	2	1
1	5	3	4	2	6
6	2	3	4	5	1
1	2	4	3	5	6

0	30	0	30	30	0
6	6	24	24	6	24
18	12	12	12	18	18
12	18	18	18	12	12
24	24	6	6	24	6
30	0	30	0	0	30

2nd 5th
3rd 4th
1st 6th

1	6	1	6	6	1
2	2	5	5	2	5
4	3	3	3	4	4
3	4	4	4	3	3
5	5	2	2	5	2
6	1	6	1	1	6

Narayana Pandita 6×6 squares of (P) + (R)

1	5	4	3	2	6
1	5	3	4	2	6
6	2	6	4	5	1
1	5	1	3	2	3
6	2	3	4	5	1
6	2	4	3	5	1

(P)

magic square in 3rd & 4th row

0	30	0	30	30	0
24	6	6	24	6	24
18	12	12	12	12	18
12	18	18	18	18	12
6	24	24	6	24	6
30	0	30	0	0	30

(R)

magic square in 3rd & 4th row

Strachey's 6 x 6 as (P) + (R)

5	1	6	2	1	6	x27
3	2	1	3	5	1	x
1	3	2	4	3	2	x
2	4	3	5	4	3	
6	5	4	6	2	4	x
4	6	5	1	6	5	x

(P)

magic except in 2nd, 3rd, 5th & 6th rows & u.d.

30	0	0	24	18	18	x 84
0	30	6	18	18	24	x
30	6	0	18	24	18	x
6	24	30	12	6	12	
24	0	30	6	12	12	x
0	30	24	12	12	6	x

(R)

— Same as in (P)

Planck-Andrews method as (P) + (R)

6	5	3	4	2	1
1	5	4	3	2	6
6	2	4	3	5	1
1	2	4	3	5	6
1	5	3	4	2	6
6	2	3	4	5	1

(P)

magic

30	0	30	0	0	30
24	24	6	6	24	6
12	18	18	18	12	12
18	12	12	12	18	18
6	6	24	24	6	24
0	30	0	30	30	0

(R)

magic

like Nelson's type.

All the index-scheme types appear to be of Nelson's type.

(53)

Falkenerch 6×6 as (P) + (R)

5	2	4	1	3	6
6	1	2	3	4	5
6	3	5	2	4	1
4	5	6	1	2	3
4	1	6	3	2	5
2	3	4	5	6	1

(P)

24	30	0	0	18	18
24	30	0	0	18	18
6	6	12	18	24	24
6	6	12	18	24	24
12	12	30	30	6	0
12	12	30	30	0	6

(R)

magic exception cos 1, 2, 3, 4 & l.d — Do —

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

24, 23, 22, 15, 14, 13

1	2	36	35	3	4
31	32	6	5	33	34
7	8	30	29	9	10
25	26	12	11	27	28
13	14	24	23	15	16
19	20	18	17	21	22
96	102	126	120	108	114

30 Days **APRIL 1980** 4th Month

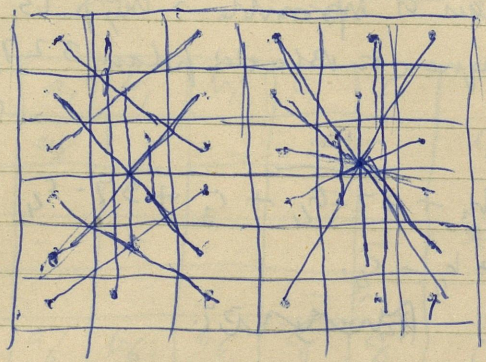
मंगलवार १५ अप्रैल १९८० **TUESDAY 15** बैशाख शुदो १५/१ सं० २०३७

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

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

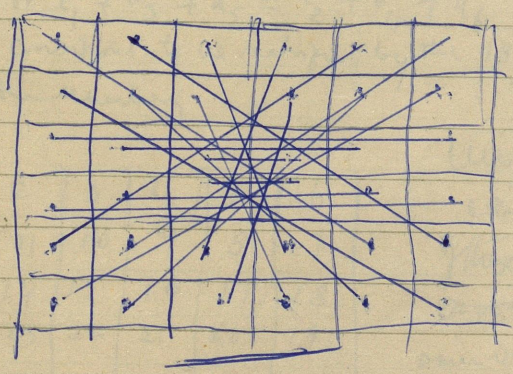
1	4	7	25	22	19	78
2	5	8	26	23	20	84
3	6	9	27	24	21	90
34	31	28	10	13	16	132
35	32	29	11	14	17	138
36	33	30	12	15	18	144

1	4			22	
2	32	8	26	23	20
	6			24	
	31			13	
	5			14	
	33			15	



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

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



In fig. 311 of Abstraction of (2), (3), (4), (6), (7), (8)

Put in figs. on p. 117, 124, [illegible], 140, 141, 149 of rough sheet

Re. square from plan

(1) not every plan is expossible - Ex, p. 152 rough.
(2) alternative square to Black's plan 327, p. 150 (rough)

(3)

$a_3 + 37 - a_4 + b_3 + \overline{37 - b_4} + c_3 + 37 - c_4 = 11$

$a_3 + b_3 + c_3 = a_4 + b_4 + c_4$.

$a_3 + a_4 = 37$. ~~$a_4 + a_3' = 37$~~.

$a_3 + a_4 = 37$ $a_3' = a_4$

$a_3 + a_3' = 37$ $37 - a_3 = a_4$ $\underline{a_3 + a_4 = 37}$

Black. ~~Ty~~ Plan 327, ~~[illegible]~~ of Andrews

a_1	a_1'	b_1	b_1'	c_1	c_1'
a_2	a_2'	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
a_6	a_6'	b_6	b_6'	c_6	c_6'

(1) whatever a's rows are magic

i.e. $(a_1 + a_1') + (b_1 + b_1') + (c_1 +$

i.e. $a_1 + 37 - a_1 + \ldots$

$37 + 37 + 37 = 111$

Cols magic mean

(2) $\sum a = \sum b = \sum c = 111$

rows magic mean

(3) $a_1 + a_2' + b_3 + b_4' + c_5 + c_6' = 111$ (l.d)

or $a_1 + b_3 + c_5 = a_2 + b_4 + c_6$

(4) $a_6 + a_5' + b_4 + b_3' + c_2 + c_1' = 111$

or $c_1 + b_3 + a_5 = c_2 + b_4 + a_6$

ie 5 conditions to be satisfied by the 18 quantities a_i, b_i, c_i

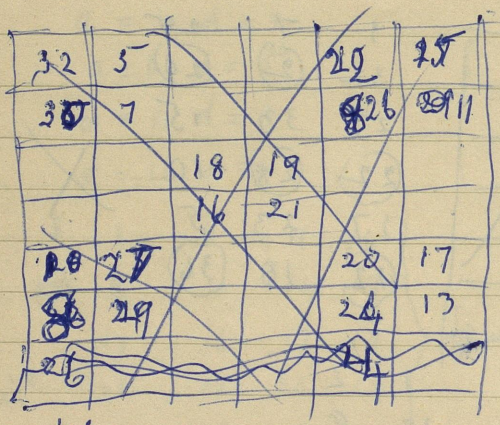
Using the numbering

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

Unfortunately we cannot take any ~~for~~ three of these columns ~~since for each col~~ $\sum a, \sum b, \sum c$ since each column contains 3 pairs of complements & the complement are to be used in rows

$a + (a+d) + (a+2d) + \ldots + (a+5d) = 111$

$6a + 15d = 111$, $2a + 5d = 37$



$a_1 + b_3 + c_5 = a_2 + b_4 + c_6$

$c_1 + b_3 + a_5 = c_2 + b_4 + a_6$

a_1	a_2	a_3	a_4	a_5	a_6
a_1'	a_2'	a_4'	a_3'	a_5'	a_6'
b_1	b_2	b_3	b_4	b_5	b_6
b_1'	b_2'	b_4'	b_3'	b_5'	b_6'
c_1	c_2	c_3	c_4	c_5	c_6
c_1'	c_2'	c_4'	c_3'	c_5'	c_6'

$a_3 + 37 - a_4 + b_3 + 37 - b_4 + c_3 + 37 - c_4 = 111$

$a_3 + b_3 + c_3 = a_4 + b_4 + c_4$ ——— (1)

$\Sigma a = \Sigma b = \Sigma c.$ ——— (2)

$a_1 + (37 - a_2) + c_5 + (37 - c_6) = 111$

$a_1 + c_5 = a_2 + c_6$ ——— (3)

$(37 - c_1) + c_2 + 37 + (37 - a_5) + a_6 = 111$

$a_5 + c_1 = a_6 + c_2$ ——— (4)

Take $a_3 = 14$, $a_4' = 15$ $a_4 = 22$

$b_3 = 28$, $b_4' = 27$. $b_4 = 10$

$c_3 = 16$, $c_4' = 11$ $c_4 = 26$

$a_1 + a_2 + a_3 + a_4 + a_5 + a_6 = 111 \quad (a_1 + a_5) + (c_1 + c_5)$

$c_1 + c_2 + c_3 + c_4 + c_5 + c_6 = 111 \quad = (a_2 + a_6) + (c_2 + c_6)$

$c_1 + c_2 + a_3 + a_4 +$

$a_1 = 8$, $a_2 = 7$, $a_5 = 25$, $a_6 = 35$

$c_1 = 34$, $c_2 = 24$, $c_5 = 5$, $c_6 = 6$.

$a_1 - a_2 = c_6 - c_5 = \alpha$ $\alpha = 1$, $\beta = -10$

$a_5 - a_6 = c_2 - c_1 = \beta$.

$a_2 + \alpha + a_2 + a_3 + a_4 + a_6 + \beta + a_6 = 111$

$2a_2 + (a_3 + a_4) + 2a_6 + (\alpha + \beta) = 111$

$2a_2 + 36 + 2a_6 + 11 = 111$

$2(a_2 + a_6) = 64$ $a_2 + a_6 = 32$

a_1	a_4	b_1	b_2	c_1	c_4
a_1'	a_4'	b_2	b_1'	c_1'	c_4'
a_2	a_5	b_3	b_4'	c_2	c_5
a_2'	a_5'	b_4	b_3'	c_2'	c_5'
a_3	a_6	b_5	b_6	c_3	c_6
a_3'	a_6'	b_6	b_5'	c_3'	c_6'

$b_1 - b_2 + b_3 - b_4 + b_5 = b_6$

$b_1 + b_3 + b_5 = b_2 + b_4 + b_6$

$a_1 + (37 - a_4) + 37 + c_3 + 37 - c_6 = 111$

$a_1 + c_3 = a_4 + c_6$

$a_3 + c_1 = a_6 + c_4$

1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 17, 18

36, 35, 34, 33, 32, 31, 30, 29, 25, 24, 20, 19

बुधवार २३ अप्रैल १९८० **WEDNESDAY 23** बैशाख शुदी ९ सं० २०३७

a_1	a_4	14	22	c_1	c_4
a_1'	a_4'	15	23	c_1'	c_4'
a_2	a_5	28	10	c_2	c_5
a_2'	a_5'	27	9	c_2'	c_5'
a_3	a_6	16	26	c_3	c_6
a_3'	a_6'	11	21	c_3'	c_6'

$a_1 + c_3 = a_4 + c_6$

$a_3 + c_1 = a_6 + c_4$

36 + 77

~~38~~

~~42~~ 69

$a_1 + a_4 + c_1 + c_4 = 75$

$a_2 + a_5 + c_2 + c_5 = 73$

$a_3 + a_6 + c_3 + c_6 = 69$

42

30

$a_1 + a_3 + a_4 + a_6 + c_1 + c_3 + c_4 + c_6 = 154$

$2(a_1 + c_3) + 2(a_3 + c_1) = 154$

$a_1 + a_3 + c_1 + c_3 = 72 = a_4 + a_6 + c_4 + c_6$

1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 17, 18

36, 35, 34, 33, 32, 31, 30, 29, 25, 24, 20, 19

$a_1 = 8, c_3 = 5$

$a_4 = 7, c_6 = 6$

11

$c_1 + c_4 = 60$ | $c_3 + c_6 = 11$

$a_3 + a_6 = 58$ | $a_1 + a_4 = 15$

$c_1 + c_4 = 60 \rightarrow (36, 24), (35, 25),$

$a_3 + a_6 = 58 \rightarrow (34, 24), (33, 25)$

24, 36

25, 35

34, 24

~~24~~ 36

~~35~~, 23

9, 5 35

16

38 73 2

8	7	14	22	25	35
29	30	15	23	12	2
		28	10		
		27	9		
34	24	16	26	5	6
3	13	11	21	32	31

~~1, 36, 4, 33, 17~~

1 4 17 18

36 33 20 19

19 33 20 1 37

x y 74-x

74-x, 74-y

2222-(x+y+z)

= 111

9	4	36	5		
		32	1		
		10	31		
		6	27		
		24	34	2	47
		3	13		

2, 4, 7, 8, 9, 11, 12, 14, 15, 16, 17, 18
35, 33, 30, 29, 28, 26, 25, 23, 22, 21, 20, 19

$a_1 = 9, c_3 = 2$

$a_4 = 7, c_6 = 4$

$c_1 + c_4 = 54$. $c_1 = 34, c_4 = 20$

$c_1 + a_3 = c_4 + a_6$. $a_3 + a_6 = 47$.

$35 + a_3 = 19 + a_6$

$a_3 + c_1 = a_6 + c_4$

$a_3 + c_1 = (44 - a_3) + (57 - c_1)$

$2(a_3 + c_1) = 101$ ✗

$a_1 + a_4 + b_1 + b_2' + c_1 + c_4 = 111$

$(37 - b_1) + (37 - a_4) + (37 - b_1) + b_2 + (37 - c_1) + (37 - c_4) = 111$

$a_1 + a_4 + b_1 - b_2 + c_1 + c_4 = 74$

$-(37 - b_1)$

1, 2, 3, 4, 5, 6, 7
8, 9, 10, 11, 12, 13, 14
15, 16, 17, 18, 19, 20, 21
~~22, 23, 24, 25, 26, 27, 28~~
29, 30, 31, 32, 33, 34, 35
36, 37, 38, 39, 40, 41, 42
43, 44, 45, 46, 47, 48, 49

1	2	3	5	6	7
8	9	10	12	13	14
15	16	17	19	20	21
29	30	31	33	34	35
36	37	38	40	41	42
43	42	45	47	48	49

×	−	1		−	×
1	×	−	−	×	
−	1	×	×		−
	1	×	×		
1	×			×	
×		1			×

By Index Scheme method

49	6	45	5	2	43
36	41	12	10	37	14
21	30	39	31	20	15
29	16	19	17	34	35
8	13	38	40	9	42
7	44	3	47	48	1

which is magic all right with S = 150

But neither nasik nor associated

1 + 47 + 36 + 33 + 15 + 12

$\begin{pmatrix} 1, & 2, & 3, & 5, & 6, & 7 \\ 0, & 7, & 14, & 28, & 35, & 42 \end{pmatrix}$ $k = i + 2j$, $l = 2i + j$

$a_{11} \to b_{33}$, $a_{12} \to b_{54}$, $a_{13} \to b_{15}$, $a_{21} \to b_{45}$

1, 12, 15, 33, 36, 47

17	40	6	21	36	2
34	49	8	30	45	12

$i + 3j$, $3i + j$ $\begin{pmatrix} 11 \\ 23 \end{pmatrix}$

$a_{16}, b_{62}, b_{13}, b_{66}, b_{12}, b_{63}$

$a_{11} \to b_{16}$

$a_{11} \to b_{44}$, $a_{12} \to b_{15}$, $a_{13} \to a_{46}$

$k = ai + bj$, $l = ci + dj$ $\begin{pmatrix} 1 & 1 \\ 2 & 3 \end{pmatrix}$ $k = i + j$, $l = 3i + 2j$

$a_{11} \to b_{25}$, $a_{12} \to b_{31}$, $a_{13} \to b_{43}$

15, 33, 36, 47, 1, 12

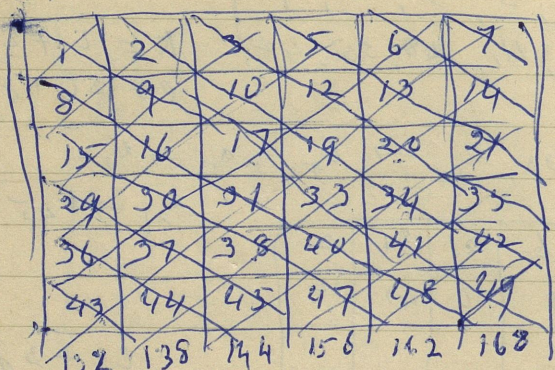
$a_{11} \to b_{26}$, $a_{12} \to b_{34}$

7 + 45 + 42 + 31 + 21 + 10

3+47+36+33+15+12

रविवार २७ अप्रैल १९८० **SUNDAY 27** बैशाख शुदी १३ सं० २०३७ सोम

1+12+15+33+36+47



$k = ai + bj$
$l = ci + dj$

$a+b=4$, $c+d=1$; $a+2b=1$, $c+2d=5$; $b=-3$, $a=7$; $d=4$, $c=-3$

$\begin{pmatrix} 7 & -3 \\ -3 & 4 \end{pmatrix}$ $\begin{pmatrix} 7 & 4 \\ 4 & 4 \end{pmatrix}$

$a_{13} \to b_{43}$ 1+45+42+31+21

$a_{11} = +10$

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

$a+b=1$, $c+d=6$; $a+2b=6$, $c+2d=2$; $b=5$, $a=-4$; $d=-4$, $c=10$

$\begin{pmatrix} -4 & 5 \\ 10 & -4 \end{pmatrix}$ $-4+15=11$, $10-12=-2$

$\begin{pmatrix} 2 & 4 \\ 4 & 2 \end{pmatrix}$ $a_{11} \to b_{66}$, $a_{12} \to b_{42}$, $a_{13} \to b_{24}$, $a_{14} \to b_{66}$, $a_{21} \to b_{64}$

$\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}$ $a_{11} \to b_{33}$, $a_{12} \to b_{45}$, $a_{13} \to b_{51}$, $a_{14} \to b_{63}$, $a_{15} \to b_{15}$, $a_{16} \to b_{21}$

$\begin{pmatrix} 3 & 1 \\ 1 & 3 \end{pmatrix}$

$k = 3i + j$
$l = i + 3j$

$a_{11} \to b_{42}$
$a_{12} \to b_{51}$
$a_{13} \to b_{64}$

7	44	3	45	2	49
36	13	40	12	41	8
35	16	31	17	30	21
29	20	33	19	34	15
42	9	38	10	37	14
1	48	5	47	6	43

47 6 43
10 37 14
19 34 15

33
36
47
1
12
15
144 x

(3, -1)
(5, -1), (1, -1)

$1 + 14 + 15 + 35 + 36 + 49 = 150$
$3 + 12 + 17 + 33 + 38 + 47 = 150$

1	2	3	5	6	7
14	13	12	10	9	8
15	16	17	19	20	21
35	34	33	31	30	29
36	37	38	40	41	42
49	48	47	45	44	43

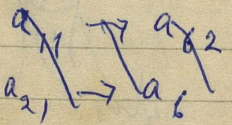
154

146

146 1
154 48
49 45
2 43
47 3
5 6
44 146
7 146
160

43
6
45
3
48
1
146

$a_{11} \to a_{62}$
$a_{21} \to a_{6}$



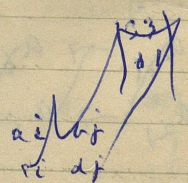
14	1	2	3	49	48	47
21	40	41	42	10	9	8
35	31	30	29	19	20	21
42	15					
49						
	5	6	7	45	44	43

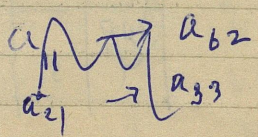
मंगलवार २९ अप्रैल १९८० TUESDAY 29 बैशाख शुदी १४ सं० २०३७

1	2	3	5	6	7
14	13	12	10	9	8
15	20	21	19	16	22
15	30	29	31	36	17
36	37	38	40	41	42
49	48	47	45	44	43

1	48	5	45	44	7
36	13	10	40	9	42
35	16	21	19	20	33
15	34	29	31	30	17
14	37	38	12	41	8
49	2	47	3	6	43

14	13				8
21	20				15
35	34				29
42	41				36
49	48				43
7	6				1





$c = 0$
$a = 1$

$2a + 2b = 3$
$2c + 2d = 5$

$a + 2b = 2$
$c + 2d = 5$

$a_i \; b_j$
$c_i \; d_j$

(61)

30 Days

APRIL 1980

$2c + 2d = 5$

4th Month

बुधवार ३० अप्रैल १९८० **WEDNESDAY 30** बैशाख शुदी १५ सं० २०३७

1	2	3	5	5	6
8	9	10	12	13	14
15	16	17	19	20	21
29	30	31	33	34	35
36	37	38	40	41	42
43	44	45	47	48	49

$a_{12} \rightarrow a_{25}$
$a_{22} \rightarrow a_{35}$

7	44	3	45	2	49
1	48	5	47	6	43

1	2	3	5	6	7
14	13	8	10	9	12
15	16	21	19	20	17
35	34	29	31	30	33
36	37	42	40	41	38
49	48				43

$a_{11} \rightarrow a_{61}$
$a_{16} \rightarrow a_{11}$
$a_{12} \rightarrow 15$
a_{45}

35 15
16 34
21 29
19 31
20 30
33 17
144 156

1	2	3	5	6	7
14	13	12	10	9	8
15	16	21	19	20	17
35	34	29	31	30	33
36	37	42	40	41	38
49	48	47	45	44	43

1	2	3	5	6	7
14	13	12	10	9	8
15	16	17	19	20	21
35	34	33	31	30	29
36	37	38	40	41	42
49	48	47	45	44	43

1	2	3	5	6	7
14	13	12	10	9	8
19	16	17	15	20	21
31	34	33	35	38	29
36	37	38	40	41	42
49	48	47	45	44	43

108
192

36
13
12
10
9

1, 2, 3, 5, 6, 7, 8, 9, 10

9	1	7
3	6	8
5	10	2

9	1	7	37	29	35
3	6	8	31	34	36
5	10	2	33	38	30
45	40	48	20	12	17
47	44	42	14	16	19
41	49	43	15	21	13

Strachey

Narayana

12, 13, 14, 15, 16, 17, 19, 20, 21

11

29, 30, 31, 33, 34, 35, 36, 37, 38

40, 41, 42, 43, 44, 45, 47, 48, 49

$a_{11} \to a_{26}$
$a_{12} \to a_{33}$
$a_{13} \to a_{46}$
$a_{14} \to a_{53}$

1	1
3	3

$i + j$
$3i + 3j$

1	3
3	1

$a_{11} \to a_{14} \to a_{61} \to a_{44}$.
$a_{12} \to a_{15}$
$a_{13} \to a_{13}$
$a_{14} \to a_{66}$
$a_{15} \to a_{45}$
$a_{16} \to a_{11}$

$a_{21} \to a_{36}$
$a_{22} \to a_{46}$

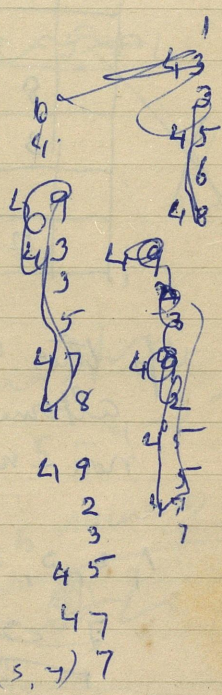
$a_{11} \to a_{44}$
$a_{12} \to a_{15}$
$a_{13} \to a_{46}$
$a_{14} \to a_{11}$

$a_{11} \to a_{41} \to a_{61} \to a_{44} \to a_{63} \to a_{16} \to a_{11}$

$(0,-3), (0,-2), (3,2), (-1,-2), (3,-1), (1,0)$

$a_{12} \to a_{15} \to a_{45}$

5				2	
	9		12		
19				16	
	6		1		
8				13	
	20		15		



$a_{21} \to a_{51}$

$a_{22} \to a_{41}$

$a_{31} \to a_{64}$

$a_{32} \to a_{65}$

$a_{41} \to a_{11}$

$\begin{pmatrix} 1 & 1 \\ 2 & 4 \end{pmatrix}$

$a_{11} \to a_{26}$

$a_{12} \to a_{34}$

$a_{13} \to a_{42}$

$a_{21} \to a_{32}$

$a_{22} \to a_{46}$

$a_{31} \to a_{42}, \; a_{42} \to a_{64}, \; a_{52} \to a_{16}, \; a_{62} \to a_{22}$

	7				13
			14		1
	8		2		
	3				9
			10		5
	12		6		

I think I had better give up this wild goose chase for finding alternative to Planets method of finding non-normal magic square of order 6

1, 2, 3, 5, 6, 7 — 24

7 3 2
1 5 6
2 3 7
6 5 1

0 28 35
0 42
28 14
35 7

2	3	7	2	3	7
6	5	1	6	5	6
2	3	7	2	3	7
6	5	1	6	5	6
2	3	7	2	3	7
6	5	1	6	5	6

0	42	0	42	0	42
28	14	28	14	28	14
35	7	35	7	35	7
0	42	0	42	0	42
28	14	28	14	28	14
35	7	35	7	35	7

2	45	7	44	3	49
34	19	29	20	33	15
37	10	42	9	38	14
6	47	1	48	5	43
30	17	35	16	31	21
41	12	36	13	40	8

34	19	29	20	33	15
37	10	42	9	38	14
6	47	1	48	5	43
30	17	35	16	31	21
41	12	36	13	40	8
2	45	7	44	3	49

1 – 6 – 5 – 4 – 3 – 2

This is same as

7	36	35		42	
44	13		48		20
3		31		38	
	8		43		15
2	20	30		37	34
7	42		47	10	19

7	36	35	1	42	29
44	13	16	48	9	20
3	40	31	5	38	33
49	8	21	43	14	15
2	41	30	6	37	34
45	12	17	47	10	19

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

References for $n = 8, 12, 16$

(1) Bk. 21, p. 144. Ex of Jaenisch for Knight's tour of $n = 8$. Actual square is given

(2) Bk. 11, p. 186 for construction of an 8×8 (same as index-rod



(3) Bk. 12, p. 46 — Chinese method for 8×8 — Also Kashinath note book, p. (36)'.

(4) Bk. 12, p. 111 — 8th order square which is bimagic & 2×2 Jaina — Also Bk. 13, p. 162

omit this

(5) Anorevs, fig. 567, p. 296 (reversions)

(6) Bk. 13, p. 160 — same as (1) above but more details

(7) Bk. 16, pp. 132–133. — Knight tour cases possible for $n = 5$ and $n = 7$ using R.M's & B.M's as Knight moves — not possible for $n = 9, 15, \ldots$

omit this

(8) Bk. 13, p. 151 — 16th order square possible by Knight moves from Madachy — Says impossible for n odd. What about $n = 5, 7$?

(9) Bk. 16, p. 182, bimagic square of order 8 with other properties (from Carré's magiques)

not for Chap. 10

(* Ref. to Portier Revue Scientifique 1903, p. 662)

(64)

31 Days **MAY 1980** 5th Month

मंगलवार ६ मई १९८० **TUESDAY 6** जेठ बदी ६ सं० २०३७

(10) Bk. 16, p. 183 – Portier's 8×8 from Carré's [illegible]

(11) Bk. 20, pp. 92–101.

(12) Bk. 27 – whole of it devoted to 8×8 square (?)

(13) constn of Fig. 14 from the associated 8×8 square of Fig. 11 in B & J. (use of Planck's rule)

(14) Fig. 49 b of B & J, p. 68.

(15) § 11, p. 70 of B & J. – omit this

(16) Rough 1 to 5.

1, 3, 6, 8, 17, 19, 22, 24, 41, 43, 46, 48, 57, 59, 62, 64

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, 28, 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

60 + 19 + 2 + 41 + 61 + 22 + 7 + 48 = 260

1	57	33	25
48	24	16	56
32	40	60	8
49	9	17	41

< 81
210

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

1/2
18

56	0	56	0	56	0	56	0
40	16	40	16	40	16	40	16
0	56	0	56	0	56	0	56
16	40	16	40	16	40	16	40
32	24	32	24	32	24	32	24
48	8	48	8	48	8	48	8
24	32	24	32	24	32	24	32
8	48	8	48	8	48	8	48

Fig. 14, p. 10 of B & J split

[8, 6, 1, 3, 5, 7, 4, 2
56, 40, 0, 16, 32, 48, 24, 8] the 2, of this ~~this~~ is exactly of the type in Fig. 694, p. 377 of Andrews

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

0	24	48	40	0	24	48	40
48	40	0	24	48	40	0	24
8	16	56	32	8	16	56	32
56	32	8	16	56	32	8	16
0	24	48	40	0	24	48	40
48	40	0	24	48	40	0	24
8	16	56	32	8	16	56	32
56	32	8	16	56	32	8	16

(C)

This is my square p. 204 of Bk. 2 with quadrants built by Narayana's method. This latter quite appears from plate 7 p. 694, p. 377 of Andrews

शुक्रवार ९ मई १९८० FRIDAY 9 जेठ बदी ९ सं० २०३७

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

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

The Monist (Chicago) - 1919,
Vol. 29, pp. 307-16

(66)

31 Days **MAY 1980** 5th Month

शनिवार १० मई १९८० **SATURDAY 10** जेठ बदी १० सं० २०३७

The Monist (Chicago)
– 1913, Vol. 23, pp. 623 – 30
Article by H. A. Sayles and J. N. Muncey.

Given to Raghunathan on 10/10/84 when he came home for lunch

0	0	48	48				
56	56	8	8				
0	0	48	48				
56	56	8	8				

Porter's square again not of Planck's type

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

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

1	8	13	12				
14	11	2	7				
4	5	16	9				
15	10	3	6				
33	24	29	28	17			
30	27	18	23				
20	21	32	25				
31	26	19	22				

For the 4 x 4 square steps are

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

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

(2, −1), (0, 2), (2, 1)

(1, 0) → (1, 4)
(−1, 0) → (−1, 4)

4 = −4

8, 16, 24, 40, 48, 56 → (2, −2)

32, 64 ↙ (−2, −2)

Suppose we change the (0, 2) & (0, −2)

Do we get a nasik square?

31 Days **MAY 1980** 5th Month

सोमवार १२ मई १९८० **MONDAY 12** जेठ बदी १३ सं० २०३७

1	24		44	49	40	13	28
	43	2	39	14	27	58	23
4	37		25		21	16	41
	42	3	38	15	26	51	22
17		45		33	8	29	12
30		18	7	46	11	34	0
36	5	32		20		48	9
31		19	6	47	10	35	

1					24	13	28
14		2	23		27		
4	21	16		4			25
15		3	22		26		
	8			17		29	12
30					11	18	7
20		32	9		5		
31					10	19	6

मंगलवार १३ मई १९८० **TUESDAY 13** जेठ बदी १४ सं० २०३७

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

30

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

diagonals not correct & also not magic

(1, 0)

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

Diagonals
sum =

196
196

1		24	24	33	12		
	23	2	11	30		34	
20		16	5		25		
15					6	19	26
	28			17		13	8
14					7	18	27
	9			4		32	21
	22	3	10	31			

200
60

X

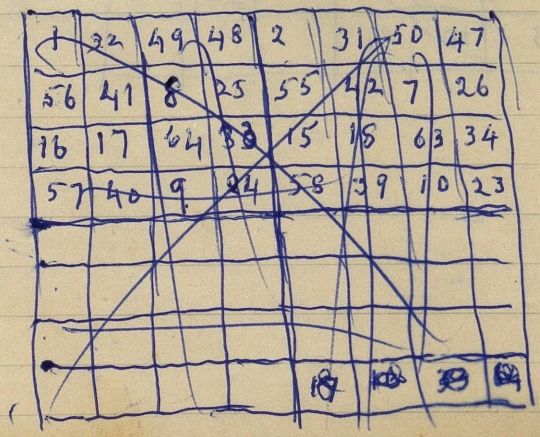
not magic

Use another of Narayanan Pandit's square

(1, 2) → (1, −2)
(2, 3) → (2, 0)
(3, 4) → (−1, 2)
(4, 5) → (0, −1)
(5, 6) → (1, −2)
(6, 7) → (−2, 0)
(7, 8) → (−1, 2)
(8, 9) → (2, −2)
(9, 10) → (1, 2)
(10, 11) → (−2, 0)
(11, 12) → (−1, −2)
(12, 13) → (0, 1)
(13, 14) → (1, 2)
(14, 15) → (2, 0)
(15, 16) → (−1, −2)

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

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



21, 5, 12, 20 (69)

1	8	13	12				
14	11	2	7				
4	5	16	9				
15	10	3	6				
		13	12	17	24	29	28
				30	27	18	23
				20	21	32	25
				31	26	19	22

diagonals wrong

1	13		33	8	12		
	39	2	11		34	7	14
4	16		36	5		9	37
	38	3	10		35	6	15
	28		17		29		24
	23		30		18		27
	25		20		32		21
	22		31		19		26

(4,0) does not work

39 ↔ 7 ✓
55 ↔ 23
36 ↔ 4 ✓
45 ↔ 13 ✓
46 ↔ 14
51 ↔ 19

① + 42 + 64 + 39 + (17) + 58 + 18 + 55 = 324
20 + (43) + 29 + 22 + 4 + (59) + 13 + 6 = 196
49 + 26 + (16) + 23 + 33 + 10 + (32) + 7 = 196
36 + 27 + 45 + (38) + 52 + 11 + 61 + (54) = 324
(63) + 41 + 18 + 40 + (47) + 57 + 2 + 56 = 324
3 + (21) + 14 + 60 + 19 + (5) + 30 + 44 = 196
31 + 9 + (50) + 8 + 15 + 25 + (34) + 24 = 196
35 + 53 + 46 + (28) + 51 + 37 + 62 + (12) = 324

~~4 ↔ 14~~
~~5 ↔ 19~~
41 ↔ 9 ✓
57 ↔ 25 ✓



324

4 + 42 + 29 + 55 + 53 + 58 + 45 + 39 = 324
20 + 26 + 13 + 7 + 36 + 10 + 61 + 23 = 196
62 + 56 + 3 + 41 + 14 + 40 + 51 + 57 = 324
35 + 9 + 46 + 8 + 19 + 25 + 30 + 24 = 196

1	14	4	15	33			
				8	11	5	10
13	2	16	3				
				12	7	9	6
				17	30	20	31
24	27	21	26				
				29	18	32	19
28	23	25	22				

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

I think I had better be satisfied with the one that I have got which is our nasik

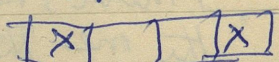
17	18	19	20	21	22	23	24
49	50	51	52	53	54	55	56
25	26	27	28	29	30	31	32
1	2	3	4	5	6	7	8
33	34	35	36	37	38	39	40
57	58	59	60	61	62	63	64
9	10	11	12	13	14	15	16
41	42	43	44	45	46	47	48

(i)

Permutation of rows of primitive square in some order followed by permutation of columns in some order as in next page

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

Applying index scheme given by Underwood



we have

(ii)

53	19	21	41	45	18	17	42
54	14	12	56	52	15	16	55
30	38	36	32	28	39	40	31
59	3	5	57	61	2	1	58
27	35	37	25	29	34	33	26
62	6	4	64	60	7	8	63
14	54	52	16	12	55	56	15
19	43	45	17	21	42	41	18

not a magic square at all

(iii)

(i) is obtained from the fundamental pandiagonal square by permutation of rows in order

4 – 7 – 1 – 3 – 6 – 8 – 2 – 5 (symmetric)

This is not a symmetric permutation of the rows since 4 + 6 < 10, 7 + 2 = 9, 1 + 8 = 9, 3 + 5 = 8

rows 4 - 7 - 1 - 3 - 6 - 8 - 2 - 5 (symmetric)

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

nova magic square construction

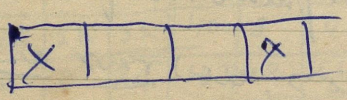
(A)

cols 4 - 3 - 4 - 7 - 2 - 5 - 6 - 8 (symmetric)

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

Applying to this the index scheme

which results by using the index rod



overleaf

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

is an associated magic square.

Suppose we apply the index scheme to (A) itself, we get

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

an associated magic square

Just as in the case of $n = 6$, we get squares for symmetric permutations of rows or cols, and rows and cols

1, 2, 3, 4, 5, 6, 7, 8
0, 8, 16, 24, 32, 40, 48, 56

(72)

31 Days **MAY 1980** 5th Month

गुरुवार २२ मई १९८० **THURSDAY 22** जेठ शुदी ८ सं० २०३७

0	56
7	63

$-0, +0$

$= [(8-1)-0] \times 8 + 0$

$+0, -0 = 7$

27	20	51	60
34	45	10	5
30	17	54	57
39	40	15	0

B & J's fig 51 e, p. 74

split

into (P) + (R)

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

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

Ph

24	16	48	56	32	40	8	0
32	40	8	0	24	16	48	56
24	16	48	56	32	40	8	0
32	40	8	0	24	16	48	56
24	16	48	56	32	40	8	0
32	40	8	0	24	16	48	56
24	16	48	56	32	40	8	0
32	40	8	0	24	16	48	56

~~24 + 8 + 32~~ + 1

28 + 11 + 39 + 56 + 29

+ 14 + 34 + 49 = 260

Right nasik

This is analogous to Narayana's 8th order square.

D.J's Zyme 51 f, p. 76 split

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

24	16	32	40	48	56	8	0
32	40	24	16	8	0	48	56
24	16	32	40	48	56	8	0
32	40	24	16	8	0	48	56
24	16	32	40	48	56	8	0
32	40	24	16	8	0	48	56
24	16	32	40	48	56	8	0
32	40	24	16	8	0	48	56

This is Planck's method in Zyp. 694, p. 377 with rows & cols interchanged viz

a_1	a_2	a_1	a_2
b_1	b_2	b_1	b_2
a_2	a_1	a_2	a_1
b_2	b_1	b_2	b_1

$(a_1, a_2) = (4, 5)$
$(b_1, b_2) = (3, 6)$

Method B of D.J's Zyme 51 f is exactly of Planck's type

Narayana's 8th order square split (Bk. 2, p. 288 Fig. 35)

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

No need to do this splitting. It is in p. 287 of Bk. 2

Cf. B & J's Fig. 51. e

This is different from Planck's scheme

Q_1				Q_2			
a_1	b_1	a_2	b_2	c_1	d_1	c_2	d_2
a_2	b_2	a_1	b_1	c_2	d_2	c_1	d_1
a_1	b_1	a_2	b_2	c_1	d_1	c_2	d_2
a_2	b_2	a_1	b_1	c_2	d_2	c_1	d_1

Construction of orders 8 & 16 from Bk 1, pp. 141 – 179 & pp. 195 – 209.

33	34	30	28
41	23	19	44
16	55	51	13
64	58	6	5

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

Ex. 109 of p. 144 Convert to a magic square from an arithmetic one

After reading all the material in Bk. 1. I have come to the conclusion that I should pick out some cases relative to Planetes scheme for squares in some manner.

a_1	b_1	h_2	b_2
a_2	b_2	a_1	b_1
a_1	b_1	a_2	b_2
h_2	b_2	a_1	b_1

viz

Also mention a few cases where such (1,8), (3,6), (5,4), (2,7) relations do not at all occur.

$n = 8$

(1) Bright move & Kings move squares

(2) Simple methods using index scheme.

(3) Continuous methods (Narayana &

(4) Reversing complementary orthogonals

(5) Methods of specially constructed quadrants = Associated & nasik squares

(6) Franklin squares $n = 0$

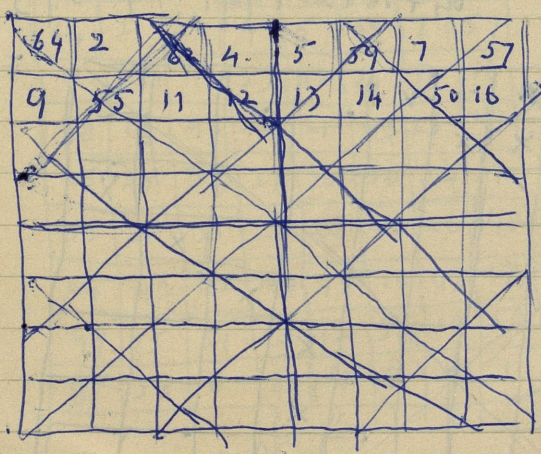
$n = 12$ – one or 2 cases – one figure

$n = 16$ – one or 2 cases – one figure

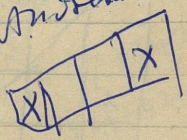
Index method – use mod

x		x	

64	2	62	4	5	59	7	57
9	55	11	12	13	14	50	16



This is given in Andrews not



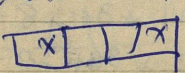
x			x

Take B & J's Fig. 14

& make it associated by

Planck's rule & see if it can

be derived from



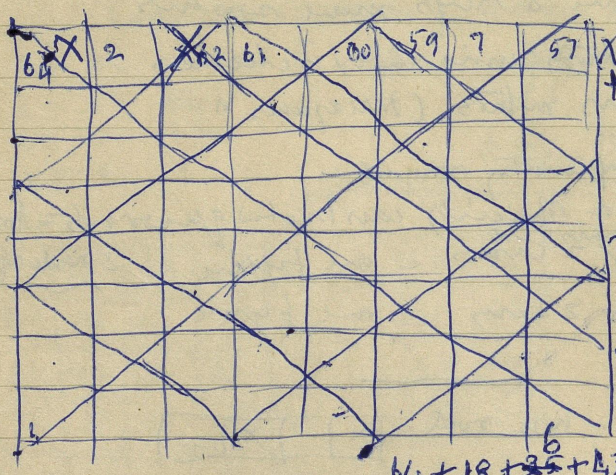
x			x

127
18
145

मंगलवार २७ मई १९८०

TUESDAY 27

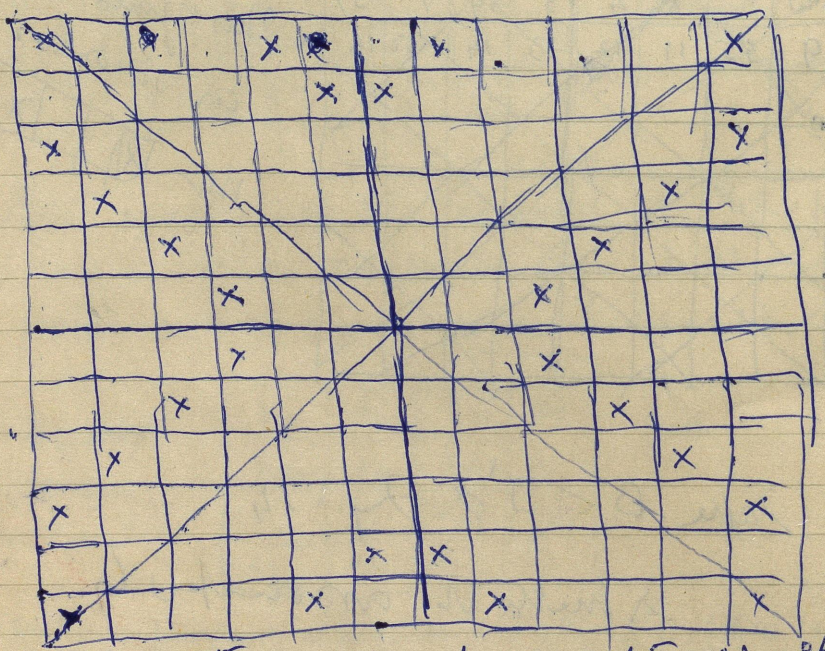
जेठ शुदी १३ सं० २०३७



64 + 35 + 17 + 54
+ 8 + 27 + 41 + 14
= 260

~~64 + 15 + 27 + 53~~
~~+ 48 + 10 + 38 + 52~~
64 + 42 + 6 + 20
+ 57 + 47 + 3 + 21
= 260

64 + 18 + ~~35~~ + ~~14~~ + 57 + 23 + 3 + 45
= 260



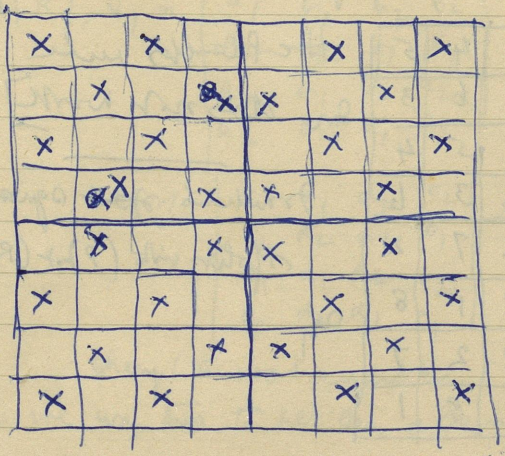
4 + 50 + 21 + 39 + 60 + 10 + 45 + 31 = 260

64 + 11 + 41 + 30 + 8 + 51 + 17 + 38 = 260

2 + 53 + 43 + 36 + 58 + 13 + 47 + 28 = 260

62 + 16 + 43 + 25 + 6 + 56 + 19 + 33 = 260

बुधवार २८ मई १९८० **WEDNESDAY 28** जेठ शुदी १४ सं० २०३७



Index no.

x		x	



x		x			x		x
	x		x	x		x	
x		x			x		x
	x		x	x		x	
	x		x	x		x	
x		x			x		x
	x		x	x		x	
x		x			x		x

57 + 14 + 48 + 27 + 1
+ 54 + 24 + 35 = 260

64 + 35 + 17 + 54 + 8 + 27
+ 41 + 14 = 260

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

64 + 42 + 6 + 20 + 57 + 47 + 3
+ 21 = 260

57 + 47 + 3 + 21
+ 64 + 42 + 6
+ 20

associated
all right.

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

nasik 2 x 2 jawa,
64 + 18 + 6 + 44 + 57
+ 23 + 3 + 45
also Right - nasik

1, 2, 3, 4, 5, 6, 7, 8,
0, 8, 16, 24, 32, 40, 48, 56

31 Days **MAY 1980** 5th Month

गुरुवार २९ मई १९८० **THURSDAY 29** जेठ शुदी १५ सं० २०३७

Bad's type transform to an arbitrary square

Five Planets rule

Q2 does not work

Franklin's ~~Plot~~ square

split into (P) + (R)

Q4

Q3

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

144
18
162
468
630

48	56	0	8	16	24	32	40
8	0	56	48	40	32	24	16
48	56	0	8	16	24	32	40
8	0	56	48	40	32	24	16
48	56	0	8	16	24	32	40
8	0	56	48	40	32	24	16
48	56	0	8	16	24	32	40
8	0	56	48	40	32	24	16

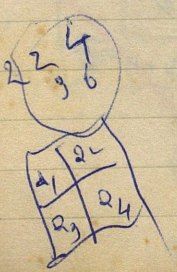
1,	8,	1,	2
2,	1,	8,	7
7,	8,	1,	2,
2,	1,	8,	7,

3,	4,	5,	6
6,	5,	4,	3
3,	4,	5,	6
6,	5,	4,	3

$$\text{In (P) } Q_1 \text{ is } \begin{vmatrix} a_1 & a_2 & a_1 & a_2 \\ b_1 & b_2 & b_1 & b_2 \\ a_2 & a_1 & a_2 & a_1 \\ b_2 & b_1 & b_2 & b_1 \end{vmatrix} \quad \therefore Q_1 = Q_2$$

22, 4
468

$$Q_3 \text{ is } \begin{vmatrix} c_1 & c_2 & c_1 & c_2 \\ d_1 & d_2 & d_1 & d_2 \\ c_2 & c_1 & c_2 & c_1 \\ d_2 & d_1 & d_2 & d_1 \end{vmatrix} \quad Q_4 = Q_3$$



In (R), Q_1 is $\begin{vmatrix} a_1 & b_1 & b_2 & a_2 \\ a_2 & b_2 & b_1 & a_1 \\ a_1 & b_1 & b_2 & a_2 \\ a_2 & b_2 & b_1 & a_1 \end{vmatrix}$ $Q_3 = Q_1$

R_2 is $\begin{vmatrix} c_1 & d_1 & d_2 & c_2 \\ c_2 & d_2 & d_1 & c_1 \\ c_1 & d_1 & d_2 & c_2 \\ c_2 & d_2 & d_1 & c_1 \end{vmatrix}$ $Q_4 = Q_2$

change to root numbers.

Can we use this to get an alternative Franklin square

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

(R)

Take $a_1 = 6$
$b_1 = 7$
$c_1 = 1$
$d_1 = 4$

for (R), Q_1 to be reduced $\begin{vmatrix} 1 & 5 & 4 & 8 \\ 8 & 4 & 5 & 1 \\ 1 & 5 & 4 & 8 \\ 8 & 4 & 5 & 1 \end{vmatrix} \rightarrow \begin{vmatrix} 0 & 32 & 24 & 56 \\ 56 & 24 & 32 & 0 \\ 0 & 32 & 24 & 56 \\ 56 & 24 & 32 & 0 \end{vmatrix}$

& Q_2 as $\begin{vmatrix} 2 & 6 & 3 & 7 \\ 7 & 3 & 6 & 2 \\ 2 & 6 & 3 & 7 \\ 7 & 3 & 6 & 2 \end{vmatrix} \rightarrow \begin{vmatrix} 8 & 40 & 16 & 48 \\ 48 & 16 & 40 & 8 \\ 8 & 40 & 16 & 48 \\ 48 & 16 & 40 & 8 \end{vmatrix}$

शनिवार ३१ मई १९८० | SATURDAY 31 | जेठ बदी २ सं० २०३७

0	32	24	56	8	40	16	48
56	24	32	0	48	16	40	8
0	32	24	56	8	40	16	48
56	24	32	0	48	16	40	8
0	32	24	56	8	40	16	48
56	24	32	0	48	16	40	8
0	32	24	56	8	40	16	48
56	24	32	0	48	16	40	8

(R)

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

35
14
31
50
130

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

(P)+(R).

Another franklin square obtained by another Genius Madhavarao !!

Magic Square on p. 75

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

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

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

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

8 1 4
2 1 5

Refer to this later on.

$\frac{1}{2} \cdot 72 \cdot 145$ 8 7 8 0

(P)

Eq. 578, p. 301 Answers is not accurate. Lucas' rule 6 3 4 9 4 0

Δ Eq. Then is no point in applying Lucas' rule

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

82

Lucas rule does not apply to [illegible]

139, 5, 141, 142, 143, 1
18, 128, 129, 130, 14, 132
115, 116, 117, 27, 119, 25
103, 104, 40, 106, 38, 108
91, 53, 93, 51, 95, 96
66, 80, 64, 82, 83, 84

1, 143, 142, 141, 5, 139
132, 14, 130, 129, 128, 18
25, 119, 27, 117, 116, 115
108, 38, 106, 40, 104, 103
96, 95, 51, 93, 53, 91
84, 83, 82, 64, 80, 66

Try 2y-134, p. 35 B 4 J
which is assumed

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

108, 103, 102, 105, 76, 71
97, 110, 111, 100, 65, 78
29, 18, 19, 32, 141, 130
24, 27, 26, 21, 136, 139
28, 23, 22, 25, 140, 135
17, 30, 31, 20, 129, 142

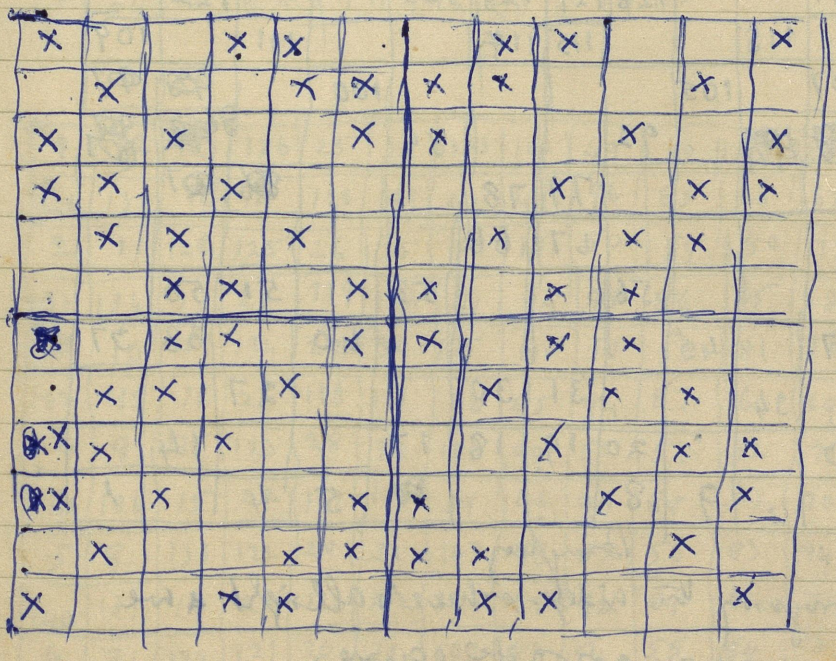
Here it
looks as if
Planet's rule
has since
2y-134, p. 35
y B 2 J
av. at

870
870
870
870
870

870
870
870

Take the index rod | X | | | X | X | for $n = 12$

The index-scheme is



and the magic square
readily by applying this index scheme to the
fundamental generative square as
shown on next page

145			141	140			137	136			133
	131			128	127	126	125			122	
120		118			115	114			111		109
108	107		105					100		98	97
[illegible]	[illegible]	[illegible]		92			89			86	[illegible]
					79	78			[illegible]	87	
					67	66					
				56			53		51	50	
48	47		45					40		38	37
36		34			31	30			27		
	23			20	19	18	17			14	
12			9	8			[illegible]	5	4		1

Bungling

Anyway the wide-scheme is allright & we will get an associated square.

Partners square split

Q, is

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

0	0	48	48
56	56	8	8
0	0	48	48
56	56	8	8

The root square (R) not obtained from (P) by interchanging rows & cols in (P) and then changing to root numbers

This is just like Franklin's square

Is Portrait square knight nasik?

1 + 12 + 46 + 39 + 3 + 10 + 48 + 37 = 156

1 + 9 + 48 + 38 + 3 + 11 + 46 + 40 = 196

870

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

Not magic in rows.

I have taken jumps for every multiple of 12 ie

12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132.

For n = 8, jumps at 8, 8, 24, 40, 56 ie odd multiples

For n = 16 jumps at 16, 32, 48; 80, 96, 112; 144, 160, 176; 208, 224, 240
1, 2, 3; 5, 6, 7; 9, 10, 11; 13, 14, 15

n = 12 jumps at ?

Omit this

~~31+17+46+29~~ =

~~2 + 45~~

3 + 16 + 50 + 61

33 + 48 + 20 + 29

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

1 58 59 4 5 62 63 8

9 50 51 12 13 54 55 16

17 42 43 20 21 46 47 24

25 34 35 28 29 38 39 32

33 26 27 36 37 30 31 40

41 18 19 44 45 22 23 48

49 10 11 52 53 14 15 56

57 2 3 60 61 6 7 64

224

288

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

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

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

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

26 4
25 6

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

(A)

b-numbers in two steps

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

reversing 2 associated pairs of ~~vertical~~ columns only

This is identical with fig. 567, p. 297
i.e. our fig. 157 of p. 38.

Suppose we reverse 2nd & 7th cols
and 4th & 5th cols in (A)

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

alternative associated square.

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

1, 2, 3, 4, 5, 6, 7, 8
0, 8, 16, 24, 32, 40, 48, 56

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

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

Chinese 8 x 8 square. (from Kashinath)

(P) (R)

$Q_1 =$

8	1	1	8	24, 40, 48, 0
2	7	7	2	32, 16, 8, 56
3	6	6	3	32, 16, 8, 56
5	4	4	5	24, 40, 48, 0

$Q_2 =$

8,	1,	1,	8	56, 8, 16, 32
2,	7,	7,	2	0, 48, 40, 24
3,	6,	6,	3	0, 48, 40, 24
5,	4,	4,	5	56, 8, 16, 32

$Q_3 =$

4, 5, 5, 4	24, 40, 48, 8
6, 3, 3, 6	32, 16, 8, 56
7, 2, 2, 7	32, 16, 8, 56
1, 8, 8, 1	24, 40, 48, 0

$Q_4 =$

4, 5, 5, 4	56, 8, 16, 32
6, 3, 3, 6	0, 48, 40, 24
7, 2, 2, 7	0, 48, 40, 24
1, 8, 8, 1	56, 8, 16, 32

6	7	1	4

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

(P)

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

13

$a_1 = 2, b_1 = 3, c_1 = 6, d_1 = 5$

$Q_1(R) =$ interchange of $Q_3(P) = Q_4(P)$

$Q_2(R) =$ " $Q_1(P) = Q_2(P)$

$Q_3(R) = Q_1(R)$,

$Q_4(R) = Q_2(R)$

2	6	3	5
3	5	2	6
6	4	7	3
7	3	6	4

$a_1 = 2$	2	7
$b_1 = 4$	3	6
$c_1 = 5$	5	4
d_1	8	1

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

$a_1 = 2$
$b_1 = 5$
$c_1 = 3$
$d_1 = 8$

$a_1 + b_1 + c_1 + d_1 = 18$

0, 1, 0,
1, 2, 3, 4, 5, 6, 7, 8
0, 8, 16, 24, 32, 40, 48, 56

Andrews: Fig. 449, p. 256 which is a & n split

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

(P)

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

(R)

BR. 20 p. 99 an alternative one a & n obtained

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

(P)

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

(R)

BR. 20, 99, Fig. 468, p. 266 of Andrews split
(due to Fresson) — both a & n

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

(R)

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

(P)

B. J's Th^ 49, p. 68 split

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

(P)

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

(R)

a_1	b_1	c_1	d_1
a_2	b_2	c_2	d_2
a_1	b_1	c_1	d_1
a_2	b_2	c_2	d_2

Q_1

a_2	b_2	c_2	d_2
a_1	b_1	c_1	d_1
a_2	b_2	c_2	d_2
a_1	b_1	c_1	d_1

Q_2

$Q_3 = Q_1$ and $Q_4 = Q_2$
& $\Delta(R)$ is obtained by interchanging rows & cols of (P).

Bk. 27.

(1) Fig. 468, p. 266 of Andrews (a & x) split

(this is done on p. 82)

(2) Fig. 567, p. 296 of Andrews (a only) split

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

(P)

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

(R)

(3) Fig. 716, p. 391 of Andrews (a & x) ~~split~~ & 4-ply (split)

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

(P)

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

(R)

(R) obtained by interchange of rows & cols

(4) Fig. 720, p. 391 of Andrews (a & x)

split

(5) Fig. 732, p. 396 (Andrews) [4-pl, Franklin, nasik]

1	6	1	8
6	3	6	3
8	1	8	1
3	6	3	6

1	8	1	8
6	3	6	3
8	1	8	1
3	6	3	6

2	7	2	7
5	4	5	4
7	2	7	2
4	5	4	5

2	7	2	7
5	4	5	4
7	2	7	2
4	5	4	5

(P)

4	2	8	7
8	7	1	2
1	2	8	7
8	7	1	2

3	4	6	5
6	5	3	4
3	4	6	5
6	5	3	4

1	2	8	7
8	7	1	2
1	2	8	7
8	7	1	2

3	4	6	5
6	5	3	4
3	4	6	5
6	5	3	4

(R)

each corner subsquare of order 4 is nasik

(4) Fig. 720, p. 391 of Andrews (a & n & 4-pl)

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

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

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

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

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

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

(P)

R_2 reversed in rows.

R_1 reversed in rows.

(R).

(6) Fig. 734, p. 397 of Andrews (nasik, 4-pl, & knight's resid)

1, 8, 1, 8 4, 5, 4, 5 2, 7, 2, 7 3, 6, 3, 6	1, 8, 1, 8 4, 5, 4, 5 2, 7, 2, 7 3, 6, 3, 6 $Q_2 = Q_1$	1 5 3 7 8 4 6 2 1 5 3 7 8 4 6 2	8 4 6 2 1 5 3 7 8 4 6 2 1 5 3 7
8, 1, 8, 1 5, 4, 5, 4 7, 2, 7, 2 6, 3, 6, 3 (P)	$Q_4 = Q_3$	$Q_4 = Q_1$	$Q_3 = Q_2$ (R)

(7) Fig. 750, p. 410 of Andrews (nasik, central 4×4 also nasik, 4×4 poly & concentric)

5, 4, 3, 6 1, 8, 7, 2 7, 2, 1, 8 3, 6, 5, 4	7, 2, 1, 8 3, 6, 5, 4 5, 4, 3, 6 1, 8, 7, 2	6, 4, 5, 3 7, 1, 8, 2 4, 6, 3, 5 1, 7, 2, 8	$Q_2 = Q_1$
6 3 4 5 2 7 8 1 8 1 2 7 4 5 6 3 (P)	8, 1, 2, 7 4, 5, 6, 3 6, 3, 4, 5 2, 7, 8, 1	6, 4, 5, 3 7, 1, 8, 2 4, 6, 3, 5 1, 7, 2, 8	$Q_3 = Q_4$.

Figs. 91, 92, 95 pp. 43 of Andrews all associated by N-method

Fig. 261, p. 165 of Andrews due to Falkener & claimed by him to be the "most perfect of 8×8 that can be constructed". — gives 5 properties that neither a nor n but still has ornate

5

Omitted properties just like translations which is not even a magic square. He refers ~~in~~ ~~to~~ in his book to "Indian Brahmins" and so I must refer to this square. Splitting this begs

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

(P)

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

(R)

$Q_1 = Q_2 = Q_3 = Q_4$.

In addition to the five properties mentioned by Talkeur we have the translation property of each half row & half column summing to 130. This is a consequence of property 3.

Only 4 bent diagonals are first from each side sums 260. Also the four corners $46 + 59 + 53 + 34 + 20 + 7 + 11 + 30 = 260$

Fig. 262, p. 165 (Nasik) when split is reads

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

(P)

$Q_4 = Q_1$
$Q_3 = Q_2$

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

(R)

$x \leftrightarrow c$ in (P) gives (R)

(1) This is nasik (2) This is 2×2 gavia (3) It is Knight-nasik

$1 + 14 + 24 + 27 + 57 + 54 + 48 + 35 = 260$
$3 + 33 + 46 + 56 + 59 + 25 + 22 + 16 = 260$
$60 + 24 + 7 + 46 + 61 + 17 + 2 + 43 = 260$
$8 + 27 + 62 + 25 + 1 + 42 + 59 + 20 = 260$

55+6+44+25 = 130. 3+14+45+36 = 98

Fig. 265, p. 167 of Andrews by Freeson — 10 properties not omit enough — omit this

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

(P)

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

(R)

Fig. 267, p. 169 seems more interesting & may be split as done above most interesting (P) & (R). Not connected by r ↔ c. It is nasik & also quadrants are nasik (not noticed by Freeson). Also Franklin square property of half rows & half cols. summing to 130 holds (not noticed by F). The 4 exceptions to 2x2 Jaina are formed by those in the middle two rows.

2	7
48	41

82	59
20	21

10	15
40	33

54	51
28	29

All bent diagonals sum 260 — Also the property i.e. diametrically equivalently distant numbers from the centre summing to 130

1 + 52 + 47 + 30 = 130 ✓
59 + 10 + 21 + 40 = 130 ✓
6 + 55 + 44 + 25 = 130 ✓
64 + 13 + 18 + 35 = 130 ✓

holds only for the centre & not for every point as in Franklin square

Is it knight nasik? no

64 + 63 + 53 + 54 + 48 + 47 + 37 + 38 = 404 ✗

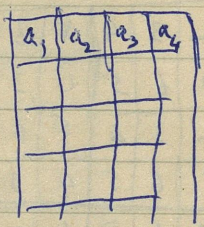
Any way include this

omit Figs 268, 269, 270.

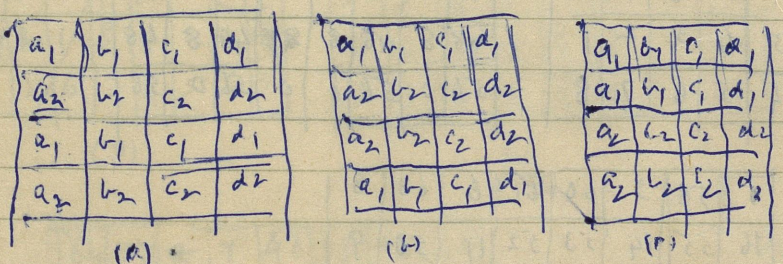
From Book I on 8×8 squares

(A) Associate squares

Form Q_1

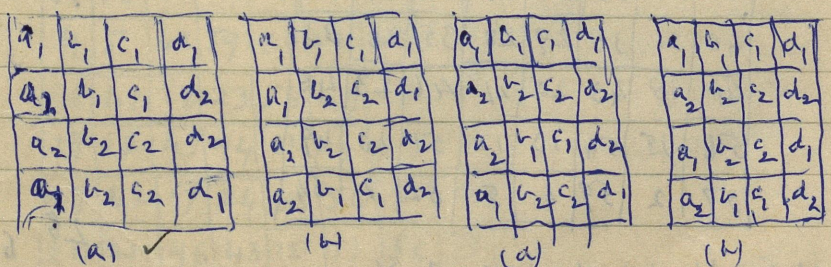


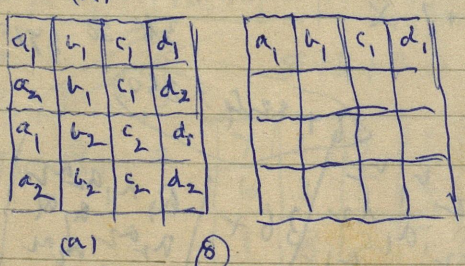
(1)



Q_2 formed on Q_1'; Q_3 and Q_4 formed by associate property.

(2)





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

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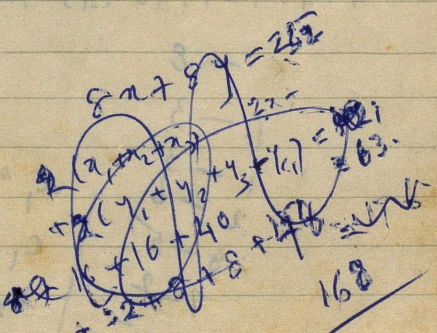


1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1
1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1
8	7	6	5	4	3	2	1
1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1
1	2	3	4	5	6	7	8

+

0	56	0	56	56	0	56	0
8	48	8	48	48	8	48	8
16	40	16	40	40	16	40	16
24	32	24	32	32	24	32	24
32	24	32	24	24	32	24	32
40	16	40	16	16	40	16	40
48	8	48	8	8	48	8	48
56	0	56	0	0	56	0	56

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

$1+14+45+34+40+43+12+7 \times$

$8-8$
$7-3$
$1-3$
$2-6$
$8-5$
$7-2$
$1-2$
$2-7$

$a_1 a_2 b_1 b_2$
$c_1 c_2 d_1 d_2$
$b_2 b_1 a_2 c_1$
$d_2 d_1 c_2$

$36+224=260$

$36+$ $a_1 a_1 a_2 a_2$
$a_2 a_2 a_1 a_1$
$a_1 a_1 a_2 a_1$
$a_2 a_2 a_1$

Variation of Fig. 265, p. 167 of Andrews (Friesen)

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

(P)

+

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

R_1

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

292

not even magic

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

8+4+3+1

Inj for R_1 =

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

40 32

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

(P)

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

(R)

Adding ways

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

292

228

not magic in diagonals

~~I think I must take [illegible] 267, [illegible] 169 Andrews~~

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

Choices for a & n

(1) Bk. 1 - Fig. 175, p. 177.

~~(2) Bk. 20, p. 99 with same (P) and (R.)~~

~~(3) Fig. 716, p. 391 of Andrews~~. Fig. 449, p. 258 Andrews,

(4) Fig. 716, p. 391 of Andrews

~~order 12~~ Case of rather a nor n — Fig. 261, p. 165 of Andrews (Also p. 85' of this book)

order 12; (1) Fig. 736, p. 398 Andrews (Also p. 402)

(2) Fig. 721, p. 392 Andrews (Also p. 397)

order 16 -

(1) Fig. 738, p. 400 of Andrews (Also p. 402-403)

(2) Fig. 741, p. 403 of Andrews.

(3) Bk. 1. Fig. 217, p. 207.

~~Miscellaneous methods~~

(1) b-numbering methods to come under choice of quadrants.

~~(2) Fig. 750, p. 410 of Andrews~~

0	1	4	5	3	8	5	2
7	4	1	6	5	2	3	8
2	5	8	3	4	7	6	1
8	3	2	5	6	1	4	7
2	5	8	3	4	7	6	1
8	3	2	5	6	1	4	7
1	6	7	4	3	8	5	2
7	4	1	6	5	2	3	8

0	16	40	56	32	48	8	24
16	0	56	40	48	32	24	8
56	40	16	0	24	8	48	32
40	56	0	16	8	24	32	48
8	24	32	48	40	56	0	16
24	8	48	32	56	40	16	0
48	32	24	8	16	0	56	40
32	48	8	24	0	16	40	56

$f+7$

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

$a_1 = 2$ | 8 48
$b_1 = 3$ | 16 40
$c_1 = 5$ | 32 24
$d_1 = 8$ | 56 0

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

126 + 72 + 25 + 79 + 119 + 85 + 23 + 77 + 121 + 67 + 21 + 75
= 870 ✓

133 + 81 + 10 + 64 + 132 + 77 + 14 + 68 + 128 + 73 + 18 + 72
= 870 ✓

(68, 69, 71, 72) (4, 5, 7, 8)

130 + 74 + 14 + 68 + 128 + 73 + 18 + 72 = 580

2 + 285 + 6 + 287 = 580 ✓

72 + 181 + 10 + 97 = 290 + 107 + 130 + 50

1 + 71 + 123 + 95 = 290 (980) 1, 71, 123, 114

(i) Whole is a nasik square with S = 870

(ii) The four 8 × 8 squares inside the square are also nasik with S = 580

(iii) Each of the ~~six~~ nine quadrants is nasik with S = 290.

~~(iv) Every 3 × 3 square contained in each quadrant.~~

(v) ~~has its~~ Each quadrant contains four 3 × 3 squares whose corner elements sum to 290 & which have equal sums along its diagonals

(iv) Every 2 × 2 subsquare of each of the quadrants sums to 290 ie each quadrant is 2 × 2 Jacobi

~~(vi) Every 5 × 5 square contained within the main square has its corner elements as integers of the form (n, n+1, n+3, n+4) and has its~~ every 5 × 5 square within the form ~~8 × 8 square has its diagonal sums equal or differing by two.~~

(vii) Every 6 × 6 square within the main square has the sum of its corner elements equal to 290 or differing from it by two

(viii) The sums of diagonal elements of any 7 × 7 square within the main square are equal or differ by four.

(ix) Corner elements of 9 × 9 square of the form n, n−2, n+6, n+8 and sum of diagonal elements equal or differ by four.

(x)

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

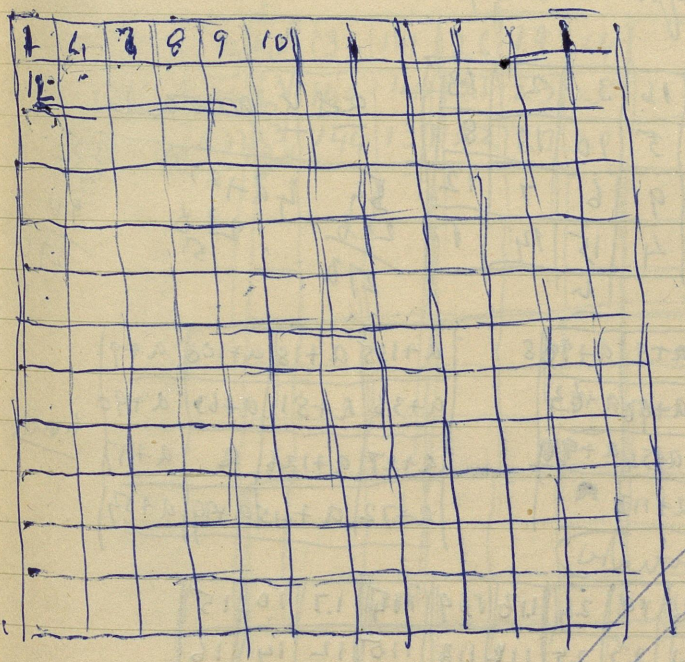
17 x 8 = 136

65

30 Days **JUNE 1980** 6th Month (91)

1, 2, 9, 10, 13, 14, 5, 11

रविवार २९ जून १९८० **SUNDAY 29** अषाढ़ बदी १ सं० २०३७



137

Composite squares 3×4

8	1	6
3	5	7
4	9	2

a

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

b

a & b associated

54
216
270

4a+270
216
54

135
215
90
270

a+135	a+18	a+9	a+108
a+36	a+81	a+90	a+63
a+72	a+45	a+54	a+99
a+27	a+126	a+117	a

associated

a+135	a+18	a+108	a+9
a+36	a+81	a+63	a+90
a+27	a+126	a	a+117
a+72	a+45	a+99	a+54

Nasik

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

6
1/4
870

138 (92)

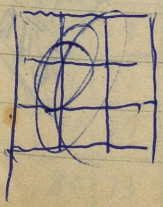
a+72	a+9	a+2	143	136	141	26	19	24
a+27	a+45	a+6	138	140	142	21	23	25
a+36	a+8	a+18	139	144	137	22	27	20

621
144

71
4
58
72
5
59
70
6
60
405
369
36

17	10	15	116	109	114
12	14	16	111	113	115
13	19	11	112	117	110
98	91	96	71	64	69
93	95	97	66	68	70
94	99	92	67	72	65

114	109	116	15	10	17
115	113	111	16	14	12
110	117	112	11	18	13
69	64	71	96	91	98
70	68	66	97	95	93
65	72	67	92	99	94



Interchange (a+9) & (a+108)
(a+63) & (a+63
replacement [illegible]

80	73	78	53	46	51
75	77	79	48	50	52
76	81	74	49	54	47
35	28	33	134	127	132
30	32	34	129	131	133
31	36	29	130	135	128

31	36	29	130	135	128
30	36	29	130	135	128
30	32	34	129	131	133
35	28	33	134	127	132
76	81	74	49	54	47
75	77	79	48	50	52
80	73	78	53	46	51

53	46	51
48	50	52
49	54	47

Interchange (a+27) & (a+72)
& (a+45) & (a+126)
& reflect horizontally

62	55	60	98	91	96
57	59	61	93	95	97
58	63	56	94	99	92
125	118	123	8	1	6
120	122	124	3	5	7
121	126	119	4	9	2

121	126	119	4	9	2
120	122	124	3	5	7
125	118	123	8	1	6
58	63	56	94	99	92
57	59	61	93	95	97
62	55	60	98	91	96

231

2	9	4	119	126	121
7	5	3	124	122	120
6	1	8	123	118	125
92	99	94	56	63	58
97	95	93	61	59	57
96	91	98	60	55	62

8	1	6
3	5	7
4	9	2

2	9	4
7	5	3
6	1	8

Interchange a & (a+52)
(a+117) & (a+99)
& rotate through 180°

(870)

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

31 Days **JULY 1980** 7th Month

शुक्रवार ४ जुलाई १९८० **FRIDAY 4** अषाढ़ बदी ७ सं० २०३७

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

2nd col ⟷ 4th

3rd col ⟷ 7th

6th col ⟷ 8th

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

10, 13, 16, 11, 14, 17, 12, 15, 18

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

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

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

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

1, 4, 7 | 2, 5, 8 | 3, 6, 9 | 4, 7, 10 | 5 X 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

31 Days JULY 1980 7th Month

1, 3, 5, 7, 9 | 2, 4, 6, 8, 10 | 11, 13

(94)

शनिवार ५ जुलाई १९८० **SATURDAY 5** अषाढ़ बदी ८ सं० २०३७

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

			21	1	14			
			5	12	19			
			10	23	3			
24	4	17	54	34	38			
8	15	22	27	45	52			
13	26	6	43	41	36			
48	28	41				27	7	11
32	39	46				2	18	25
37	50	30				16	20	9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20										
31	32	33	34	35										
46	47	48	49	50										
61	62	63	64	65										
76														
91														
106														
121														
136														
151														
166														
181														
196														
211														

1, 4, 7, 10
2, 5, 8, 11
3, 6, 9, 12

1, 3, 5; 2, 4, 6; 7, 9, 11, 8, 10, 12

47	1	2	4	40	42	39
7	34	13	15	31	32	43
9	17	28	21	26	33	41
12	20	23	25	27	30	38
44	36	24	29.	22	14	6
45	18	37	35	19	16	5
11	49	48	46	10	8	3

49

~~(32, 49)~~

1, 12; 13, .. 20; 21, .. 29, 30, .. 37, 38, .. 49

(1, .. 8), (9, .. 17), (18, .. 25)

~~a = a + d + D.~~

~~x - z =~~ $x = 13$ $a = 6, d = 3, D = 4.$

$z = 1, y = 7$

$a + d + D = x.$ $d + D = y - z.$

~~a~~ $a = x - y + z.$ $x - y + z +$

$a + 2d + 2D = x + y - z.$

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

5, 6, 7, 9, 10, 14, 17, 18

30, 31, 34, 38, 39, 41, 42, 43.

5, 6, 7, 9, 10, 17.

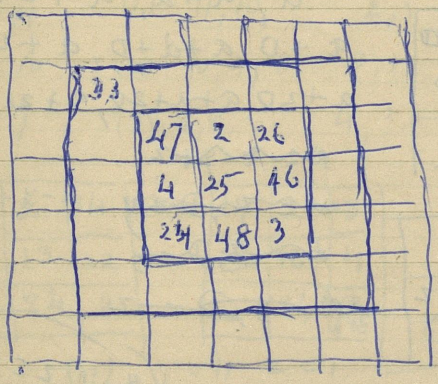
31, 38, 39, 41, 42, 43

~~4, 10, 17, 7, 43~~

~~31, 38, 39~~

7, 38, 43 } 6, 9, 17 }

41, 10, 5 } 31, 39, 42 }



1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21
22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37
38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49

$a_1 = 35$

$a_1 \; a_2 \; a_3 \; a$

1, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 49] $n = 7$.

16, 17, 18, 19, 20, 21, 22, 23
27, 28, 29, 30, 31, 32, 33, 34] $n = 5$.

6, 7, 8, 10, 11, 15, 18, 19
31, 33, 35, 39, 40, 42, 43, 44

$a_1 + a_2 + a_3 + a_4 + a_5 = 120$
$a_1 + a_6 + a_7 + a_8 + a_5 = 72$.

Choose $a_1 = 14$
$a_5 = 18$

$a_7 + a_3 + a_1 = 88$
$a_6 + a_7 + a_5 = 76$

$a+d+2D$	a	$a+2d+D$
$a+2d$	$a+d+D$	$a+2D$
$a+D$	$a+2d+2D$	$a+d$

$a,\ a+d,\ a+2d$

$a+D,\ a+d+D,\ a+2d+D$

$a+2D,\ a+d+2D,\ a+2d+2D$

~~$a = x-y+z$~~

~~$d = z,\ D = y$~~ $x-y+2y$

~~$d = -z,\ D = y$~~

~~$d = y,\ D = -z$~~

$x-z$	$x-y+z$	$x+y$
$x+y+z$	x	$x-y-z$
$x-y$	$x+y-z$	$x+z$

$y = 1,\ z = 10$

$y = 10,\ z = 1$

~~$a = 1,\ d = 1,\ D = y = 1,\ z = -11$~~

~~$x-y+z = 13,\ x = 13+y-z$~~

~~$a+1-11 = 13,\ a = 23.$~~ $= 13+1+11 = 25$

1, 2, 3

12, 13, 14

23, 24, 25

24	1	13
3	12	23
11	25	2

$a = x-y-z.$

$d = z,\ D = y.$

14	1	24
23	13	3
2	25	12

$x+y-z$	$x-y-z$	$x+y$
~~$x+y-z$~~ $x+y-z$	x	~~$x+y+z$~~ $x-y+z$
~~$x-y$~~ $x-z$	$x+y+z$	$x-y$

24	1	14
3	13	23
12	25	2

$x = 13,\ z = 1,\ y = 11$

$a = 1,\ d = 4,\ D = 8$

2600

18	1	17
9	13	17
9	19	5

X

$13-1-2 = 0$ (repeating)

	10	
12	13	
12		11

1875
650
1225
23

$\frac{1248}{48} = \frac{104}{4} = 26$

14	2	23
22	13	4
3		

13 - 1 - 1 = 11

बुधवार ९ जुलाई १९८० WEDNESDAY 9 अषाढ़ बदी १२ सं० २०३७

1 - 11 (1) 11, 10, ... 2, 1 — 66

2 - 10 (2) 10, 9, 8, ... 3, 1. — 9 | 10

3 - 9 (3) 9, 8, ... 4, 2, 1 — 9.

$x-y-z$, $x=y$, $x-y+z$

$xz-z$, x, $xz+z$

$x+y-z$, $x+y$, $x+y+z$

23	2	14
14	13	22
12	24	3

11	2	23
22	13	4
3	24	12

2, 3, 4

12, 13, 14

22, 23, 24

(i) $y = 11$, $z = 1$.

$1+2+3+\dots+10 = \frac{1}{2} \cdot 10 \cdot 11$.

$\frac{1}{2}(n^2+1) - 3 = \frac{1}{2}(n^2-5)$.

$\frac{1}{2} \cdot \frac{1}{2}(n^2-5)\left\{\frac{1}{2}(n^2-5)+1\right\}$

$= \frac{1}{4}(n^2-5) \cdot \frac{1}{2}(n^2-3)$

$= \frac{1}{8}(n^4 - 8n^2 + 15)$.

$(3n^4 - 26n^2 + 23)$

$(n^2-1)(3n^2-23)$

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

$z = 1$, $y = 3$

$(3+26+23)/48$

$\frac{1}{2}(n^2+1) - 2 = \frac{1}{2}(n^2-3)$

$\frac{1}{2} \cdot \frac{1}{2}(n^2-3)\left\{\frac{1}{2}(n^2-3)+1\right\}$

$\frac{1}{8}(n^2-3)(n^2-1)$

69.

$23+3$

$(n^2-1)(3n^2-23)$

21780

21384

396

centre nucleus 16 · 1 115

16	9	14
11	13	15
12	17	10

$x+y$	$x-y-1$	$x+z$
$x-y+1$	x	$x+y-z$
$x-z$	$x+y+z$	$x-y$

$x-y-z$, $x-y$, $x-y+z$

$x-z$, x, $x+z$

$x+y-z$, $x+y$, $x+y+z$

343×7 / 2401

7203 / 23 / 7226 / 1274

49×26 / 294 / 98 / 1274

5952 / 48 = 372 / 3 = 124 cows

21780

गुरुवार १० जुलाई १९८० **THURSDAY 10** अषाढ़ बदी १३ सं० २०३७

62

$\frac{174,240}{8} = 21780$

$\frac{21780}{36} = \frac{2420}{4} = \frac{605}{594}$

11

605×36
3630
1815
21780

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

$11 - z.$

$12 - z.$

$13 - y - z.$

$y = 1, z = 1, 2, \ldots, 11$
$y = 2, z = 1, 2, \ldots 10$

$y = 1, z = 11.$
$y = 2, z = 10$

14	1	24
23	13	3
2	25	12

15	1	23
21	13	5
3	25	11

$x+y$	$x-y-z$	$x+z$
$x-y+z$	~~$x+y$~~ x	$x+y-z$
$x-z$	$x+y+z$	$x-y$

11
10
9

$y = 1, z = 2$

	10	15
14	12	11
11		12

$\left\{ \begin{array}{lll} x-y-z, & x-y, & x-y+z \\ x-z, & x, & x+z \\ x+y-z, & x+y, & x+y+z \end{array} \right\}$

$x+y-z = x-y.$

$y = 3, z = 1, 2, \ldots 9$
$y = 9, z = 1, 2, 3.$
$y = 10, z = 1, 2$
$y = 11, z = 1$

$1 + \ldots + 11$

$\frac{1}{2} \cdot 11 \cdot 12$

66

$\frac{1}{2}(n^2+1)-3$

$n=13$ $\frac{1}{2}(n^2+1)-2$

$\frac{1}{2}(n^2-3)$

66 (33)

$y=1,\ z=\cancel{1},\cancel{2}$ 11,
$y=2,\ z=\cancel{1},\cancel{2},$ 10.
$y=3,\ z=\cancel{1},\cancel{2},\cancel{3},$ 9.
$y=4,\ z=\cancel{1},\cancel{2},\cancel{3},\cancel{4}$ 8
$y=5,\ z=1,2,$ 7
$y=6,\ z=1,2,$ 6
$y=7,\ z=1,2,$ 5
$y=8,\ z=1,2,$ 4
$y=9,\ z=1,2,3$
$y=10,\ z=1,2.$
$y=11,\ z=1$ 13 9

$y=3,\ z=1.$ $y=1,\ z=2.$

$y=2,\ z=1$

	10	
12		
		11

12	10	15
14	13	10
11	14	10

$y=1,\ z=11$

14	1	24
23	13	3
2	25	12

~~$x-y-z=11,\ y=1,\ z=1$~~

$y=2,\ z=3$
$y=3,\ z=2$
~~$y=2,\ z=0.$~~
$y=1,\ z=14$
$y=4,\ z=1$
refl

14	8	17
16	13	10
9	18	12

17	8	14
10	13	16
12	18	9

$9+8+6+4+2$

$a=10,\ d=1,\ D=2$
$d=2,\ D=1$

	10	15
12	13	12
11		12

$a+d+D=\frac{1}{2}(n^2+1)$

$d=3$, $D=1$ } $d=1$, $D=3$

14	9	16
15	13	11
10	17	12

reflection

14	9	14
11	13	15
12	17	10

$x-y-z.$

$y=1,\ z=1$ $n=11$

$\frac{1}{2}(n^2+1)=25$ 23, 22, 21, 20, 19, 18, 17,
$21+20+18+16+14+12+11$ 1981

$\frac{1}{2}(n^2+1)-2$
$\frac{1}{2}(n^2-3)$

$1 + 2 + \frac{2}{2}(n^2-3)$

$\frac{1}{2}\cdot\frac{1}{2}(n^2-3)\left\{\frac{1}{2}(n^2-3)+1\right\}$

$\frac{1}{4}(n^2-3)\cdot\frac{1}{2}(n^2-1)$

$= \frac{1}{8}(n^2-1)(n^2-3)$

$x-y-z,\ x-y,\ x-y+z$

$x-z,\ x,\ x+z$

$z+y-x,\ x+y,\ x+y+z$

$\frac{1}{8}(n^2-1)(n^2-3) - \frac{1}{48}(n^2-1)(3n^2-2)$

$x+y$	$x-y-z$	$x+z$
$x-y+z$	x	$x+y-z$
$x-z$	$x+y+z$	$x-y$

$\frac{1}{48}(n^2-1)\left\{6n^2-18-3n^2+23\right\}$

$\frac{1}{48}(n^2-1)(3n^2+5)$

(13)

$\frac{1}{8}(24)(\ldots) - \frac{1}{48}(24)(\ldots)$

$66 - 40 = 26$

$\frac{1}{8}(6)(46) - \frac{1}{48}(48)(\ldots)$

$276 - 121 = 152$

$276 -$

$x+2+3$

191
147

66 − 41 = 12

×

	11	
12		12

$y=1, z=1$

repetition $x-y=x-y$

×

14	10	15
14	13	12
11	16	12

$y=1, z=2$

repetition $x+y-z=x-y$

$z=2y$

✓

14	9	16
15	13	11
10	17	12

$y=1, z=3$

✓

14	8	17
16	13	10
9	18	12

$y=1, z=4$

✓

14	7	18
17	13	9
8	19	12

$y=1, z=5$

14	6	19
18	13	8
7	20	12

$y=1, z=6$

14	5	20
19	13	7
6	21	12

$y=1, z=7$

11	4	23
20	13	6
5	22	12

$y=1, z=8$

14	3	22
21	13	5
4	23	12

$y=1, z=9$ ✓

14	2	23
22	13	4
3	24	12

$y=1, z=10$ ✓

14	1	24
23	13	3
2	25	12

$y=1, z=11$ ✓

→ 9 cases.

$x+y-z = x-y$

$z=2y$

	10	
12		
12		11

$y=2, z=1$ ✗

repetition

$x-y+z=x-z$

$y=2z$

$y=2, z=2$ ✗

repetition

$x-y=x-z$

$x+y=x+z$

15	8	16
14	13	12
10	17	11

$y=2, z=3$ ✓

	7	17
15	13	11
9		11

$y=2, z=4$ ✗

$z=2y$

15	6	18
16	13	10
8	20	11

$y=2, z=5$ ✓

15	5	19
17	13	9
7	21	11

$y=2, z=6$ ✓

15	4	20
18	13	8
6	22	11

$y=2, z=7$ ✓

15	3	21
19	13	7
5	22	11

$y=2, z=8$ ✓

15	2	22
20	13	6
4	24	11

$y=2, z=9$ ✓

15	1	23
21	13	5
3	25	11

$y=2, z=10$ ✓

→ 7 cases

16	9	14
11	13	15
12	17	10

$y=3, z=1$ ✓

16	8	15
12	13	14
11	13	10

$y=3, z=2$ ✓

$y=3, z=3$ ✗

16	6	17
14	13	12
9	20	10

$y=3, z=4$ ✓

16	5	18
15	13	11
8	21	10

$y=3, z=5$ ✓

$y=3, z=6$ ✗

16	3	20
17	13	9
6	23	10

$y=3, z=7$ ✓

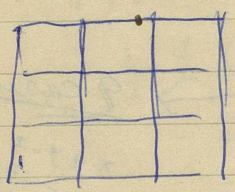
16	2	21
15	13	12
5	24	10

$y=3, z=8$ ✓

16	1	22
10	13	7
4	25	10

$y=3, z=9$ ✓

→ 7 cases



$y=4, z=1$

$y=4, z=1$ ✓
$y=4, z=2$ ✗
$y=4, z=3$ ✓
$y=4, z=4$ ✗

$y=4, z=5$ ✓
$y=4, z=6$
$y=4, z=7$
$y=4, z=8$ ✗

5 Cases.

$y=5, z=1$ ✓
$y=5, z=2$ ✓
$y=5, z=3$ ✓
$y=5, z=4$ ✓
$y=6$

$y=5, z=5$ ✗
$y=5, z=6$
$y=5, z=7$ ✓

6 cases.

$y=6, z=3$ ✗
$y=6, z=6$ ✗

4 Cases

$y=7 \rightarrow 5$ cases
$y=8 \rightarrow 3$ cases.
$y=9 \rightarrow 3$ cases
$y=10 \rightarrow 2$ cases
$y=11 \rightarrow 1$ case

52 cases.

Reducing $n=7$, $\frac{1}{2}(n^2+1) = 25$

(2) $y=1 \rightarrow 23 \rightarrow 21$
(3) $y=2 \rightarrow 22 \rightarrow 19$
(2) $y=3 \rightarrow 21 \rightarrow 19$
(3) $y=4 \rightarrow 20 \rightarrow 17$
(2) $y=5 \rightarrow 19 \rightarrow 17$
(2) $y=6 \rightarrow 18 \rightarrow 15$
(2) $y=7 \rightarrow 17 \rightarrow 15$
(3) $y=8 \rightarrow 16 \rightarrow 13$
(1) $y=9 \rightarrow 15 \rightarrow 14$
(2) $y=10 \rightarrow 14 \rightarrow 12$
(1) $y=11 \rightarrow 13 \rightarrow 12$
(2) $y=12 \rightarrow 12 \rightarrow 10$

$y=13 \rightarrow 11 \rightarrow 11$ — (8) 248
$y=14 \rightarrow 10 \rightarrow 9$ — (1) 124 ✓
$y=15 \rightarrow 9 \rightarrow 9$ — (0)
$y=16 \rightarrow 8 \rightarrow 7$ — (1)
$y=17 \rightarrow 7 \rightarrow 7$ — (0)
$y=18 \rightarrow 6 \rightarrow 6$ — (0)
$y=19 \rightarrow 5 \rightarrow 5$ — (0)
$y=20 \rightarrow 4 \rightarrow 4$ — (0)
$y=21 \rightarrow 3 \rightarrow 3$ — (0)
$y=22 \rightarrow 2 \rightarrow 2$ — (0)
$y=23 \rightarrow 1 \rightarrow 1$ — (0)

$x-4$,

5 Cases. $n=5$

$y=1 \to 11 \to 9$ (2)

$y=2 \to 10 \to 7$ (3)

$y=3 \to 9 \to 7$ (2)

$y=4 \to 8 \to 5$ (3)

$y=5 \to 7 \to 6$ (1)

$y=6 \to 6 \to 4$ — (2)

$y=7 \to 5 \to 5$ — (0)

$y=8 \to 4 \to 3$ — (1)

$y=9 \to 3 \to 3$ — (0)

$y=10 \to 2 \to 2$ — (0)

$y=11 \to 1 \to 1 \to$ (0)

$(x-4)+(x-6)+(x-6)+(x-8)$

$\Sigma(n^2+1) = x.$

For $n=5$, (2), (3) twice
(1), (2) once
(0), (1) once
(0), (0), (0) thrice

For $n=7$, (2), (3) 4 times
(1), (2) twice
(0), (1) twice
(0) (0) — 7 times

$(x-4)+(x-6)+(x-6)+(x-8)+(x-8)+(x-10)+(x-10)+(x-12)$

बुधवार १६ जुलाई १९८० **WEDNESDAY 16** अषाढ़ शुदी ४ सं० २०३७

b	$x+a-b$	$2x-a$
$3x-a-b$	x	$a+b-x$
a	$b-a+x$	$2x-b$

$x+a-b,\ 2x-b,\ 3x-a-b.$

$a,\ x,\ 2x-a$

$a+b-x,\ b,\ x-a+b.$

$a = x-2$

$b = x+y$

$x-2 < x+y$

$b < x$

$x < 2x+y-2$

$x \neq x+2y+2$

$z-y < x$

$x-2 = \frac{1}{2}(x-3)$

$\frac{1}{2}(2x-4-x+3)$, $\frac{1}{2}(x-1)$

$x-4 = 2y+1$

$2y = x-5$

$y = \frac{1}{2}(x-5)$

$\frac{1}{2}(n^2+1)-4$

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

$x = 25$

$x = 13,\ a = 9$

$x = 25,\ a = 21.$

$a = 1$

$(1,11), (2,10), (3,9)$

$(4,8), (5,7), (6,6)$

$(1, 4, 8)$

$a = 1$ to $x-4$

$d = 1,\ D = 23.$

$(1,23), (2,22), (3,21), (4,20), (5,19), (6,18), (7,17), (8,16)$

$(9,15), (10,14), (11,13), (12,12), \cancel{(13,11)}$ 10

$x-1 = 12$

$a = 1,\ d+D = x-1.$

$(1, x-2), (2, x-3), \ldots \left[\frac{1}{3}(x-1), \frac{2}{3}(x-1)\right]$

$\left[\frac{1}{2}(x-1), \frac{1}{2}(x-1)\right]$

$\frac{1}{2}(x-1)-2 = \boxed{\frac{1}{2}(x-5) \text{ cases}}$

$\frac{1}{2}(x-5)+1$

$\frac{1}{2}(x-3)$

$a = 2,\ d+D = x-2,\ (1, x-3), (2, x-4), \ldots \left[\frac{1}{2}(x-3), \frac{1}{2}(x-1)\right]$

$= \frac{1}{2}(x-3)$ cases

$a = 3,\ d+D = x-3 \rightarrow (1, x-4), \ldots \left[\frac{1}{2}(x-3), \frac{1}{2}(x-3)\right]$

$= \frac{1}{2}(x-3)-1 = \frac{1}{2}(x-5)$ cases

$a = 4,\ d+D = x-4 \rightarrow (1, x-4), \ldots \left[\frac{1}{3}(x-4), \frac{2}{3}(x-4)\right], \ldots \left\{\frac{1}{2}(x-5), \frac{1}{2}(x-3)\right\}$

$= \frac{1}{2}(x-5)$ cases.

$a = 5,\ d+D = x-5 \rightarrow (1, x-5), \ldots \left\{\frac{1}{2}(x-5), \frac{1}{2}(x-5)\right\} = \frac{1}{2}(x-7)$ cases.

$a = 6,\ d+D = x-6 \rightarrow (1, x-5), \left\{\frac{1}{2}(x-7), \frac{1}{2}(x-6)\right\} = \frac{1}{2}(x-7)$ cases

$a = 7,\ d+D = x-7 \rightarrow$

42
14
56

12, 6

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

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

31 Days **JULY 1980** 7th Month

गुरुवार १७ जुलाई १९८० **THURSDAY 17** अषाढ़ शुदी ५ सं० २०३७

$(0111, 1010, 1011, 0101)_3$ → mark square.

	0	r_1	$2r_1$	r_2	r_2+r_1	r_2+2r_1	$2r_2$	$2r_2+r_1$	$2r_2+2r_1$
0_4	0000	0111	0222	1010	1121	1202	2020	2101	2212
$2b_1$	2222	1122	1200	2021	2102	2210	0001	0112	0220
$2b_2$	2022	2100	2211	0002	0110	0221	1012	1120	1201
b_2	0101	0212	0020	1111	1222	1000	2121	2202	2010
b_2+b_1	1112	1220	1001	2122	2200	2011	0102	0210	0021
b_2+2b_1	2120	2201	2012	0100	0211	0022	1110	1221	1002
$2b_2$	0202	0010	0121	1212	1020	1101	2222	2000	2111
$2b_2+b_1$	2210	2021	1102	2220	2001	2112	0200	0011	0122
$2b_2+2b_1$	2221	2002	2110	0201	0012	0120	1211	1022	1100

1	14	27	31	44	48	61	65	78
32	45	46	62	66	79	2	15	25
63	64	77	83	13	26	33	43	47
11	24	7	41	54	28	71	75	58
42	52	29	72	73	59	12	22	8
70	74	60	10	23	9	40	53	30
21	4	17	51	34	38	81	55	68
49	35	39	79	56	69	19	5	18
80	57	67	20	6	16	50	36	37

nasik allright
different from
nasik series
method 367

6+36, 7+45, 2+27, 9+63, 1+72, 5+54, 3+9, 4+18, 8+0

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

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

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

3. 49, 6, 9, 2, 9, 3, 5

+8, 12, 15 12, 15, 9

108, 135, 81 216

$r_2 = 1001$ $1111 = r_2 + s_2$ } complete
$s_2 = 0110$ $1221 = r_2 - s_2$ } table

Take $(0111, 1001, 1011, 0110)$
$0, r_1, 2r_1, r_2, r_2+r_1, r_2+2r_1, 2r_2, 2r_2+r_1, 2r_2+2r_1$

0, 0111, 0222, 1001, 1112, 1220, 2002, 2110, 2221

$s_1 + s_2 = 1121$
middle term is

1121, 1202, 1010, 2122, 2200, 2011, 0120, 0201, 0012
44, 48, 31, 72, 73, 59, 16, 20, 6

24, 6, 15 // X

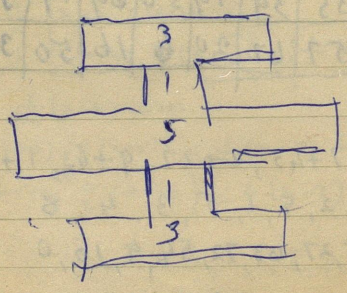
8, 3, 4, 9, 1, 5, 7, 2, 6 } non magic
36, 45, 27, 63, 72, 54, 9, 18, 0 } series

Take $(0111, 1100, 1110, 0011)$ $r_2 + s_2 = 1111$ } Complete table
$r_2 - s_2 = 1122$

0000, 0111, 0222, 1100, 1211, 1022, 2200, 2011, 2122,
$s_1 + s_2 = 1121$ middle term is
1121, 1202, 1010, 2221, 2002, 2110, 0021, 0102, 0210
44, 48, 31, 80, 57, 67, 8, 12, 22 ✱ 369
8, 3, 4, 8, 3, 4, 8, 3, 4 — non magic 24, 9, 12
36, 45, 27, 72, 54, 63, 0, 9, 18 — magic

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



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

1+11+44+34+33+43+12+42 = 150 ✗

2, 3, 6, 7
9, 12, 13, 16
17, 20, 21, 24
26, 27, 30, 31.

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

$\phi = 2$

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

$\phi = 3$

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

$q = 4$

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

$q = 1$

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

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

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

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

$q = 2$

+

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

$q = 3$

=

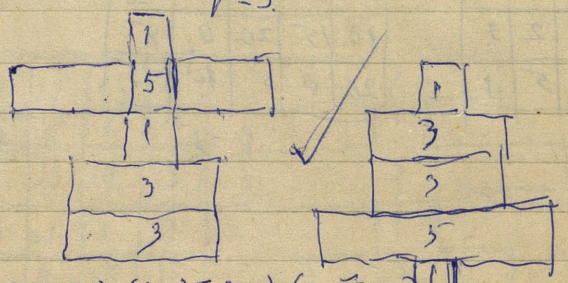
16	12	25	8	1
23	9	1	17	15
2	20	13	24	6
14	21	7	5	18
10	3	19	11	22

$1 \cdot 2 \cdot 3 \cdot 4 \cdot 5$

30 ways

$5 \cdot 1$

$2! \cdot 2!$



(1, 3, 5, 3, 1), (1, 3, 3, 5, 1), (1, 3, 5, 3, 1), (1, 5, 3, 3, 1)
(1, 1, 3, 3, 5), (1, 1, 5, 3, 3)

2, 3, 3, 4, 1 — 1, 2, 3, 4, 5 — (105)

1, 1, 3, 3, 5
1, 1, 3, 5, 3
1, 1, 5, 3, 3 — (3)

3, 3, 1, 1, 5
3, 3, — (3)

1, 3, 3 — 3, 1, 1, 3, 5 / 3, 1, — (6)

1, 3, 1, 3, 5
1, 3, 1, 5, 3
1, 3, 3, 1, 5
1, 3, 3, 5, 1
1, 3, 5, 1, 3
1, 3, 5, 3, 1 — (6)

1, 5, 1, 3, 3
1, 5, 3, 1, 3
1, 5, 3, 3, 1 — (3)

3, 3, 1, 1, 5 — (3)
3, 5, 1, 3, 1 — (3)
5, 1, 1, 3, 3 — (3)
5, 3, 1, 1, 3 — (3)

3 + 6 + 3 + 6 + 3 + 3 + 3 + 3 = 30

1, 3, 5, ... 2m−1, 2m+1, 2m−1, ... 5, 3, 1

$\frac{(2m+1)!}{(2!)^m}$ $\frac{7!}{(2!)^3}$ = $\frac{1\cdot2\cdot3\cdot4\cdot5\cdot6\cdot7}{8}$ = 630

1, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 47, 53, 71

1	59	7	31
	13	19	
	23	43	
	3	29	

39 = 1 + 7 + 31 = 3 + 5 + 31
= 3 + 7 + 29 = 3 + 13 + 23
= 3 + 17 + 19 = 5 + 11 + 23
= 7 + 13 + 19

1 + 7 + 31, 3 + 13 + 23 only 2 distinct sums

So 59 cannot be in a corner.

3	71	5	23
53	11	37	1
17	13	41	31
29	7	19	47

98
54
44

43 + 19

102
24
78

76
29
47

70
32

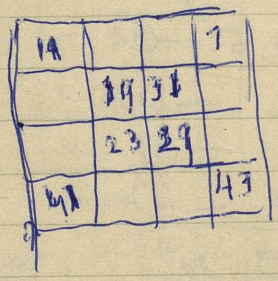
31 Days (106) **JULY 1980** 7th Month

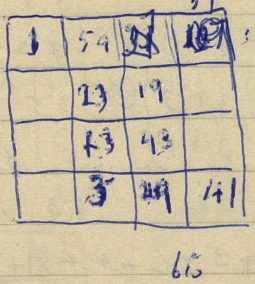
42

मंगलवार २२ जुलाई १९८० **TUESDAY 22** अषाढ़ शुदी १० सं० २०३७

1, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59

41, 53, 71

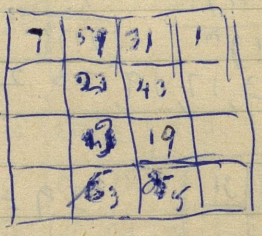




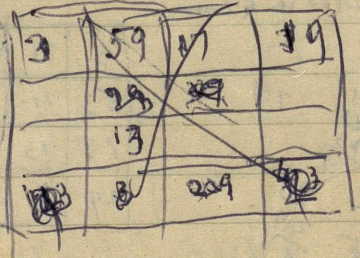
65

1+7+31
3+13+23
or 3+17+19
or 5+11+23
or 3+7+29

39 = 1+7+31
= 3+5+31 = 3+7+29 = 3+13+23 = 3+17+19
= 5+11+29 =



1+3+41+53 = 98
1+7+31+59 = 98
1+7+37+53 = 98



1	31	7	23
	13	~~29~~	
	17	53	
~~47~~	11	13	

$37+10+c=71$

$c=71-47$

$=24$

$41+10-d=53$

$A-a+d=13-10-2=1$

$C-b+d=37-18-2=17$

$D-a-c=41-10-24=7$

$B+b-d=11+18+2=31$

$C+(a+c)=71$

$D-(a+c)=7$

$C+D=78$

$A=13$, $B=11$, $C=37$, $D=41$

$a=10$, $b=18$, $c=24$, $d=-2$

$1+7+23$

$3+11+17$

$1+7=3+5$

$1+11=5+7$

$1+13=3+11$

102
71
31

$31=1+7+23=1+11+19=1+13+17$

$=3+5+23=3+11+17=5+7+19$

$=7+11+13$

40

102
26
76

102
49
53

71
31

62

3	59	23	13
	5	11	

$D+a-d$

$+C+a+C$

$+A-b+C$

$B+b-d$

$=A+B+C+D$

1, 59, 7, 31

13

23

3

29

$A-a$, $A-a+d$, $A-b+C$

$2a+2c-2d=0$

31

90
80
21
77

$a+c=d$

57
41

31	59	31	7
	23		
	13		
37	3	5	53

$A-a+D-a-c+D$

$+A-a+d$

$2(A+D)-3a-c+d$

$=A+B+C+D$

$1D=B+C+2a$

$C-b+d+B+B+b-c$

$+C+a=A+B+C+D$

$2(B+C)+a+d=A+B+C+D$

$B+C=A+D-(a+d)$

$C-b+d+D-a-c$

$+B+b-c+A-a+d=2A$

$2d-2a-2c=0$

$a+c=d$

$c=d-0$

$A + D = B + C + 2a$, $a + c = d$

$B + b + B + b - d + C + C + a + c = A + B + C + D$

$2(B + C) + 2b + a + c - d = A + B + C + D$

$B + C + 2b = A + D$

$C - b + d + D - a - c + A - a + d + B + b - c = \Sigma A$

$-b + 2d - 2a - 2c = 0$, $a + c = d$

$D - b + D + a - d + A + A - b + c = \Sigma A$

$2(A + D) - 2b + a - d + c = \Sigma A$

$A + D = B + C + 2b$.
$A + D = B + C + 2a$
$a + c = d$

$A = 71$, $B = 379$, $C = 197$, $D = 193$

$A + D = 264$
$B + C = 576$

$2a - 2b = -302 - 312$

$a - b = -156$

$a = b - 156$

$A - a = 227$

$C + a = 197 - 156 = 41$ ✓

$B + b = 379 - 156 = 223$ ✓

$D - b = 193 + 156 = 349$ ✓

$A - (2d - a) + d - a$
$A = 2d + a + d - a$

$C + a + c = 127$

$197 - 156 + c = 127 \quad c + 41 = 127, \; c = 86$

$c \cdot d = a + c = 86 - 156 = -70$

$a + c = b - c$
$a + c = d$
$b - c = d$
$a + b = 2d$

$B + b - c = 379 - 156 - 86 = 379 - 242 = 137$

$D + a - d = 193 - 156 + 70 = 263 - 156 = 107$

$C - b + d = 197 + 156 - 70 = 353 - 70 = 283$

$D - a - c = 193 + 156 - 86 = 263$

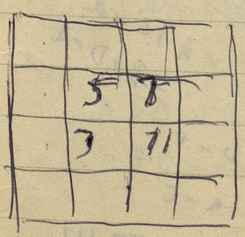
$A - b + c = 71 + 156 + 86 = 313$

$A - a + d = 71 + 156 - 70 = 157$

$B + b - d = 379 - 156 + 70 = 449 - 156 = 293$

$A + D - a = B + C + a$
$A + D = B + C + 2a$
$B + C + b = A + D - b$
$A + D = B + C + 2b$

	5	7	
	3	11	



$A = 1, \; B = 3, \; C = 5, \; D - 7.$

$A + D = 8, \; B + C = 8, \; a = b = 0$

$A + D = 14,$
$B + C = 12, \quad a = b = 2.$

$B - c + A + d$
~~$A + B + a$~~
$B - (a + c)$
$B + a + c + d$
$C - 2c - c + d$

$A - a$	$C + a + c$	$B + b - c$	$D - b$
$D + a - d$	B	C	$A - a + d$
$C - b + d$	A	D	$B + b - d$
$B + b$	$D - a - c$	$A - b + c$	$C + a$

$A - \cancel{a} + (\cancel{a} - d)$
$B + a - (a - d)$
$B + a - d$

Bergholtz form

$-a - (a - d)$
$A - \cancel{a} + \cancel{a} - d$
$a + c = b - c = d$
$D - a - (d - a)$
$D - b$

$A - a + \frac{1}{2}(a + b)$
$A + \frac{1}{2}(b - a)$

$C - 2d + a + d$
$c + a - d$

$A - b + \frac{1}{2}(b - a)$
$\cancel{A + \frac{1}{2}}$ $A - \frac{1}{2}(b + a)$
$A - \cancel{b} + d - b$

(9) Type I - Nasik

$A + D = B + C + 2a = B + C + 2b$

$(a = b)$

$a + c = d.$

Type II: $A + B - a = C + D + a = 5/2$

$= A + B + b = C + D - b.$

$A + B - a = A + B + b \rightarrow a + b = 0$

$C + D + a = C + D - b \rightarrow a + b = 0$

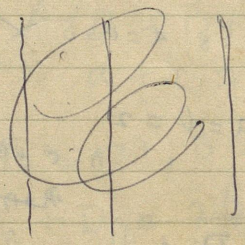
$C + D + 2a + c - d = \cancel{C + D - a - b - c + d}.$

$= C + D + a.$

$2a + c - d = a$ ie $a + c = d$

$2a + c - d$

$a = -c + d$



$a = -b$

$A + B$

$= C + D + 2a$

$C + a + c$

$A + C + d$

$= B + D - d$

$B + b - c$

$B - a - c$

~~103, 157, 127.~~

$A + B - d$

$= C + D + a$

~~151.~~

173, 167, 137, 131

$A - a$	$C + d$	$B - d$	$D + a$
$D + a - d$	B	C	$A - a + d$
$C + a + d$	A	D	$B - a - d$
$B - a$	$D - d$	$A + d$	$C + a$

~~89~~, 83,

109, 103,

$A, A - a, A + d, A - a + D$

$B + a - c$

$A - a + (d - a)$

$D - a - (d - a)$

157, 151,

$A, A-a, A+d, A-a+d$
$B, B-a, B-d, B-a-d.$
$C, C+a, C+d, C+a+d$
$D, D+a, D-d, D+a-d.$

$C = 197$
$C+d = 127$
$d = -70$

$a = -6, d = 30$

17, 23, 47, 53
67, 73, 97, 103
227, 233, 257, 263
277, 283, 307, 313

$A, A+6, A+30, A+36$
$B, B+6, B-30, B-24.$
$C, C-6, C+30, C+24$
$D, D-6, D-30, D-36$

$A = 227, D = 313, B = 97, C = 23$

$B+b-c$
$D+a-(d-a)$

(3) Type 3 (Assoc. ...)

$A + C = B + D = 5/2$

$A + C + a - b + 2c = 5/2 \qquad a - b + 2c = 0$

$B + D - a + b - 2c = 5/2 \qquad -a + b - 2c = 0$

In case of Type I (nasik) Berghaly becomes

$A-a$	$C+d$	$B+2a-d$	$D-a$
$D+a-d$	B	C	$A-a+d$
$C-a+d$	A	D	$B+a-d$
$B+a$	$D-a-d$	$A-2a+d$	$C+a$

$A, A-a, A-a+d, A-2a+d$ (17, 23, 53, 59)
$B, B+a, B+a-d, B+2a-d$ (173, 167, 137, 131)
$C, C+a, C+d, C-a+d$ (37, 31, 67, 73)
$D, D-a, D-d, D+a-d.$ (41, 47, 11, 5)

$a = -6, d = 30$
37, 31, 67, 73
41, 47, 11, 5

सोमवार २८ जुलाई १९८० **MONDAY 28** सावन बदी १ सं० २०३७

(131, 137, 167, 173)

(5, 11, 17, 23), (31, 37, 41, 47), (53, 59, 67, 73) → 268

23	67	131	47	268
5	173	37	53	268
73	17	41	137	268
167	11	59	31	268
268	268	268	268	→ 268

we have not used
A + D = B + C + 2a
& hence not nonsense

A + D = 58
B + C = 210
B + C + 2a = 210 + 2 = 198

The values of A, B, C, D must further satisfy A + D = B + C + 2a

324 − 2 = 330
C + D + a = 336 − 6 = 330

A = 73, B = 37
~~A + B =~~

A + B + 6 = C + D − 6, C + D = A + B + 12

C + D = 122
43
43, 79.

A, A − a, A + d, A − a + d
B, B − a, B − d, B − a − d
C, C + a, C + d, C + a + d
D, D + a, D − d, D + a − d.

A = 71, B = A + D = 264
B + C = 576
(A + D) − (B + C) = −312
a = −156
d = −70

71
156
227

390
348
42

110
12

188
390
378
390
32

186
12
174

127
137
264
12
252

In Fig. p. 21 of notebook 2 the nasik derived from Kraitchik's formula has

$A = 71,\ B = 379,\ C = 197,\ D = 193$

$a = -156,\ d = -70,\ C + d = 127$

$B + 2a - d = 379 - 312 + 70$ ~~$= 435 - 312 = 123$~~

$= 449 - 312 = 137$

$D - a = 193 + 156 = 349$

This appears a highly artificial choice ~~with~~ there must be a simpler choice.

$A,\ A-a,\ A-a+d,\ A-2a+d$
$B,\ B+a,\ B+a-d,\ B+2a-d$
$C,\ C+a,\ C+d,\ C-a+d$
$D,\ D-a,\ D-d,\ D+a-d$

should all be primes

$A + D = B + C + 2a$.

~~$A = 193, D = 197$~~

~~$a = -16$~~ $a = 6, d = 10$

$B(17) - (17, 23, 13, 19)$

~~$C(37) - (37, 43, 47, 41)$~~

~~$B(11) - (11, 17, 7, 13)$~~

~~$C(37) - (37, 43, 47, 41)$~~

~~$A(29) - (29, 23,$~~

$B(29) - (29, 23, 53, 47)$

~~$C(67) - (67, 61, 27,$~~

~~$C(79) - (79, 73, 43,$~~ ~~$C(89) - (89, 83, 59,$~~

$C(103) - (103, 97, 73, 79)$

~~$B + C = 54$~~

~~$A + D = 66$~~

$A + D = 60$

$a = -6,\ d = -30$.

$A + D = 132 - 12 = 120$

A(37) - (37, 43, 13, 19)

D(83) - (83, 89, 113, 107)

43	73	47	89
107	29	103	13
79	97	83	53
23	113	19	97

49

$2^5 2$

$2^5 2^2 2$

$2^3 5^2 2$

$2^3 5^2$

$2^2 3^2 5$

$2^2 3^2 5$

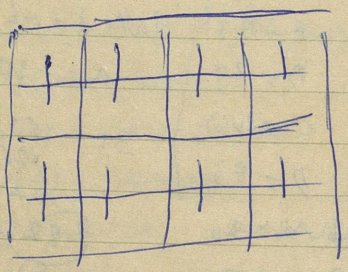
$2^2 3^2 5

43	73	113	89
53	83	83	13
79	103	29	107
23	13	19	97

$43+107+53+84 = 22$

$a+c = b-d+a$
$a+d-c = b-d+a$
$b = 2d-a$
$-a-c = -b+c$
$b = a+2c$

Type IV



89			
53			
13			
97			

$A+D-d = S/2$
$A+D-a-c = S/2$
$A+D-b+c = S/2$
$A+D-b-a+d = S/2$
$B+C+a+c = S/2$
$B+C+d = S/2$
$B+C+b-c = S/2$
$B+C+b-d+a = S/2$

$A-a+D+a-d = S/2$
$C+a+c+B = S/2$
$B+b-c+C = S/2$
$D-b+A-a+d = S/2$
$C-b+d+B+b = S/2$
$A+D-a-c = S/2$
$D+A-b+c = S/2$
$B+b-d+C+a = S/2$
$d = a+c$ ✓ —— (i)
$-a-c = -b+c$
$-b-a+d = -b+c$
$d = b-c$ ✓
$b-c = b-d+a$
$A+D-d = B+C+d$
$A+D = B+C+2d$

$a+c = b-c$
$a-b = 2c$
$b = a+2c$
$a = b-2c$
$d = b-c$
$d = a+c$

$B+C+b-c = A+D-b+c$
$A+D = 2B+C+2(b-c)$
$-d = -b-a+a$
$b = 2d-a$
$B+b = d-a-d$
$B+b = d-a$

$a = b-2c$
$2d = 2b-2c$
$2d = 2b-a$
$b = 2d-a$
$c = d-a$
$a-d = b-2c$
$a-d = 2b-2d$

शुक्रवार १ अगस्त १९८० FRIDAY 1 सावन बदी ५ सं० २०३७

$A + D = B + C + 2d$

$b = 2d - a, \quad c = d - a$

$A - a$	$C + d$	$B + d$	$D + a - 2d$
$D + a - d$	B	C	$A - a + d$
$C + a - d$	A	D	$B - a + d$
$B - a + 2d$	$D - d$	$A - d$	$C + a$

$A, A-a, A-d, A-a+d$

$B, B+d, B-a+d, B-a+2d$

$C, C+a, C+d, C+a-d$

$D, D-d, D+a-d, D+a-2d$

$A = 37$

$B = 29$

$C = 103$

$D = 83$

Take $d = -6$

$a = -30$

$A(37) - (37, 67, 43, 61)$

$B(29) - (29, 23, 53, 47)$

$C(103) - (103, 73, 97, 79)$

$D(83) - (83, 89, 59, 85)$ ✗

$A = 103, A-a = 73, A+d = 113, A-a+d = 53$

$B = 83, B-a = 23, B-d = 73, B-a-d = 13$

$C = 37, C+a = 97, C+d = 47, C+a+d = 107$

$D = 29, D+a = 89, D-a = 19, D+a-d = 79$

In Type II take $A = 103, D = 83, B = 37, C = 29$

$A = 37, D = 29, B = 103, C = 83$

In Type III $A + B = C + D + 2a$

$a = 60, d = 10$

In Type IV $d = -60$

$a = -10$

शनिवार २ अगस्त १९८० **SATURDAY 2** सावन बदी ६ सं० २०३७

89	47	73	43
53	83	37	79
13	103	29	107
97	19	113	23

97	19	113	23
53	83	37	79
89	47	73	43

A(37) - (37, 43, 67, 131)

B(71, 41, 47, 17)

A = 37, C = 67

B = 19 - (13, 43, 19, 79)

A + D = B + C + 60

37 + D = B + 127

D = B + 90

a = -6, d = -30

37 + D = 71 + C - 60

= 11 + C

D = C + 26

37 + D = 71 + 103 - 60

= 174 - 60 = 114

D = 114 - 37 = 77

47

~~A = 37, B = 71, C = 109, D = 83~~

~~A + D = 120~~

~~B + C = 180, B + C + 2d = 120 = A + D~~

~~a = -6, d = -30~~

300

43	79	41	137
107	71	109	13
73	37	83	

Take a = -6, d = 30

A, A − a, A − d, A − a + d

B, B + d, B − a + d, B − a + 2d

C, C + a, C + d, C + a − d

D, D − d, D + a − d, D + a − 2d

~~A (37) − (31, 37, 1,~~

A (37) − (37, 43, 7, 73)

~~B (47) − (41, 53, 17, 83)~~ (27, 41)

~~C (59) − (5~~

~~D (59) − (53, 89, 89~~

~~B (31) − (31, 61, 67, 97)~~

~~C (53) − (53, 47, 85, 17)~~

~~D (107) − (107,~~

~~C (59) − (59, 53, 89, 23)~~

~~D (113) − (113, 83~~

~~D (137) − (127, 97,~~

~~D (137) − (137, 107, 101, 71)~~

A + D = B + C + 2d

37

59
60
9

~~B + C + 60 = 31 + 53 + 60 = 144~~

~~A + D = 144~~

~~D = 144 − 37 = 107~~

150
37
113

121

101
30

174

127
60

131
30

174 = 31 + C + 60

C = 174
91
83

174
60
114

140

174 = B + C + 60

B + C = 114

114
47
67

A + D = B + C + 60

108
124

103 + 97 = 168

101 + 73
101 + 67

108
97
71

Month | 31 Days | **AUGUST 1980** | 8th Month

२०३७ | सोमवार ४ अगस्त १९८० | **MONDAY 4** | सावन बदी ९ सं० २०३७

A, A-a, A-d, A-a+d

A(59) - (53, 47, 83, 17)

B(67, 37, 31, 1)

C(73, 79, 43, 109)

C(101, 107, 71, 137)

B + C + d = 126

37 + 57 + d = 126

d = 36

C(103, 109, 73, 139)

53 + D = 67 + 18 - 60

a = -6, d = 30

A(31) - (31, 37, 43, 7)

A(37) - (37, 31, 61, 1)

A(53) - (53, 59, 23, 89)

A(67) - (67, 73, 37, 103)

A(97) - (97, 103, 67, 127)

A(101) - (101, 107, 71, 137)

A(103) - (103, 109, 73, 139)

C(37) - (37, 31, 67, 1)

C(43) - (43, 37, 73, 7)

C(53) - (53, 47, 83, 17)

C(59) - (59, 53, 89, 23)

C(67) - (67, 61, 97, 31)

C(73) - (73, 67, 103, 37)

B(7) - (7, 37, 43, 73)

B(17) - (17, 47, 53, 83)

B(23) - (23, 53, 59, 89)

B(31) - (31, 61, 67, 97)

B(37) - (37, 67, 73, 103)

B(43) - (43, 73, 79, 109)

D(67) - (67, 37, 31, 1)

D(73) - (73, 43, 37, 7)

D(83) - (83, 53, 47, 17)

D(89) - (89, 59, 53, 23)

D(97) - (97, 67, 61, 31)

D(103) - (103, 73, 67, 37)

D(109) - (109, 79, 73, 43)

C(79) – (79, 73, 109, 43)

~~C(97) – (97,~~ C(107) – (107, 101, 137, 71)

~~C(103) – (103, 97,~~ C(109) – (109, 103, 139, 73)

A(97) D(59) 156 60 216

C(79, 73, 109, 43)

B(31, 61, 67, 97) (61, 31, 37, 71)

(59, 53, 29, 83)

79 31 110 +60

139 28 167

107 + 31 + 60

198 89 109

109 + 77 + 60 = 186 107 89

~~A(103) – (103,~~

A(127) – (127,

A(131) – (131, 137, 101, 167)

B(71) – (71, 101, 107, 137)

B(73) – (73, 103, 109, 139)

B(101) – (101, 131, 137, 167)

137 83 234 60 294

170 103 67

170 53 103 17

184 83 101

186 131

170 103 67

109 33 142 +60

202 131 79

A(103) – (103, 109, 73, 139)

~~D(97) – (97, 67, 61, 31)~~

D(89) – (89, 59, 53, 23)

16 24 12

109 + 7 + 60 176 1

109 47 156

206 212 131 81

140 89 51

67 43 60 170

a = –6 d = –30

A, A+6, A+30, A–24, B, B–30, B–24, B–54

37 43 80

140 97 43

144 101 43

~~C(113) = (113~~

A+6–30

B+6–30

B(3) – (3,

59 B+6–60

C, C–6, C–30, C+24, D, D+30, D+24, D+54

53 31 60 149

144 59 101

140 67

192–60

132 79 53

(157, 151, 127, 181)

140 23 117

132 73 59

~~B(53) – (53, 73, 89,~~

~~B(59) – (59, 89, 97~~

A + D = B + C – 60

B(23, 109

(137 24 161)

$A + D = B + C + 2d$

$A,\ A-d,\ A-d,\ A-d+d$

$B,\ B+d,\ B-a+d,\ B-a+2d$

$C,\ C+a,\ C+d\ \ C+a-d$

$D,\ D-d,\ D+a-d,\ D+a-2d$

$a = -6$
$d = -30$

$A + D - d = 126$

$A,\ A+6,\ A+30,\ A-24$

$B,\ B-30,\ B-24,\ B-54$

$C,\ C-6,\ C-30,\ C+24$

$D,\ D+30,\ D+24,\ D+54$

$A = 107$
$D = 73$
180

$43 \quad 73 \quad 73$
$36 \quad 36 \quad 36$
$37 \quad 7$

$B + C = 60$

$B + C = 240$

240
59

240
193
47

101
24

$A(31) - (31, 37, 61, 7)$
$A(37) - (37, 43, 67, 13)$
$A(41) - (41, 47, 71, 17)$
$A(53) - (53, 59, 83, 29)$
$A(67) - (67, 73, 97, 43)$
$A(97) - (97, 103, 127, 73)$
$A(107) - (107, 113, 137, 83)$
$A(151) - (151, 157, 181, 127)$
$C(37) - (37, 31, 7, 61)$
$C(43) - (43, 37, 13, 67)$
$C(47) - (47, 41, 17, 71)$
$C(59) - (59, 53, 29, 83)$
$C(73) - (73, 67, 43, 97)$
$C(89) - (89, 83, 59, 113)$
$C(103) - (103, 97, 73, 127)$
$C(113) - (113, 107, 83, 137$

$B(61) - (61, 31, 37, 7)$
$B(67) - (61, 37, 43, 13)$
$B(83) - (83, 53, 59, 29)$
$B(97) - (97, 67, 73, 43)$
$B(113) - (113, 83, 89, 59)$
$B(127) - (127, 97, 103, 73)$
$B(137) - (137, 107, 113, 83)$
$B(181) - (181, 151, 157, 127)$
$D(7) - (7, 37, 31, 61)$
$D(13) - (13, 43, 37, 67)$
$D(17) - (17, 47, 41, 71)$
$D(29) - (29, 59, 53, 83)$
$D(43) - (43, 73, 67, 97)$
$D(59) - (59, 89, 83, 113)$
$D(73) - (73, 103, 97, 127)$
$D(83) - (83, 113, 107, 137)$

$a = -6, d = 36$

A (37) = (37, 43, 1, 79)
A (47) = (47, 53, 11, 89)
A (67) = (67, 73, 31, 109)
A (97) = (97, 103, 61, 139)
A (107) = (107, 113, 71, 149)

B (11) = (11, 17, 47, 53)
B (17) = (17, 23, 53, 59)
B (31) = (31, 37, 67, 73)
B (37) = (37, 43, 73, 79)
B (47) = (47, 53, 83, 89)

C (43) = (43, 37, 79, 1)
C (47) = (47, 41, 83, 5)
C (53) = (53, 47, 89, 11)
C (73) = (73, 67, 109, 31)
C (103) = (103, 97, 139, 61)

D (79) = (79, 43, 37, 1)
D (83) = (83, 47, 41, 5)
D (89) = (89, 53, 47, 11)
D (109) = (109, 73, 67, 31)
D (139) = (139, 103, 97, 61)

$A + D = B + C + 72$ $B = 17, C = 47$

$73 + 11 + 72 = 156$

$103 + 17 + 72 = 186$

A (53) = (53, 59, 17,

$a = -6 - 36$

A (37) = (37, 43, 73, 79)
A (47) = (47, 53, 83, 89)
A (61) = (61, 67, 97, 109)
A (67) = (67, 73, 103, 109)

B (73) = (73, 109, 43, 7)

227, 313, 97, 23

250, 410

(160)

शुक्रवार ८ अगस्त १९८० | FRIDAY 8 | सावन बदी १३ सं० २०३७

$a = -30, d = 66$

A, A+30, A−66, A+96

B, B+66, B+96, B+162

C, C−30, C+66, C−96

D, D−66, D−96, D−162

$A + D = B + C + 132$

(31, 97, 127, 193)

A(67) = (67, 97, 1, 163)

A(71) = (71, 101, 5, 167)

A(79) = (79, 107, 11, 173)

A(83) = (83, 113, 17, 179)

A(97) = (97, 127, 31, 193)

A(127) = (127, 157, 61, 223)

A(137) = (137, 167, 71, 233)

D(233) = (233, 167, 137, 71)

D(263) = (263, 197, 167, 101)

B(71) = (71, 137, 167, 233)

B(97) = (97, 163, 193, 259) ×

B(101) = (101, 167, 197, 263)

B(131) = (131, 191, 227, 293)

B(211) = (211, 277, 307, 373)

(127, 97, 193, 31)

A(67) = (67, 97, 1, 163)

B(71) = (71, 137, 167, 233)

C(127) = (127, 97)

D(373) = (373, 307, 277, 211)

D(227) = (227, 293)

~~[illegible]~~

$A + D = B + C + 2d$

$A,\ A-a,\ A-d,\ A-a+d$

$B,\ B+d,\ B-a+d,\ B-a+2d$

$C,\ C+a,\ C+d,\ C+a-d$

$D,\ D-d,\ D+a-d,\ D+a-2d$

A $a = -30$, $d = -6$

$a = 30$, $d = -6$

$A,\ A-30,\ A+6,\ A-36$

$B,\ B-6,\ B-36,\ B-42$

$C,\ C+30,\ C-6,\ C+36$

$D,\ D+6,\ D+36,\ D+42$

$A + D = B + C - 12$

$A(37) - (37, 7, 43, 1)$

$A(41) - (41, 11, 47, 5)$

$A(47) - (47, 17, 53, 11)$

$A(53) - (53, 23, 59, 17)$

$A(67) - (67, 37, 73, 31)$

$A(73) - (73, 43, 79, 37)$

$B(89) - (89, 83, 53, 47)$

$B(103) - (103, 97, 67, 61)$

$B(109) - (109, 103, 73, 67)$

$B(173) - (173, 167, 137, 131)$

$B(199) - (199, 193, 163, 157)$

$B(233) - (233, 227, 197, 191)$

~~D(157) - (157, 163, 193, 199)~~

~~D(47) - (47, 53, 83, 89)~~

~~D(277) - (277, 283, 313,~~

~~D(67) - (67, 73, 103, 109)~~

$D(67) - (67, 73, 103, 109)$

$C(17) -$

Try $a = -30$, $d = -6$

$a + c = b - c = d$

$c = d - a = -6 + 30 = 24$

$b = c + d = 24 - 6$

(125)

132
19
113
30

79
24
103

रविवार १० अगस्त १९८० **SUNDAY 10** सावन बदी १५ सं० २०३७

79
18
97

A, A+30, A+6, A+24

B, B-6, B+24, B+18

C, C-30, C-6, C-24.

D, D+6, D-24, D-18

37
24

A+D = B+C-12

138
97
41

53
29

138

124
41
79

A(31) - (31, 61, 37, 59) X

A(37) - (37, 67, 43, 61)

A(41) - (41, 71, 47, 65) X

A(53) - (53, 83, 59, 89) X

B(89) - (89, 83, 113, 107)

B(113) - (113, 107, 137, 131)

B(13) - (13, 7, 37, 31)

B(19) - (19, 13, 43, 37)

B(23) - (23, 17,

73
21
49

83
24
59

41
24

41
18

C(113) - (113, 83, 107, 89)

C(37) - (37, 7, 31, 13)

67
24

~~A(59) - (59, 89,~~

A(67) - (67, 97, 73, 91) X

A(83) - (83, 113, 89, 107)

A(97) - (97, 127, 103, 73)

D(41) - (41, 47, 17, 23)

~~D(71)~~

D(61) - (61, 67, 37, 43)

83
24

144
73
71

158
12

~~A(97) - (97, 127, 103, 121) X~~ ~~A-53, D-61~~

83
24
107

~~D(41) - (41, 47, 17, 23)~~

B(113) - (113, 107, 137, 131)

C(37) - (37, 7, 31, 13)

114
12
126

126
47
79

127
11

127	31	107	
	113	37	73
	97	41	
		103	

B(79) - (79, 73, 103, 97)

C(47) - (47, 17, 41, 23)

~~A(53) - (53, 83, 59, 29)~~

D(61) - (61, 67, 37, 43)

170
23
141

170
13
157

126
97
29

114 ~~A+D = 114~~

83
31
18

D(31) - (31, 37, 7, 13)

P.T.O

A, A-a, A-d, A-a+d

A(83) - (83, 113, 89, 107) - A, A+30, A+6, A+24

D(31) - (31, 37, 7, 13) - D, D+d, D-a+d, D-a+2d
D, D-d, D+a-d, D+a-2d

B(79) - (79, 73, 103, 97) - B, B+d, B-a, C+a-d
B-a+d, B-a+2d

C(47) - (47, 17, 41, 23) - C, C+d, C+d, C+a-d

113	47	73	13
7	79	47	107
23	83	31	103
97	37	89	17

250

Apka all the best for damniling

(9C)

Type II:

A+b

A-a+C-b+d = D+a-d+B+b = 5/2

C+a+C+A = B+D-a-c = 5/2

B+b-c+D = C+A-b+C = 5/2

D-b+B+b-d = A-a+d+C+a = 5/2

A+C-a-b+d = A+C+a+C

B+d+b-c = B+D-b+b-d

B+D+a+b-d = B+D-a-c

A+C+a+C = A+C

A+C-b+c = A+C+d

2a+b+c = c-b

a+b = 0 // b = -a

-2b+2c

2a+2d-2d

c = d-a

A+C+d+B+D-d

a+b=0, d=a+c

A+C+d+B+D-d

A+C+B+D

A+C+B+D

A+C+B+D

Same figure as for Type II (diagonal) but

A − a	C + d	B − d	D + a
D + a − d	B	C	A − a + d
C + a + d	A	D	B − a − d
B − a	D − d	A + d	C + a

$B + D = A + C + 2d$

No need for ~~again~~ any worry.

Type V is obtained from Type IV by interchange of middle two rows (cols) followed by interchange of middle two cols (rows). Thus from Fig (x) on previous page we get (y) of Type V.

Type V

113	73	41	13
23	31	83	103
7	47	79	107
97	89	37	17

(y)

Type VI. Interchange 2nd & 4th rows of (x) followed by interchange of 2nd & 4th cols of (x) and we get (z) of Type VI

113	13	73	41
97	17	89	37
23	103	31	83
7	107	47	79

(z)

(or interchange of 1st & 3rd rows & 1st & 3rd cols)

Type VII : $a+c=b-c$

$C+D-A-B = 2A+2D-2B-2C$

$3C-D-3A+B$

$3(A+C)=B+D$

$A-a+B+b=S/2$

$D+a-d+C-b+d=S/2$, $C+D+a-b=S/2$

$B+C+a+c=S/2$

$A+D-a-c=S/2$

$B+C+b-c=S/2$

$A+D-b+c=S/2$

$D-b+C+a=S/2$

$A-a+d+B+b-d=S/2$ $A+B-a+b=S/2$

$a+c=b-c$

$a+c=b-c$

$A+D-b+c=S/2+b-c$

$B+C-a-c=S/2-a-c$

$2a+2c$

$(B+C)-(A+D)$

$=-a-b$

$A+D=S/2+a+c$

$B+C=S/2-a-c$

$-a-c$

$+b-c=a$

$2c=b-a$

$+b+c=-a-c$

$2c=b-a$

$A+B-a+b=S/2$

$C+D+a-b=S/2$

$A+D-b+c=A+D-a-c=S/2$

$B+C+a+c=B+C+b-c=S/2$

$-b+c=-a-c$ $2c=b-a$

$a+c=b-c$

$A+B=S/2+a-b$

$C+D$ $S/2-a+b$

$A+D=S/2+b-c$

$B+C=S/2-a-c$

$(A+B)-(C+D)=2(a-b)=-4c$

$C+D=A+B+4c$, $2c=b-a$

$(A+D)-(B+C)=a-b=-2c$

$B+C=A+D-2c$

$(A+D)-(B+C)$

$=S/2+b-c$

$-S/2+a+c$

$a+b$

$B=D$ absurd

$A+D=B+C+2c$

$C+D-A-B=$

$C+D-A-B=$

$C+D-A-B=4c$

$=B+C-A-D=-2c$

$D-B=B-D$

$B=D$

$C+D=S/2-a+b$

$A+B=S/2+a-b$

$-2a+2b$

$B+C=S/2-a-c$

$A+D=S/2$

$(b-a)=2c$

$C+D=S/2-a+b$

$A+B=S/2+a-b$

$-2a+2b$

$2(b-a)$

$A+D-B-C$

$C+D-A-B$

$=2(A+D-B-C)$

गुरुवार १४ अगस्त १९८० **THURSDAY 14** सावन शुदी ४ सं० २०३७

Type VII
Normal

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

Berghol's

A-a	C+a+c	B+b-c	D-b
D+a-d	B	C	A-a+d
C-b+d	A	D	~~B-c+d~~
B+b	D-a-c	A-b+c	C+a

$A = 4, B = 5, C = 10, D = 15$

$a = -2, b = 6, c = 4, d = -3.$

41	73	13	
97	79	47	17
23	83	31	103
7	37	89	107

diagonals

~~$a = -30, b = 48, c = 24$~~

$a = -30, d = -6$

$79 + b - c = 83 + c$

59	89	
79	47	
83	31	
19	73	

$A + B + 2c = 5/2$

$C + D - 2c = 5/2$

$83 - A = 113$

$A = -30$

$79 + b = 97$

$b = 18$

$b - a = 48$

$C = 24$

11, 13, 17, 19

$5 + 6 - d = 14$

$B + 2c - a - d$

$b - a = 24$

$B + b - d$

$b = 2a + a$

$A - 2c - a + c$

$A - a - c.$

$2c = b - a + c = b - c$

$2c = b - a.$

$47 + a + c = 41$ $a + c = -6$

$31 - a - c = 37$ $a + c = -6$

$79 + b - c = 73$ $b - c = -6$

$83 - b + c = 89$ $b - c = -6$

$2b = b - a$

$b + c = c + a$

$2c + a - b = 0$

$a + c = 12.$

$b - c = 10$

$b - a = 2c$

$b - a - 2c = -2$

$a - b + 2c = 2$

$2c : b - a$

$b - c = -6$

$a + c = -6$

$2c + a + b = 0$

$A - x$
$B + x$
$C + x$
$D - x$
} should cube prism

$A + B + 2c$
$C + D - 2c$

$83 - 18 + 24$

A

$A = 13, x = 2$

$B = 17.$

$b = c - 6$

$a = -c - 6$

$b - c = a + c$

In the normal case $x = 2$, $a = -2$, $b = 6$, $c = 4$, $d = -3$

$b - c = a + c = 2$

$a = -10$

$b = -14$

23	31	41	5
	59	29	
	13	19	
37	17	11	

$A + B + C = 5/2$

$73 + C = 60$

$C = -13$

$2C = b - a$

$C + D = A + B + 4C$

$A + B = C + D - 2(b - a)$

$A + D = B + C + a + b$

$B - D = D - B - 4C - a - b$

$A - D = C - B - 2b + 2a$

$2B = 2D - 2b + 2a - a - b$

$A + D = B + C + a + b$

$C = A + 6$

$2A = 2C - 12$

$2D = 2B + 20$

$D = B + 10$

$2A = 2C + 3a - b$

$2D = 2B + 3b - a$

$2C = b - a$

$2A = 2C + 2a - 2C$

$2D = 2B + 2b + 2C$

$A = C + a - c$

$D = B + b + c$

	$C - c$	$A + 2c$	$D - 2c$	$B + c$
$D + a - d$	~~$B + 3c + d$~~	B	C	$A - a + d$
$C - b + d$	~~$A + c - d$~~	A	D	$B + b - d$
	$D - c$	$B + 2c$	$C - 2c$	$A + c$

$A, A + c, A + 2c, A - a + d$

$B, B + c, B + 2c, B + b - d$

$C, C - c, C - 2c, C - b + d$

$D, D - c, D - 2c, D + a - d$

$D - a + d$

$= B + b + c - a + d$

$C - b + d$

$A - a + c - b + d$

$\cancel{A} + c + d - a - b = \cancel{A} - c - d$

$2(c + d) = a + b$

$B + b + c - a - b$

$C + a - c - b + c$

Month 31 Days **AUGUST 1980** 8th Month
२०३७ शनिवार १६ अगस्त १९८० **SATURDAY 16** सावन शुदी ६ सं० २०३७

$B + 2c - a - d$ $C - (2c + a)$ (131)

$a - d =$ $d - a = 18$ $b - a = 2c$

(~~N, 17, 23~~ $A, A + c, A + 2c, A - a + d$
$B, B + c, B + 2c, B + 2c + a - d$
$C, C - c, C - 2c, C - 2c - a + d$
$D, D - c, D - 2c, D + a - d.$

$a - d = x$]

$A, A + c, A + 2c, A - x$
$B, B + c, B + 2c, B + 2c + x.$
$C, C - c, C - 2c, C - 2c - x$
$D, D - c, D - 2c, D + x$

$B + 2c - a$
$B + 2c - a - d$
$B + c - a$
$b = -78 + 6 = -72$
$B + 2c - a =$

$A, A - a, A - a - c, A - a + d.$
~~$B, B - a + c, B - a + 2c, B - a - d + 2c$~~
$B, B + c - a, B + 2c - a, B + 2c - a - d.$
$C, C - c, C - 2c, C - 2c - a + d$
$D, D - c, D - 2c, D + a - d.$

~~$B + 30 + 2c = 7$~~
~~$109 - a = -6$~~
~~$c = -39$~~
~~$85 - 7 = 78$~~ $2c = -32$
$c = -39.$ $c = -16$
$A + B + b - a = 120$
$152 + 2c = 120$

~~150~~

113	41	73	13
97	79	47	17
23	83	31	103
7	37	89	107

90

330
150
110
130

$47 - a$
$83 - a$

$79 - 32 - a$
$83 - a$

113, 41, 73, 13
97, 37, 89, 17
23, 83, 31, 103
7, 79, 47, 107

113, 41, 73, 13
23, 83, 31, 103
7, 79, 47, 107
97, 37, 89, 17

~~113, 73, 41, 13~~
~~23, 31, 83,~~
~~7, 47, 79~~
~~97, 89, 37~~

113, 41, 73, 13
23, 83, 31, 103
7, 79, 47, 107
97, 37, 89, 17

113, 73, 41, 13
23, 31, 83, 103
7, 47, 79, 107
97, 89, 37, 17

23, 83, 31, 103
7, 79, 47, 107
113, 41, 73, 13
97, 37, 89, 17

31, 83, 23, 103
47, 79, 7, 107
73, 41, 113, 13
89, 37, 97, 7, 97

97, 37, 89, 17
7, 79, 47, 107
23, 83, 31, 103
113, 41, 73, 73

17, 37, 89, 97
107, 79, 47, 7
103, 83, 31, 23
13, 41, 73, 113

113, 41, 73, 103
97, 79, 47, 107
23, 83, 31, 13
7, 37, 89, 17

A-a+c
C-c = A-a

D-A = B-c+(b-a)+c
= B-c+4c

221

A = c+a-c
D = B+b+c
2c = b-a

b-a=2c

31
79
52
-(b+c) = 48
b = 2c+a
12+42

B+2c+a+c

	79 B	47 C
	83	31 D

36 = a-c
-48 = b+c
31 = 79+b+c
-12 = a-b = -2c
c = 6
a = 42
b = 54

53
18

A = 83, a = 30

89

A = 97, a = -6, c = 2

A = 83, a = -6
A-a = 89, c = 18
A-a-c = 71
A-a+c = 107

A = 83, a = -6, c = 10
A-b+c
A-2c-a+c
2c+a
b = 36-6
= 30

89, 83, 89
A-a = 53, c = 6
A-a-c = 47
A-a+c = 59

59 A-a+c
b = 2c+a = 6

Month

31 Days

AUGUST 1980

8th Month

२०३७

सोमवार १८ अगस्त १९८०

MONDAY 18

सावन शुदी ७ सं० २०३७

$A-a$	$A+2c$	D	$D-2c-a$
$D+a-d$	$D-a-3c$	$A-a+c$	$A-a+d$
$A-2a-c+d$	A	D	$D-c-d$
$B+2c+a$	$D-a-c$	$A-a+c$	$A+c$

$A, A-a, A-a+c, A-a-c, A+c, A-a+d, A-2a-c+d, A+2c$

$D, D-c, D-a-c, D-a-2c, D-2c, D-a-3c, D-c-d, D+a-d$

$A, A-a, A+c, A-a-c, A-a+c=a, A+2c, A-a+d, A-2a-c+d$

$D, D-a, D-a-c, D-a-2c, D-a-3c, D-c, D-2c, D-c-d, D+a-d$

$A, A-a, A-a+c, A-a-c, A+c, A+2c, A-a+d, A-2a-c+d$

$D, D-a, D-a-c, D-a-2c, D-a-3c, D-c, D-2c, D+a-d, D-c-d$

$A, A-a, A-a-c, A-a+d$

$B, B-a+c, B-a+2c, B-a+2c-d$

$C, C+a, C-2c-a+d$

$D, D-c, D-2c, D+a-d$

$C = A-a+c$

$D = B+a+3c.$

There must be something wrong here since $C-C = A-a$ i.e. not true

$A+B-a+b = S/2$

$C+D+a-b = S/2$

$A-C+c-a = 0 \quad C = A-a+c$

$C = A-a+c \quad D = B+b+c$

$A-C-a+b-a-c=0$

$A-C-2a-c+b=0$

$A-C-2a-c+2c+a$

$C = A-a+c$

$D = B+b+c$

$= B+a+3c$

$A+B-a+b$

$= A+D-a-c$

$D = B+b+c$

$C = A-a+c$

(134)

31 Days **AUGUST 1980** 8th Month

$c' - b + d$

$A - a + c + a$

$-2c - a + c$

$A - a - c$

मंगलवार १९ अगस्त १९८० **TUESDAY 19** सावन शुदी ८ सं० २०३७

$b = 2c + a$

~~A, A-a, A-a-c, A-a+d.~~

~~B, C+a, C+a+c, C+a+c+d.~~

A, A − a, A − b + c, A − a + d

B, B + b, B + b − c, B + b − d

C, C + a, C + a + c, C − b + d.

D, D − b, D − a − c, D + a − d

$C = A - a + c$

$D = B + b + c$

$2c = b - a$

$a = -6, c = 18$

$b = 30$

A(83) − (83, 89, 71, 89 + d) ✓

~~B (31) − (31, 61, 43, 61 − d).~~

C (107) − (107, 101, 119, 77 + d) ✗

~~D (79) − (79, 49, 67, 85 − d)~~ ✗

$C = A - a + c$

$= 89 + 18 = 107$

B, B + 30, B + 12, B + 48

107 30 85 113 18

~~41, 71~~

~~(97, 127, 109, 127 + d)~~

~~29, 59, 41, 59 + d~~

~~127~~ ~~157~~

~~149, 179, 97~~

161

151, 181, 163, 186

181 18 157 48 163

~~107 18 119~~

131 18 149

~~109 18 121~~

181, 211

~~199 30 169~~

$a = -30, b = -6, c = 12$

229 235 18 217

$C = 71 + 12$

$= 83$

211 18 193

229 30 199

~~A = 37.~~

~~A (37) − (37, 67, 55)~~

A (41) − (41, 71, 59, 71 + d)

C (83) − (83, 53, 65)

181 48 229

$b - a = 2c$

$A - (2c + a) + c$

$A - a - c$

65 53

Pur

(135)

31 Days **AUGUST 1980** 8th Month

$A-(2c+a)+c$

$B+a+2c-c$

$B+2c-a+c$

139
36
103

139
60
73

103
30
73

बुधवार २० अगस्त १९८० **WEDNESDAY 20** सावन शुदी ९ सं० २०३७

$A, A-a, A-a-c, A-a+d$
$B, B+a+c, B+a+2c, B+a+2c-d,$
$C, C+a, C+a+c, C-a-2c+d$
$D, D-a-2c, D-a-2c, D+a-d$

$C = A-a+c$
$D = B+a+3c$

$a=-6, c=-30$

$C = 61+6-30$

79
66
145

$A(61)-(61, 67, 97, 67+d)$

~~B(139)-(139, 103, 73, 73+d)~~

$C(37)-(37, 31, 1, 103+d)$

~~D(43)-(43, 79, 109, 37-2d)~~

$37+6+60+d$

66
103

$D = 139-6-90$

96
43

49
30

103
22
81

37
19
18

37
23
14

43-6

There appears to be no d making all the last terms prim.

Take a different B. eg ~~137~~

~~139, 43, 43, 43+d~~

~~D = 109+6-90~~

96
13

13
36

~~13, 29~~

167
96
71

101
37
64

71
~~39~~
~~39~~

103
34
69

107
37
70

103
60
43

127
37
90

103
70
13

113
37
76

103
76
27

~~179~~

200
140

61
139
200
60
140
65

$B+b-c$
$B+a+2c-c$
$A+B+2c$

163
36
127
30
97

149
71
36
107

37
6
60
103

71
6
65

$B(167, 131, 101, 101+d)$

$D(71, 107, 137, 65-d)$

67+d
73+d
101+d
65-d

71
36

$d=6$. 73, 79, 107, 59

$A(61)-(61, 67, 97, 73)$

$B(167)-(167, 131, 101, 107)$

$C(37)-(37, 31, 1, 109)$

~~D(43)-(43, 79, 109,~~

$D(71, 107, 137, 59)$

A (61) – (61, 67, 97, 67+d)

B (167) – (167, 131, 101, 101+d)

C (37) – (37, 31, 1, 103+d)

D (71) – (71, 107, 137, 65-d)

d = 36

A (61) – (61, 67, 97, 103)

B (167) – (167, 131, 101, 137)

C (37) – (37, 31, 1, 139)

D (71) – (71, 107, 137, 29)

2 like a = -30, c = -36

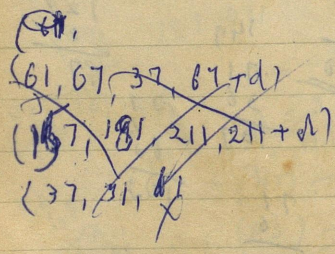
B + a + 2c + d

= D - a - 3c

D = B + 2a + 4c + d

D - b = D - a - 2c

a = -6, c = 30



197 36 161 167

173 36 137 173 48 (137)

13 12

173 − 30 − 18 37 + 30 + 12

~~A(67) − (67, 97, 103, 97 + d)~~

~~B(173) − (173, 131, 173, 137, 131, 131 + d)~~

~~C(37) − (37, 7, 1, 79 + d)~~

~~A(97) − (97, 103,~~

~~A(47) − (41, 53, 83, 53 + d)~~

~~C(23) − (23, 17~~

A(103) − (103, 109, 139, 109 + d)

C(79) − (79, 73, 43, 145 + d

B(167) − (167, 131, 101, 101 + d)

D(71) − (71, 107, 137, 65 − d)

× B(199) − (199, 163, 133, ...)

× B(193) − (193, 157, 127, 127 + d)

× D(97) − (97, 133

× B(229) − (229, 193, 163, 163 + d)

× D(133)

d = 48

A(103) − (103, 109, 139, 157)

C(79) − (79, 73, 43, 163)

B(167) − (167, 131, 101, 53)

D(71) − (71, 107, 137, 17)

53 30 79 97 36 133

C = 47 + 6 − 30

103 + 6 − 30

C 109 30

79 36 115 79 66 145 48

D = 193 96 97

229 36 193 97 36 133 85 13 52

229 96 133

109 48 157

101 48 53

101 48 53 D − a − 2c 48

C − a − 2c + d

420

210 137 73 C + D − a − b 210 107 43

C + D − 2c

150 60 B + 2c + a − d

167 96 71

210 17 193

55 12 26 37 130

Table VII

109	43	131	137
17	167	79	157
193	103	71	53
101	107	139	73

Excellent

Let me after all 2/5/84

(1 1 1 1 1 1 1)

(1 (1 1) 1)

Type VII

109	131	43	137
17	79	167	157
193	71	103	53
101	139	107	73

→

109	131	43	137
193	71	103	53
17	79	167	157
101	139	107	73

Type X.

Type Z

Type VII → Type X by successive interchange of the middle two or the ends.

Type

109	137	131	43
17	157	79	167
193	53	71	103
101	73	139	107

$2^{nd} \& 4^{th}$ cols

$2^{nd} \& 4^{th}$ rows

109	137	131	43
105	73	139	107
193	53	71	103
17	157	79	167

26 X

43	109	137	131
167	17	157	79
103	193	53	71
107	101	73	139

→

167	17	157	79
43	109	137	131
107	101	73	139
103	193	53	71

Type IX

In type VII interchange $1^{st} \& 2^{nd}$ cols $\& 3^{rd} \& 4^{th}$ cols followed by interchange of $1^{st} \& 2^{nd}$ rows $\& 3^{rd} \& 4^{th}$ rows we get type IX

In Type X interchange $1^{st} \& 2^{nd}$ cols $\& 3^{rd} \& 4^{th}$ cols followed by interchange of $1^{st} \& 2^{nd}$ rows $\& 3^{rd} \& 4^{th}$ rows

$A \Leftrightarrow 2C + 2A = 5$

Type X

131	109	43	131
71	193	107	139
79	17	103	71
139	101	167	79

→

71	101	107	139
131	109	43	131
139	17	167	79

$2B + C + D - b + d = S$

$B + S - A - a + d = S$

$B =$

$2A + C + D + a - d = S$

$A + S - B + a - d = S$

$B - A = a - d$

$B = A + a - d$

131	109	137	43
71	193	53	103
79	17	157	167
139	101	73	107

→

71	193	53	103
131	109	137	43
139	101	73	107
79	17	157	167

Type VIII

$D - C = a + d$

In type X do the same interchange as in getting VII → IX

Then we get Type VIII

$A + B + 2C + C + 2d = S$

$C - D + S + a + d = S$

$A + B + 2C + b = S$

$A + B + C + D + C - D + b = S$

$D - C = b$

Type XI

$A + D - d = S/2$

$B + C + d = S/2$

$A + C + C + d = S/2$

$B + D - b = S/2$

$A + C + a = S/2$

$b = c + d$

$C - D =$

$A + B + 2C + C + 2d = S$

$b + d = S$

$A + B + C + D + C - D + C + 2d = S$

$C - D + C + 2d = 0$

$a = b$

$C - D + a + d$

$b = D - C$

$C - d$

$2A + C + D + C - d = S$

$A + B + C + D + (A - B) + C - d = 0$

$2A + C + D + C = S$

$A + B + C + D + (A - B) + C = S$

$D - C = a + d$

$B - A = C$

$B + D - a + b - c - d = S/2$

$a + b - c$

$a + d$

$B + C + b - c = S/2$

$A + D - b + c = S/2$

$2A + C + D + a - b + c = S$

$B + D - a = S/2$

$A + B + C + D + A - B + C = S$

$B = A + C$

$= A + a - d$

(140) 31 Days $a = c + d$ **AUGUST 1980** 8th Month

सोमवार २५ अगस्त १९८० **MONDAY 25** सावन शुदी १४ सं० २०३७

$a = b = c + d$

$\cancel{B - A = a - d}$ $D - C = a + d$, $B - A = a - d$, $C + a + c = C + a + a - d$

$A - b + c$

$A, A - a, \cancel{A - a + d}\ A - d, A - a + d$

$B, B + a, B + d, B + a - d$

$C, C + a, C - a + d, C + 2a - d$

$D, D - a, D + a - d, D - 2a + d$

$B = A + a - d$

$D = C + a + d$

$a = b = c + d$

Take $a = -6$, $d = 30$

$\cancel{A}(53) - (53, 59, 83, 29)$

$\cancel{B}(77)$

$\cancel{A}(73) - (73, 79, 103, \cancel{49})$

$\times A(83) - (83, 89, 113, 59)$

$\times B(107) - (107, 101, 77)$

$\cancel{A}(97) - (97, 103, 127, 73)$

$\cancel{A(101) - (101, 107, 71,}$

$\times B(121)$

$\times A(101) - (101, 107, 131, 83)$

$\cancel{B}\ A(107) - (107, 113, 137, 113)$

$\cancel{A(101)}\ A(131) - (131, 137, 161$

$\times A(157) - (151, 157, 181, 127)$

$\times B(175)$

$\times A(157) - (157, 163, 187$

$\times A(167) - (167, 173, 197, 143)$

$A(173) - (173, 179, 203$

Let me try $a = -6$, $d = 30$

$a - d = -16$

$a = -6$

$d = 10$

$73 - 6 + 30$

83 6

89 30

83 24

107 30

97 24

127 24

97 24

137 24

113 101 24

$-6 + 30$

157 30

151 24

173 30

$= 36$

73 12 61 30 31

53-6-30

A(53) - (53, 59, 23, 89)
B(17) - (17, 11, 47, -21)

A(73) - (73, 79, 43, 109)
B(37) - (37, 31, 67, 1)

~~C(47) - (47, 41, 83, 5)~~
~~D(71) - (71, 77)~~

C(103) - (103, 97, 139, 61)
D(127) - (127, 133

C(113) - (113, 107, 149, 71)
D(137) - (137, 143

C(157) - (157, 151, 193, x

C(163) - (163, 157, 199, 121)

C(173) - (173, 167, 209,

C(181) - (181, 173, 217)

Try a = -30, d = -6.

A(37) - (37, 67, 43, 61)
B(13) - (13, -17

A(73) - (73, 103, 79, 97)

A(193) - (193, 199, 223, 169)

~~A(199)~~ A(223) - (223, 229, 253)

~~[illegible]~~

(197, 191, 233

(199, 193, 223, 157)

73 6 67 30

47 24 71

47 12 55

35

47-6=41

109 103

103 12 91 30

113 12 101

97 30

113-6+30

107+30

169

199 30 229

163 12 151

183

187 30

~~B = 37-30+6~~

~~53-30+6~~

~~B = 73-30+6~~

~~43-36=41~~

199 30

239 30 201

197 12 185

193

199 12 187

199 30 223

313
30

263

283
30
213

233
12
121

~~239, 233~~

(233, 227, 269, 91)

257, 251, 293

~~269, 257,~~

~~277, 271,~~

~~307, 293,~~

Looks very difficult

We must by other values of a & d

A, A−a, A−a+c, A−c
B, B+a, B+a−c, B+c
C, C+a, C−c, C+a+c
D, D−a, D+c, D−a−c

B = A+c
D = C+2a−c

D−2a+a−c

A, A−a, A−c, A−a+c
B, B+a, B+c, B+a−c
C, C+a, C−c, C+a+c
D, D−a, D+c, D−a−c

B = ~~A+c~~ A+c
D = C+2a−c

97
24
121

A, A−a, A−c, A−a+c
A+c, A+a+c, A+2c, A+a
C, C+a, C−c, C+a+c
C+2a−c, C+a−c, C+2a, C+a−2c.

103
24
79

103
48
151

103
18
121

103
18

A+18
(133)

A, A−a, A+a, A−c, A+c, A+2c, A−a+c, A+a+c
C, C+a, C+2a, C−c, C+a+c, C+a−c, C+2a−c, C+a−2c

A = 257, a = 6, c = 24

~~257~~
~~48~~
~~209~~

251
24
227

263
24
239

~~257~~
~~48~~
~~209~~

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

$a = 11$
$b = 7$
$7 - 9 + c = 11$,

$12 - 9 - d = 15$
$d = -12$
$c = 13$

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

$a = 6 = b$
$c + 6 + c = 5$
$7 + c = 2$

$c = -2$
$16 - 6 + d = 12$
$d = 8$
$a = b = c + d$ //

$D - C = 14 = a + d$ ✓
$B - A = -2 = c$

$c = a - d$
$B + \cancel{a - a + d}$
$c = d - a$
$B + a + a - d$
$B + 2a - d$.

A, A−a, A−d, A−a+d
B, B+a, B+d, B+a−d
C, C+a, C−a+d, C+2a−d
D, D−a, D+a−d, D−2a+d

$D = C + a + d$
$B = A + a - d$

$a = b \quad d = 30$
$37 + 6 - 30$

(A (37) − (37, 31, 7, 61) ✗
(B (13) − (13, 19, 43, −11) ✗
(A (43) − (43, 37, 13, 67)
(B (19) − (19, 25, ✗
(A (47) − (47, 41,
(B (23) . . . (−1) ✗
~~A~~ (53) − (53, 47, 23, 77)
✗A (59) − (59, 53, 29, 83) ✗
✗A (67) − (67, 61, 37, 91) ✗
✗A (73) − (73, 67, 43, 97)
~~A~~ (79) − (79,

$B = 43 + 6 - 30$
$B = 47 + 6 - 30 = 23$
23
$47 + 30$
$53 +$

$B = 59 + 6 - 30 = 35$

$B = 73 + 6 - 30 = 49$ ✗
$79 + 6 - 30$ ✗

A (89) – (89, 83, 59, 113) B = 89 + 6 – 30 = 65
A (103) – (103, 97, 73, 127) B = 103 + 6 – 30 = 79
B (79) – (79, 85
A (107) – (107, 101, 77
A (113) – (113, 107, 83, 137) B = 113 + 6 – 30 = 89
B (89) – (89, 95
A (137) – (137, 131, 107, 161)
A (157) – (157, 151, 127, 181) B = 157 + 6 – 30 = 133
A (179) – (179, 173, 149, 203)
A (257) – (257, 251, 227, 281) B = 257 + 6 – 30 = 233
B (233) – (233,

Try a = –6, d = 30

A (37) – (37, 43, 7, 73) B = 37 – 6 + 30 =
B (7) – (7,
A (43) – (43, 37, 13, 67) B = 43 – 6 + 30 =
A (47) – (47, 41, 17, 71)
B (79) – (79, 73, 109, 43)
B = 47 + 6 + 30 =
A (47) – (47,
B (83) – (83, 77)
A (53) – (53, 47, 23, 89) B = 53 – 6 – 30 = 17
B (71) – (71, 65
A (53) – (53, 59, 23, 89) B = 53 – 6 + 30 = 17
B (17) – (17, 11, 47, –21)
A (61) – (61, 67, 31, 97) B = 61 – 6 – 30 = 25
A (67) – (67, 73, 37, 103) B = 67 – 6 – 30 = 31
B (31) – (31, 25

A(73, 79, 43, 109)
B(37, 31, 67, 1)
C(53, 47, 89, 11)
c(59, 53, 95)
c(61, 55)
d(87, 61, 103, 25)
d(73, 67) (rep)
d(79, 73 rep)
c(83, 77)
d(89, 83, 125)
c(97, 91)
c(103, 97, 139, 61)
D(127, 133)
c(109, 103, 145)
c(113, 107, 149, 71)
D(127, 143)
c(137, 131, 173,
c(163, 157, 199, 121)
d(173, 167, 209)
c(199, 193,
c(233, 227, 269, 191)
D(257, 263, 221
c(263, 257, 299)
c(277, 271, 313, 295)
d(283, 277, 319, 271)
c(313, 307, 349, 343)
D(337, 343)

B = 73 − 6 − 30 = 37

D = 53 − 6 + 30 = 77

79		67	
x	37		109
y	73		1
31		43	

D = 103 − 6 + 30 = 127

D = 113 − 6 + 30 = 137

D = 233 − 6 + 30

D = 313 − 6 + 30

C (373, 367, 409, 391), D = 373 − 6 + 30 = 397

~~C (463, 457, 499, 421)~~

D (397, 403

XC (383, 379, 411)

C (463, 457, 499, 421) − D = 463 − 6 + 30

D (487, 493, −)

C (563, 557, 599, 521) − D = 563 − 6 + 30

D (587, 593, 551

XC (593, 587, 629)

XC (613, 607, 649)

XC (593, 587, 629)

XC (613, 607, 649)

XC (653, 647, 689)

C (683, 677, 719, 691)

D (707

C (733, 727, 769, 691) D = 727

D (757, 763

Stop here

and take (a = 6, d = −30)

A (43) − (43, 37, 73, 7) B = A + a − d = 43 + 6 + 30 = 79

B (79) − (79, 85

A (37) − (37, 31, 67, 1) ~ B = 37 + 36

B (73) − (73, 79, 43, 109)

C (47) − (47, 53, 11, 89) D = 37 + 6 − 30 = 23

D (23) − (23, 17, 59, 19)

C (53) – (53, 59, 17, 25)

~~C (59) – (59,~~

C (97) – (97, 103, 61, 139) – D = 103 – 30 = 73 ~~[illegible]~~

C (107) – (107, 113, 71, 89) – D = ~~[illegible]~~

D (83) – (83, 77

C (127) – (127, 133

C (157) – (157, 163, 121, 199) – D = 157 – 30 + 6 – 30 = 133

C (167) – (167, 173, 191, 209)

C (197) – (197, 203

C (227) – (227, 233, 191, 269) D = 233 – 30 = 203

C (257) – (257, 263, 221)

C (277) – (277, 283, 241, 319)

C (307) – (307, 313, 271, 349) – D = 307 + 6 – 30

D (283) – (283, 277, 319)

C (367) – (367, 373, 331, 409)

D = 343

~~C (467) – (467, 473~~

C (607) – (607, 613, 571, 649)

C (647) – (647, 653, 611)

C (677) – (677, 683, 641, 719) – D = 683 – 30 = 653

D (653) – (653, 647, 689)

C (727) – (727, 733, 691, 769) D = 733 – 30 = 703

D (703)

I think I must stop here & try a = –6, d = –30 which is the only remaining possibility

$A, A-a, A-d, A-a+d$
$B, B+a, B+d, B+a-d$
$C, C+a, C-a+d, C+2a-d$
$D, D-a, D+a-d, D-2a+d$

$B = A+a-d$
$D = C+a+d$
$a = -6, d = +30$

$A, A+6, A+30, A-24$
$B, B-6, B-30, B+24$
$C, C-6, C-24, C+18$
$D, D+6, D+24, D-18$

$B = A+24$
$D = C-36.$

A cannot end with 9, or 1 or 7 for A+6 is not prime, or B is not prime, or B not with 1 makes B-6 not prime

So we can take A only ending with 3

$A = 43 - (43, 49 -)$
$XA(53) - (53, 59, 83, 29) - B = 77X$
$XA(73) - (73, 79, 103, 49)$
$A(83) - (89, 89, 113, 59) - B = 107$
$XB(107) - (107, 101, 77$
$XA(103) - (103, 109, 133)$
$XA(113) - (113, 119)$
$XA(163) - (163, 169)$
$XA(173) - (173, 179, 203)$
$XA(193) - (193, 199, 223, 169)$
$XA(223) - (223, 229, 253, X)$
$XA(263) - (263, 269, 293, 239) - B = 263+24 = 287$
$XA(353) - (353, 359, 383, 329)$
$XA(373) - (373, 379, 403 X)$

×A (383) – (383, 389, 413)

433 / 24 — 563 / 24 / 539 — 613 / 24 / 589

×{A (433) – (433, 439, 463, 409) – B = 433+24 = 457
B (457) – (457, 451)

×A (563) – (563, 569, 593, 539)

×A (613) – (613, 619, 643, 589)

×A (653) – (653, 659, 683, 629)

×A (733) – (733, 739, 763,

A (823) – (823, 829, 853, 799)

×{A (853) – (853, 859, 883, 829) – B = 853+24 = 877
B (877) – (877, 871,

~~D+a=d~~ c=29
c–a+d
c+a–d
53
24
29

29 + 6 – 30

(5)

Again looks a wild goose chase

(29, 23, 103 – 30

~~[illegible]~~ I think I had better omit types XI & XII in prime

a = 30, d = ~~x~~ – 6. 43, 6

×{A (37) = (37, 7, ~~31, 13~~)
B (73) = (73, 103, 57, 109)

~~A (43) = (43, 13, 37, 19)~~
~~B (21) = (71, 101, 77)~~

×C (53) – (53, 83, 29, 119)×

×C (59) – (59, 89, 23, 125)

~~C (61)~~

C (83) = (83, 113, 47, 17)

D (107) – (107, 77)

B = 37 + 30 – 6 = 61
= 37 + 30 + 6 = 73 103 107 30

~~B = 43 + 30 – 6~~ = 71

113 + 6

29 – 6 119 + 6

~~59 + 30 = 1 + 6~~ 103 / 24

53 – 6

D = 61 + 30 – 6 = 85 113 – 6

83 + 30 – 6 = 107

83 – 60 = 23 – 6

127, 19

103 – 6 + 30

103 + 6 – 30

$C + 2a - d = D + a - d$ $D = C + a$

(150)

30 Days **SEPTEMBER 1980** 9th Month

181 157+6 71 127 181

गुरुवार ४ सितम्बर १९८० **THURSDAY 4** भादों बदी १० सं० २०३७

C(99) - (99, 127, 61, 163)
D(151) - (151, 157, 187)

C(101) - (101, 131, 65)

C(107) - (107, 137, 71, 173)
D(131) - (131, 101, 167, 65)

C(113) - (113, 143)

C(127) - (127, 157, 91)

C(137) - (137, 167, 101, 83)
D(151) - (151, 121)

C(149) - (149, 179, 113, 215)

C(163) - (163, 193, 127, 229)

C(167) - (167, 197, 131, 233)
D(191) - (191, 161 —)

C(181) - (181, 211, 145)

C(191) -

C(193) - (193, 223, 157, 259)

C(197) - (197, 227, 173, 263)
D(221)

97-30 67-6 97 157 60

37+6

D = 127+30-6 = 151

77 167+6 137

131 30

D = 107+30-6

107-6 D - a = C + a

131 - 30 = 107 + 30

131 60 161+6

D = 127 71-6 77+6

+30 -6 = 156 97-6

149+30-6 179 6 171

149 60 209+6 119

D = 187 153 30 181

163+30-6 133 223 6

193 6 187 137

137-6

167 30 197 6 193 60 253+6

163-6

167+ 197 60 257

D = 197+30-6

= 227-6 = 221

Try a = -30, d = 6.

A = 37, B = 37-30-6

B = 1

A(37) - (37, 67, 31, 73)

a+d = 24

a+d = -36

a = -6

d = -30

D = 37, C = 29, A = 83, B = 103

B = 83 - 6 + 30, B = 117

24

(~~863~~, 1013, 1019, 1043 1093 + 24 = 1117

A (1033, 1039, 1063, 1009) B = 1057 ✗

~~79+x+3~~ 79 + x = 31 + y , y − x = 48 11, 59

110 + x + y = 158 + 2x = 62 + 2y ~~y − x = 48~~

y − x = 48 y = x + 48

x + y = C + D D + a − d = x x = 5, y = 53

C − a + d = y 110 + 58 = 168

S = 184 126 + x = 168 137 + C = 168

~~x = 42~~ x + C = 29 x = 13, y = 61

168 = 139 S = 13 + 37 + 29 + 89 = 184 184 / 123 / 61

29 74 / 110 / 184

D = 683 − 6 + 30

a = −6, d = 30.

73 + x = 79 + 2 = x − 6

79		67	y + 6
y − 36	37	x	109
x + 36	73	y	1
31		43	x − 6

x + 24 − 36

S = 110 + x + y 146 / 110

37 + 1 = 31 + 2

= 146 + x

110 + x + y − 146 − x

y − 36

110 + x + y − (110 + y − 36) 127 / 24 / 151

y + 43 = ½(1)

2(y + 43) = 110 + x + y

y + 86 = 110 + x

y − x = 24 , y = x + 24

x = 113, y = 137

278 / 110 / 388

2(x + 67) = 110 + x + y

x + 134 = 110 + x + y

2(67 + x) = 110 + x + y

2(y + 43) = 110 + x + y

194 / 37 / 157

134 + 2x

194 / 73 / 121

250 / 110 / 360 180 / 37 143 180 / 73 / 107

30 Days | SEPTEMBER 1980 | 9th Month

शनिवार ६ सितम्बर १९८० | SATURDAY 6 | भादों बदी १२ सं० २०३७

(152)

79	x-42	67	x+30
x-12	37	x	109
x+36	73	x+24	1
31	66+x	43	x-6

x = 173

x-42, x-12, x-6, x+30, x+36, x+66

x-42, x-12, x-6, x+24, x+30, x+36, x+66

353, 311, 341

373, 331, 361

30 Days **SEPTEMBER 1980** 9th Month

रविवार ७ सितम्बर १९८० **SUNDAY 7** भादों बदी १३ सं० २०३७

383, 3411	433	443	463	503	523	563	593	613	643
673	683	733	743	773	823	853	863	883	953
1013	1033	1063	1093	1103	1123	1153	1163	1193	

If $x = 1193$

$x - 12 = 1181$ ✓ $x + 24 = 1217$ ✓

$x - 42 = 1151$ ✓ $x - 6 = 1187$ ✓

$x + 36 = 1229$ ✓, $x + 66 = 1259$ ✓

79	1151	67	1223
1181	37	1193	109
1229	73	1217	1
31	1259	43	1187

Type XI

$S = 2520$

Excellent – wonderful

Perseverance pays

79	1151	67	1223
1229	73	1217	1
1181	37	1193	109
31	1259	43	1187

Type XII

Type III

$A-a+C+a = S/2$
$B+b+D-b = S/2$
$\Big\} A+C = B+D$

$A+C+a-b+2c = S/2$
$B+D-a+b-2c = S/2$
$A+C-a-b+2d = S/2$
$B+D+a+b-2d = S/2$

$S+2a+2c-2d = S \quad a+c=d$
$S-2a-2c+2d = S \quad a+c=d$

$a-b+2c=0, \; a+c=b-c=d, \; a+b=2d$

A, A−a, A−d, A−a+d
B, B+d, B−a+d, B−a+2d
C, C+a, C+d, C+a+d
D, D−d, D+a−d, D+a−2d

$a=2, d=12, A=73, B=19, C=239, D=293$

(73, 71, 61, 83)
(19, 31, 29, 41)
(239, 241, 251, 229)
(293, 281, 283, 271)

Type VII. $A=103, B=167, C=79, D=71$
$a=-6, c=-30, b=-66, d=48$

$2c = b-a, \; C = A-a+c = A-24$
$D = B+b+c = B-96$

1, 31, 37, 67, 73, 103, 109, 139,

1, 7, 37, 43, 73, 79, 109 ✗

1, 3, 5, 7, 11	~~1~~, 3, 5, 7, ~~11~~
13, 17, 19, 23, 29	13, 17, 19, 23, 29
31, 37, 41, 43, 47	41, 37, ~~31~~, 43, 47
53, 59, 61, 67, 71	53, ~~59~~, 67, 61, 71
73, 79, 83, 89, 103	~~73~~, 79, 83, ~~89~~, 103

15, 61, 165, 191, 235

1+19+47+67+79+103+89

~~103~~, 3, 5, 13, ~~89~~

7, 17, 19, 23, 29

41, 37, 31, 43, 47

53, 59, 67, 61, 71

~~11~~, 79, 83, 73, 1

~~103~~, 3, 5, 13, ~~89~~

53, 17, 79, 23, ~~41~~

~~29~~, 37, 31, 43, ~~73~~

~~97~~, 59, 67, 61, ~~19~~

~~11~~, 71, 83, 47, 1

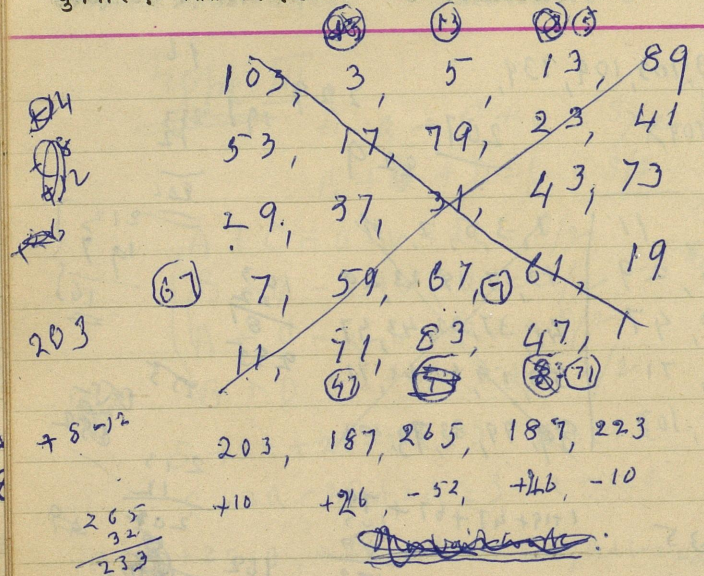
7 19 41

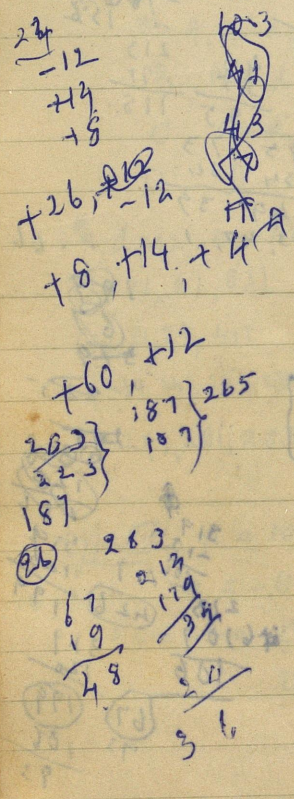
53 67 79

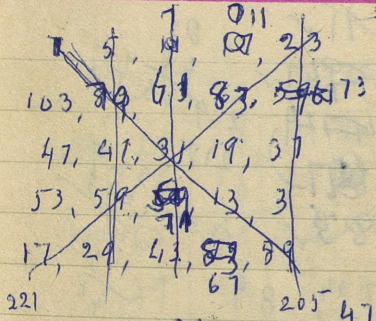
46, 60, 72

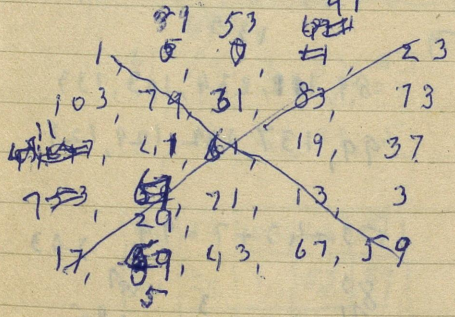
34, 48, 60

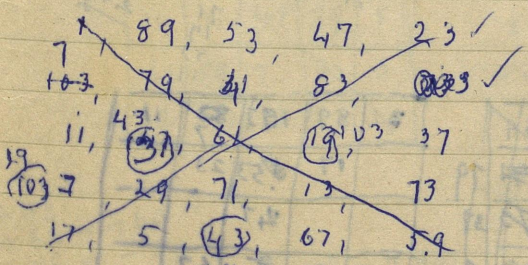
12, 26, 36

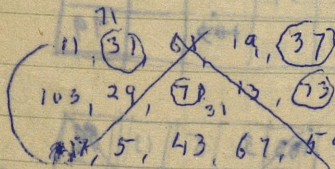

103, 3, 5, 13, 89
53, 17, 79, 23, 41
29, 37, 31, 43, 73
7, 59, 67, 61, 19
11, 71, 83, 47, 1
203, 187, 265, 187, 223
+10 +26, -52, +26, -10

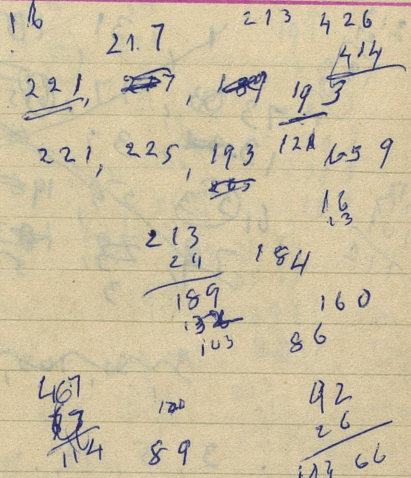

103, 3, 5, 13, 89
53, 17, 79, 23, 41
29, 37, 31, 43, 73
7, 59, 67, 61, 19
11, 71, 83, 47, 1
103, 3, 13, 5, 89
53, 17, 79, 23, 41
29, 37, 31, 43, 73
67, 59, 67, 61, 19
11, 71, 83, 47, 1
3, 5, 13
53, 79, 41
29, 37, 43, 73
7, 67, 19
71, 83, 47

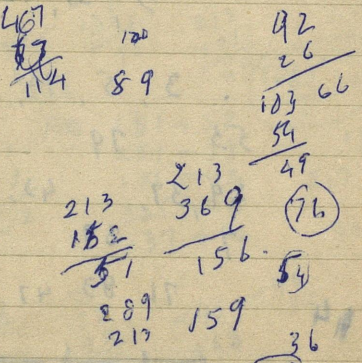


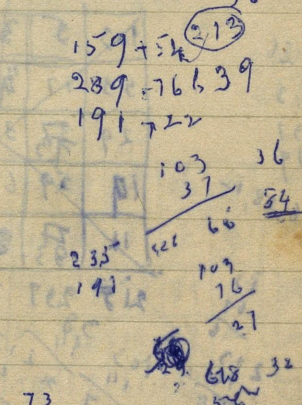




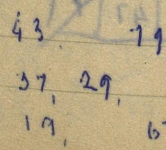












30 Days (158) **SEPTEMBER 1980** 9th Month

शुक्रवार १२ सितम्बर १९८० **FRIDAY 12** भादों शुदी ३ सं० २०३७

89, 106, 234, 103, 133

99, 137, 182, 129, 123

53 + 43 + 7 = 99

3, 5, 13,

53 79 41

29, 37, 43, 73

7 67 19

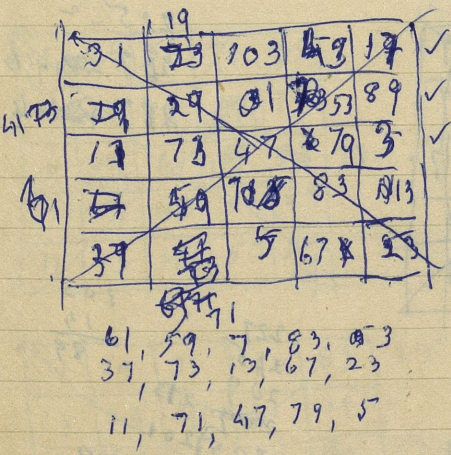
71 83 47

103	5	3	13	89
53	17	79	23	41
29	37	31	43	73
19	59	67	61	7
11	83	71	47	101

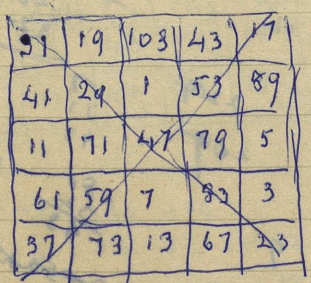
3	89	103	83	11
	17	53	23	
		47		
	59	61	67	
73		103		79

103	5	3	13	89
73	17	79	23	41
19	37	31	43	53
7	59	67	61	29
11	71	83	47	101

(159)



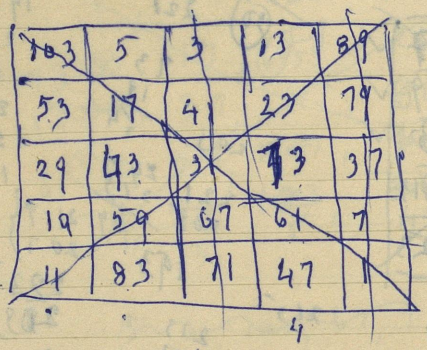
61, 59, 7, 83, 3
37, 73, 13, 67, 23
11, 71, 47, 79, 5

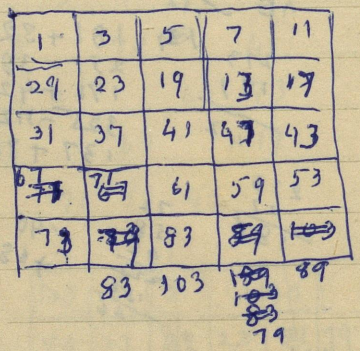






रविवार १४ सितम्बर १९८० SUNDAY 14 भादों शुदी ५ सं० २०३७







Month

30 Days

SEPTEMBER 1980

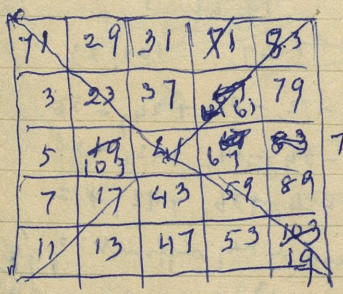
9th Month

२०३७

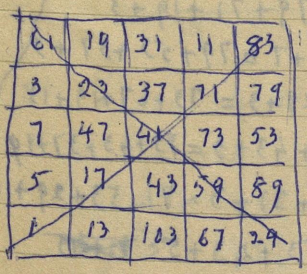
सोमवार १५ सितम्बर १९८०

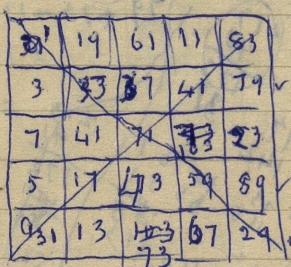
MONDAY 15

भादों शुदी ६ सं० २०३७









1	79	61	19	45
3	23	43	71	89
83	47	31	103	23
103	17	53	59	89
31	13	73	67	29

79, 61, 19 (205)
273 7, 47, 103, 23 (221)
-72, -32, +24, -56
-54, -14, +42, -38
-4, +36, +92, +12

wild goose chase - seems a very difficult problem meaning in Marathi

103	3	5	13	89
53	17	79	29	41
29	37	31	43	73
7	59	67	61	19
1	71	83	47	11

203, 187, 265, 187, 223

83				89
	17		23	
		41		
	59		61	
1		103		11

3, 5, 7, 13, 19, 29, 31, 37, 43, 47, 53, 67, 71, 73, 79

5 + 7 + 29 = 41 = 3 + 7 + 31

73 + 71 + 29 = 173 = 73 + 53 + 47

79 + 73 + 13 + 7 = 172 = 79 + 71 + 19 + 3
= 79 + 67 + 19 + 7 = 79 + 53 + 37 + 3
= 73 + 67 + 29 + 3 = 73 + 67 + 19 + 13
= 73 + 53 + 43 + 3 = 73 + 43 + 37 + 19
= 71 + 67 + 31 + 3 = 71 + 53 + 29 + 19
= 71 + 53 + 43 + 5 =
= 67 + 53 + 47 + 5

बुधवार १७ सितम्बर १९८० **WEDNESDAY 17** भादों शुदी ८ सं० २०३७

59 / 61 / 120 — 213 / 120 / 93 / 51 — 79 14 — (93) — 71 — 40 — 50

~~79+13+1=93~~

73 + 13 + 7 = 93 = 71 + 19 + 3 = 53 + 37 + 3
= 47 + 43 + 3 = 43 + 37 + 13 = 43 + 31 + 19

(62)

213 / 115 / 98

79 + 19 = 98 = 67 + 31 = 80 +30 -68

83	7	29	5	89
73	17	47	23	53
71	31	41	3	67
13	59	43	61	37
1	19	103	79	11

241, 133, 263, 171, 257
-28, +80, -50 +42, -44

28
20

203, 251, 209, 181, 221

83	29	5	7	89
53	17	47	23	73
31	67	41	71	3
43	59	13	61	37
1	67	103	31	11

79 19

-52
+24
-28

83	5	7	29	89
73	17	53	23	47
19	71	41	79	3
37	59	43	61	13
1	67	103	31	11

83 + 53 + 31 + 43 + 1 = 211

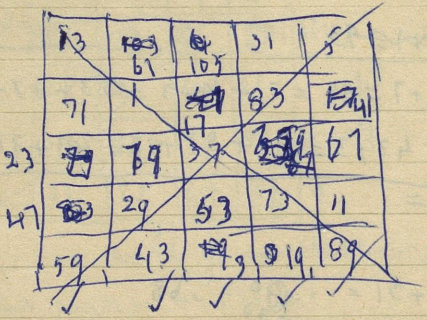
5 + 7 + 29
73 + 53 + 47
79 + 71 + 19 + 3
43 + 37 + 13
67 + 31

241, 167, 247, 223, 187
219

163
36
67

30 Days **SEPTEMBER 1980** 9th Month

गुरुवार १८ सितम्बर १९८० **THURSDAY 18** भादों शुदी ९ सं० २०३७



3, 7, 11, 17, 19, 23, 31, 41, 43, 47, 53, 61, 67, 71, 79, 103

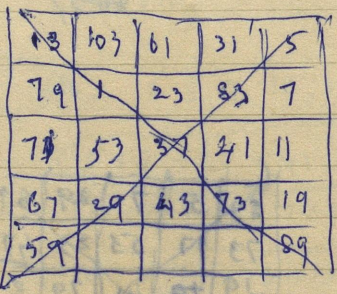
103 + 79 + 3 = 103 + 61 + 31.

79 + 23 + 7 = 79 + 19 + 11

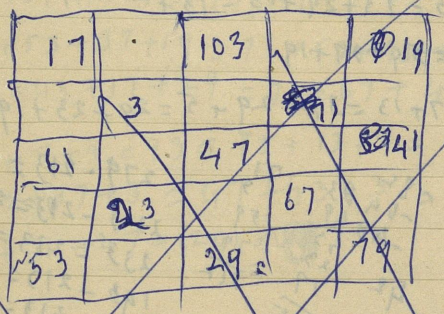
71 + 53 + 41 + 11

67 + 41 + 3 = 67 + 3

47 + 11 + 7 = 43 + 19 + 3.







17		103		19
	3		71	
61		47		41
	23		67	
53		29		79

1, 5, 7, 11, 13, 31, 37, 43, 59, 73, 83, 89

73 + 13 = 86.

89 + 43 + 7 = 139 = 83 + 43 + 13

59 + 5 = 64

73 + 43 + 7 = 123 = 73 + 37 + 13

Cannot take 4 other numbers on both sides

13	103	61	31	5
71	1	41	83	17
79	67	37	23	7
53	29	47	73	11
59	43	19	3	89
275	243	205	213	129

13	61	103	31	5
71	1	17	83	41
79	67	37	23	7
47	29	53	73	11
59	43	3	19	89
269	201	✓	229	153

11	103	73	19	7
	3		79	
		43		
	31		67	
53				89

1, 5, 13, 17, 19, 23, 29, 37, 41, 47, 59, 61

103 + 73 + 19 = 195 = 103 -

83 + 47 + 1 = 83 + 29 + 19 = 131

71 + 61 + 37 + 1 = 71 + 59 + 23 + 17 = ~~71 + 47~~

= 71 + 47 + 29 + 23 = ~~61 + 47 +~~ 170

30 Days **SEPTEMBER 1980** 9th Month

शनिवार २० सितम्बर १९८० **SATURDAY 20** भादों शुदी ११ सं० २०३७

$83+19+13=115=73+37+5=73+29+13=73+23+19$

$=61+41+13=61+37+17=59+37+19$

$47+19+5=71=41+17+13=37+29+5=29+23+19$

11	103	73	19	7
83	3	47	79	1
71	59	43	23	17
61	31	41	67	13
53	37	29	5	89

109	13	5	3	89
79	17	53	23	41
73	43	31	37	29
67	59	19	61	7
11	83	71	47	1

3, 5, 7, 13, 19, 29, 37, 41, 43, 47, 53, 67, 71, 73, 79, 83

(1) $3+5+13=21$

(2) $83+71+19=173=83+53+37=83+47+43$

$=79=73+71+29=73+53+47=79+53+41$

(3) $83+79+13+7=182=83+73+19+7=83+67+19+13$

$=83+67+29+3=83+53+41+5=83+53+43+3$

$=79+67+29+7=79+71+29+3=79+71+19+13$

$=79+53+37+13=79+47+37+19=79+47+43+13$

$= 79+43+41+19 = 73+67+37+5 = 73+67+29+13$

$= 73+53+37+19 = 73+53+43+13 = 73+47+43+19$

$= 73+43+37+29 = 71+67+41+3 = 67+53+43+19$

(4) $83+7+3 = 93 = 73+13+7 = 71+19+3 = 67+19+7$

$= 53+37+3 = 47+43+3 = 43+37+13.$

(5) $83+71+47 = 201$

$103+83 = 186 \quad 213-186 = 27$

$103+11+37+61+1 = 213$

$83+23+37+53+17 = 213$

103				83
	11		23	
		37		
	53		61	
17				1

3, 5, 7, 13, 19, ~~29~~ 31, 41, 43, 47, 59, 67, 71, 73, 79, 89

3, 5, 7, 13, 19, 29, 31, 41, 43, 47, 59, 67, 71, 73, 79, 89.

(1) $19+5+3$

(4) $89+59+47 = 79+73+43$
(a) (b)

2(a) $79+71+29 = 71+67+41$; 2(b) $89+59+31$

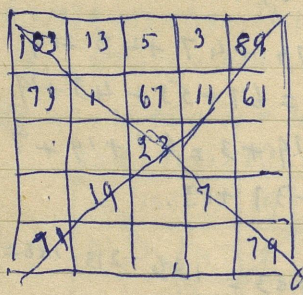
3, 5, 7, 13, 19, 29, 31, 41, 43, 47, 53, 67, 71, 73, 79, 89

3, 5, 7, 13, 17, 23, 29, 31, 41, 47, 53, 59, 61, 67, 71, 73, 79, 83

30 Days **SEPTEMBER 1980** 9th Month 30 Day

सोमवार २२ सितम्बर १९८० **MONDAY 22** भादों शुदी १३ सं० २०३७ मंगलवा

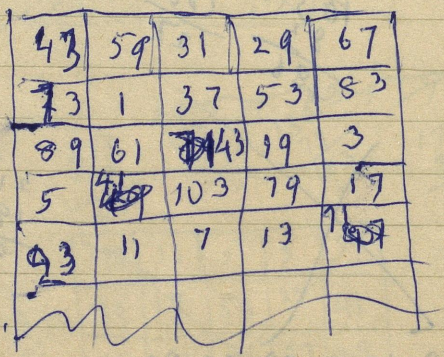
83 + 71 + 47 = 73 + 67 + 61

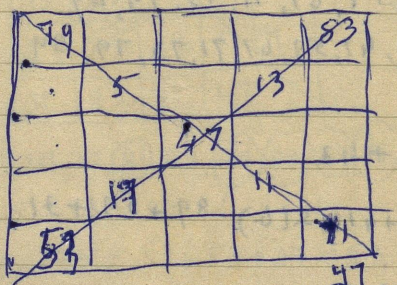


(1) 103 + 73 + 5 + 3

(2) 73 + 67 + 61

17, 29, 31, 37, 41, 43, 47, 53, 59, (61), (67), (73), 83





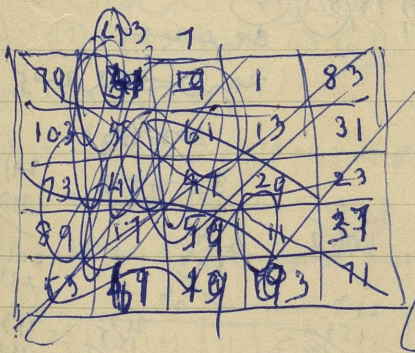
1, 3, 7, 11, 19, 23, 29, 31, 37, 41, 43, 47, 59, 61, 73, 89, 103

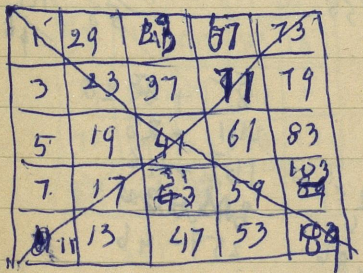
(2) 103 + 73 + 19 = 103 + 61 + 31.

(3) 43 + 7 + 1 = 31 + 19 + 1

(4) 89 + 59 + 37 = 89 + 43 + 33 = 89 + 73 + 23

(5) 59 + 23 + 7 = 53 + 19 + 17





3, 5, 7, 13, 19, 29, 31, 37, 43, 47, 53, 61, 67, 79, 83, 103

(1) $139 = 103 + 31 + 5 = 103 + 29 + 7 = 83 + 53 + 3 = 83 + 43 + 13$
$= 83 + 37 + 19 = 79 + 53 + 7 = 79 + 47 + 13 = 79 + 31 + 29$
$= 67 + 53 + 19 = 67 + 43 + 29$

(2) $119 = 103 + 13 + 3 = 83 + 31 + 5 = 83 + 29 + 7$
$= 79 + 37 + 3 = 67 + 47 + 5 = 61 + 53 + 5$
$= 53 + 47 + 19 = 53 + 37 + 29 = 47 + 43 + 29$

(3) $137 = 103 + 31 + 3 = 103 + 29 + 5 = 83 + 47 + 7$
$= 79 + 53 + 5 = 61 + 47 + 29 = 53 + 47 + 37$

(5) $113 = 103 + 7 + 3 = 79 + 31 + 3 = 79 + 29 + 5$
$= 67 + 43 + 3 = 61 + 47 + 5 = 53 + 47 + 13$
$= 53 + 31 + 29 = 47 + 37 + 29$

बुधवार २४ सितम्बर १९८० **WEDNESDAY 24** भादों शुदी १५ सं० २०३७

(3), (5), (7), 13, (19), (29), (31), 37, 43, (47), (53), (61), (67), 79, (83), (103)

1	19	53	67	73
83	23	5	71	31
13	79	41	43	37
47	17	61	59	29
11	7	103	3	89
155	145	263	243	259

66

34

1	19	53	67	73
5	23	83	71	31
79	43	41	13	37
47	17	29	59	61
11	103	7	3	89
143	205	213	213	259

36
18

155
30
185
26

32
46
78

26
24
50

30

+6
-30

+28
-30
-26

78
46
32

213
165
48

14
26
14
40

259
213
46

appears different

213 - 18 = 195
213 - 84 = 129
213 - 102 = 111
213 - 148 = 65

13				5
	1		83	
		37		
	29		73	
59				89

1065

213
155
58

213
185
28

213
155
58

241
213
28

241
213

213
167
46

213
155
58

213
46

185 + 28
241 - 28
167 + 46
259 - 46

+14
-32
+26
+96

185, 241, 167, (213), 259

96
32

42

सं० २०३७

गुरुवार २५ सितम्बर १९८० **THURSDAY 25** आश्विन बदी १ सं० २०३७

3, 7, 11, 17, 19, 23, 31, 41, 43, 47, 53, 61, 67, 71, 79, 103

3 7 11 17 19 23 31 41 43 47 53 61 67 71 79 103

(1) 195 = 103 + 61 + 31

(2) 129 = 79 + 47 + 3 = 79 + 43 + 7 = 67 + 43 + 19 = 71 + 41 + 17

(4) 111 = 71 + 23 + 17 = 61 + 43 + 7 = 53 + 47 + 11

(5) 65 = 47 + 11 + 7 = 41 + 17 + 7 = 43 + 19 + 3

79	103	41	31	3
67	1	43	23	19
79	53	31	41	3
71	29	23	23	17
29	47	11	7	89

233

41
53
79

+118
−118

289 − 76
233 − 30
175 + 38
235 − 22
133 + 80

(1) 79 + 47 + 3 = 71 + 41 + 17

(2) 79 + 43 + 7 | 67 + 43 + 19 | 71 + 41 + 17 | 71 + 41 + 17

(3) 67 + 43 + 19 | 67 + 43 + 19 | 71 + 41 + 17 | 71 + 41 + 17
53 + 47 + 11 | 53 + 47 + 11 | 61 + 43 + 7 | 53 + 47 + 11
41 + 17 + 7 | | | 43 + 19 + 3

(4)

30 Days **SEPTEMBER 1980** 9th Month

शुक्रवार २६ सितम्बर १९८० **FRIDAY 26** अश्विन बदी २ सं० २०३७

(1)

13	103	61	31	5
67	1	43	83	19
79	53	37	41	23
71	29	23	73	17
59	47	11	7	89

(2)

13	103	61	31	5
67	1	43	83	19
79	71	37	23	3
53	29	47	73	11
59	41	17	7	89

13	103	61	31	5
71	1	41	83	17
79	67	37	23	3
53	29	47	73	11
59	43	19	3	89

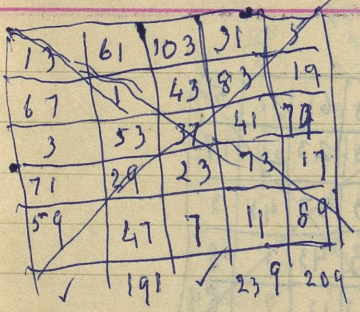
(3)

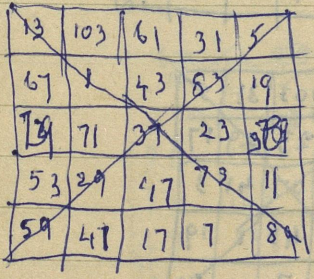
(1) 3, 37, 41, 53, 79
(2) 3, 23, 37, 71, 79
(3) 7, 23, 37, 67, 79

(1) 289 - 76
233 - 20
175 + 38
235 - 22
137 + 680

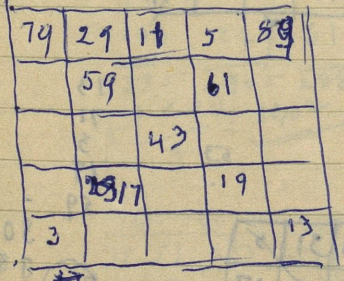
(3) 275 - 62
243 - 30
205 + 8
213 + 0
129 + 84

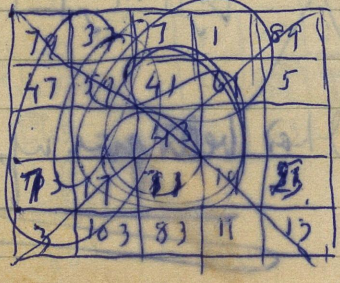
13	61	103	31	5
71	1	37	83	41
23	79	37	7	67
47	29	53	73	11
59	43	3	19	89

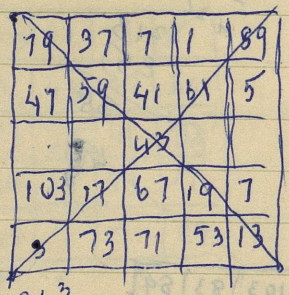


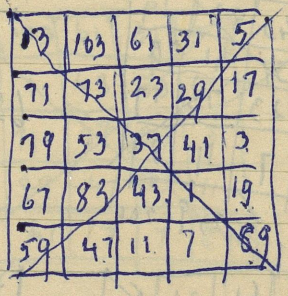


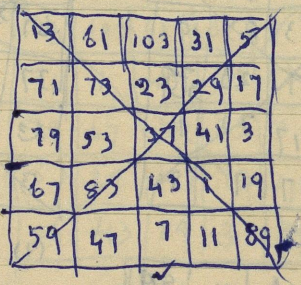


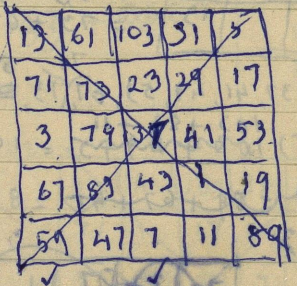












I think I had better give up this chase

11, 53, 193, 233, 1033 173
17, 59, 199, 239, 1039 179
29, 71, 211, 251, 1051 203
41, 83, 223, 263 1063
47, 89, 229, 269 1069
145 355 1055 1255 5255

8065/5 = 1613

126 384

11, 7, 17, 31, 157, 541, 947
17, 13, 23, 37, 163, 547, 953
29, 43, 53, 67, 193, 577, 983
41, 73, 83, 97, 223, 607, 1013
79, 89, 103, 229, 613, 1019
215 335 965 2885 4915

7010/5 = 1402

(60, 390, 390, 60
72, 138, 138, 72)

10 42 140 40 308
1, 11, 53, 193, 233, 541
6 7, 17, 59, 199, 239, 547
12 19, 29, 71, 211, 251, 577
12 31, 41, 83, 223, 263, 607
6 37, 47, 89, 229, 269, 613
95, 145, 355, 1055, 1255

2905 581 = 5

239	19	41	89	193
83	229	233	7	29
1	17	71	223	269
211	263	37	11	59
47	53	199	251	31

b+b' = 0
a+a' = 1
a = -2, b = -1
a' = 3, b' = 1
i = (1+2-3)2 = 0
j = (1+1-1)2 = 2

215, 265, 335, 965, 2085, 4915, 24865

4937
4943
4973
5003
5009
24865

1		17	71	223
59	211	263	11	
31	53		199	251
	239	19	41	193
29	83		233	7

7	173	227	17	223
53	157	67	107	263
167	197	89	193	1
229	37	101	257	23
191	83	163	73	137

1	23	137	223	263
167	229	191	7	53
197	37	83	173	157
89	101	163	227	67
193	257	73	17	107

647

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

1, 17, 101, 157, 191

	67			
17				73
		1		
7				
			37	

223	263	1	23	137
7	53	167	229	191
173	157	197	37	83
227	67	89	101	163
17	107	193	257	73

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

89	101	163	227	67
193	257	73	17	107
1	23	137	223	263
167	229	191	7	53
197	37	83	173	157

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

73	17			
			1	
	7			
				37
		67		

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

$a=-2,\ b=-1$
$a'=3,\ b'=1$

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

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

$a=1,\ b=2$
$a'=-1,\ b'=-3$

$i=(1-a-a')2$
$j=(1-b-b')2$
$i=(1+2-3)2=0$
$j=(1+1-1)2=2$
$(1-1+1)2=2$
$(1-2+3)2=4$

89	193	1	167	197
101	257	23	229	37
163	73	137	191	83
227	17	223	7	173
67	107	263	53	157

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

$S=647$

1	167	197	89	193
23	229	37	101	257
137	191	83	163	73
223	7	173	227	17
263	53	157	67	107

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

$S=647$

223	7	173	227	17
263	53	157	67	107
1	167	197	89	193
23	229	37	101	257
137	191	83	163	73

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

$S=647$

23	229	37	101	257
137	191	83	163	73
223	7	173	227	17
263	53	157	67	107
1	167	197	89	193

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

$S=647$

101	257	23	229	37
163	73	137	191	83
227	17	223	7	173
67	107	263	53	157
89	193	1	167	197

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

$S=647$

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

$(1,2),(1,0)$
$a=1,\ b=2$
$a'=0,\ b'=-2$
$ab'=-2+2=0$

229	37	101	253	23
191	83	163	73	137
7	173	227	17	223
53	157	67	107	263
167	197	89	193	1

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

7	53	167	229	191
163	227	67	89	101
23	137	223	263	1
197	37	83	173	157
107	193	257	73	17

I think this will hold for all 8 points

Surely I think " for " for $(-2,-1)$ & $(1,0)$ also

89	193	1	167	197
101	257	23	229	37
163	73	137	191	83
227	17	223	7	173
67	107	263	53	157

31
131 100
577 446
691 114
787 96
1601 814
1627 26
1655 30

17	157	1	101	191
101	191	17	157	1
157	1	101	191	17
191	17	157	1	101
1	101	191	17	157

72	36	0	66	6
0	66	6	72	36
6	72	36	0	66
36	0	66	6	72
66	6	72	36	0

Sheuldh and square

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

701

$(a, b) = (-2, -1)$

$a = -2, b = -1$

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

$a' = 3, b' = 1$

$(1 - a - a')2 = 0$

$(1 - b - b')2 = 42$

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

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

$j = (1 - 2)2 = 42$

$(0, 2)$

$a + a' = 0$

$b + b' = -1$

$i = 2$

$j = 4$

1013	839	41	1091	521
251	1301	173	1289	491
449	941	701	461	953
911	113	1229	101	1151
881	311	1361	563	389

$S = 3505$

$\frac{2S}{n} = 1402$

251	1301	173	1289	491
449	941	701	461	953
911	113	1229	101	1151
881	311	1361	563	389
1013	839	41	1291	521

$a = 1, b = 2$

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

$i = 2, j = 4$

372

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41, 113, 251, 389, 461
72, 138, 138, 72.

12, 23, 23, 12
24, 46, 46, 24

रविवार ५ अक्टूबर १९८० **SUNDAY 5** अश्विन बदी १२ सं० २०३७

41, 101, 491, 881, 941
60 390 390 60

47, 107, 227, 347, 407
60 120 120

~~47, 109, 241, 373~~
~~62 132 132~~

~~31, 103, 241, 379, 451~~
~~72 138 138 72~~

31, 101, 181, 261
70 80 80 100

31, 67, 97, 127, 163.
36, 30, 30, 36

131, 167, 197, 227, 263.

521, 557, 587, 617, 653.

577, 613, 643, 673, 709.

691, 727, 757, 787, 823

787, 823, 853, 883, 919.

1601, 1637, 1667, 1697, 1733.

1627, 1663, 1693, 1723, 1759.

1657, 1693, 1723, 1753, 1789.

not workable,

31, 31, 101, 251, 401,
70 150, 150

31, 101, 199, 293

37, 97, 223, 349, 409
60, 126, 126, 60

507
241
109
194 132

420
900

241
379
72
451

131
36
167
30
197
30
227
36
263

521
131
390

241
110
351

311
131
180

521
36
557
30
587
30
617
36
653

431
467
487
30
517

223
97
126

359

521
390
911

691
560
1151

787
577
210
1251

787
210
997

199
98
297

197
96
293
70
363

227
126
353
70
423

223
101
126

349
80
409

97
126
223

सोमवार ६ अक्टूबर १९८० **MONDAY 6** अश्विन बदी १३ सं० २०३

(60, 126, 126, 60)

37, 97, 223, 349, 409

41, 101, 227, 353, 413

47, 107, 233, 359, 419

71, 131, 257, 383, 443.

107, 167, 293, 419, 479

97
60
157
126
283
126
409
60
469 X

167
126
293
126
419
60
479

wild goose chase of in an alternative to Schuldham

12
16

157, 163, 167.

2426
2432
2438
2442. 407.

$\frac{25}{6} = \frac{2 \times 408}{6} = \frac{816}{6} = 136.$

23 119

43 89
53 83

5 + 131 = 136.
23 + 113 = 136
29 + 107 = 136
47 + 89 = 136
53 + 83 = 136.

(1, 7, 13), (5, 11, 17), (31, 37, 43), (41, 47, 53), (61, 67, 73)
(97, 103, 109), (101, 107, 113), (151, 157, 163), (167, 173, 179)
(257, 263, 269), (271, 277, 283), (347, 353, 359) 383

21 309 789
33 321 831
111 471 1059
141 519 2679
201 1620

2679
1620
507
4806

801

4814/6 4830/6 = 805 X

4871 4836/6 = 806

-36
+16
-20

(20)

167

1	16	353	5	91	17
37	47	41	43	53	31
11	67	73	61	103	109
163	157	113	151	107	101
7	173	179	257	263	269
389	73	347	283	277	271

826

$S = \frac{4836}{6} = 806$ = odd ✗
= even ✓

768
806

346
316
278
266

806
54
752
346
406
278
128

346, 340, 348, 342
340, 334, 342, 336
278, 270, 278, 272
270, 264, 272, 266

160, 154, 162, 156
172, 166, 174, 168
90, 84, 92, 86
34, 28, 36, 30
36, 30, 38, 32.

160 ✓
166
86 ✓
412

166
87
263

340
412
272
140

167
166
333

not worth it 73 +

331 × 2 = 662
= 139 + 523
= 241 + 421

223

139, 241, 331, 421, 523
0, 30,

4887
16
4903

1, 7, 13, 19
5, 11, 17, 23
41, 47, 53, 59
61, 67, 73, 79

1	23	61	59
67	53	7	17
19	5	79	41
73	47	13	11

Schuldham 5th order a-n square

389, 41, 251, 461, 113 (Principal square middle row)
60, 900, 450, 0, 840. (Row square middle row)

60, 600, 300, 0, 540.
1, 61, 601, 301
3, 5, 67, 607, 307, 7, 547
71, 611, 73, 613, 313, 13, 553
79, 619, 319, 83, 623, 89, 629,
97, 637, 101, 641, 341, 103, 643, 343
107, 647, 347, 47, 587
113, 653, 353, 53 593
61, 67 - 127, 667, 71, 73 - 573, 373.
79 - 159, 679, 83, 89 - 149, 689, 97 - 157, 697, 101,
103 - 163, 703, 107 - 167, 707, 109, 113 - 173, 713, 127,
131 - 191, 731, 137 - 197, 737, 139 - 199, 739, 439, 139, 679,
149 - 209, 151 - 211, 751, 451, 157 - 217,
163 - 223, 763, 167 - 227, 767, 173 - 233, 773, 473,
179 - 239, 779, 181 - 241, 787, 421, 191 - 251, 791

193 - 253] 197 - 257, 797, 497] 199 - 259] 211 - 271, 811, 511

223 - 283, 823, 523, 223, 63 — 223

227 - 287] 229 - 289] 233 - 293, 833] 239 - 299,

241 - 301] 251 - 311, 851] 257 - 317, 857, 557, 257, 97 — 257 — 4

263 - 323] 269 - 329] 271 - 331, 871] 277 - 337, 877, 577, 277, 817 — 277

281 - 341] 283 - 343] 293 - 353, 893] 307 - 367, 907, 607, 307, 847

311 - 371] 313 - 373, 913] 317 - 377] 331 - 391]

(1) 337 - 397, 937, 637] 347 - 407] 349 - 409, 949

353 - 413] 359 - 419, 959] 367 - 427] 373 - 433, 973

379 - 439, 979] 383 - 443, 983, 683, 383, 983

(2) 389 - 439, 989] — 383

(3) 397 - 457, 997, 697] 401 - 461, 1001] 403 - 463, 1003

409 - 469] 419 - 479, 1019, 719, 419, 959

421 - 481] 431 - 491, 1031, 731] — 419

433 - 493] 439 - 499, 1039, 739, 439, 979]

17, 47, 53, 257, 509, 683,

31 Days | **OCTOBER 1980** | 10th Month

शुक्रवार १० अक्टूबर १९८० | **FRIDAY 10** | अश्विन शुदी १ सं० २०३७

(423) - 503, 1043 | (449) - 509, 1049, 749 | (457) - 517

(461) - 521, 1061, 761, 461, 1001 | (463) - 523 | (467) - 527

(479) - 539 | (487) - 547, 1087, 787, 487, 1027

(491) - 553 | (499) - 539 | (503) - 563, 1103, 803

(509) - 569, 1109, 809, 509, 1049 — 5

(521) - 581, | (523) - 583 | (541) - 601, 1141

(547) - 607, 1147 | (557) - 617

(563) - 623 | (569) - 629 | (571) - 631, 1171

(577) - 637 | (587) - 647, 1187, 887, 587, 1127

(593) - 653, 1193, 893 | (599) - 659, 1199

(601) - 661, 1201, 901 | (607) - 667 | (613) - 673, 1213, 913

(617) - 677, 1217, 917 | (619) - 679 | (631) - 691, 1231,

(643), (647), (653), 931 | (641) - 701, 1241

(659) - 719, 1259, 959 | (661) (673) - 733, 1273

(677) (683) - 743, 1283, 983, 683, 1223 — 6

41, 113, 251, 389, 461

0, 60, 450, 840, 900

90 - 810. 131 - 851

120 - 280 161 -

150 - 750 191 - 791

180 - 720 221

210 - 690 251 - 731

240 - 660 281 - 701 ✓ for 41.

270 - 630 353 - 773 ✓ for 113

491 - 911 ✓ for 251

629 - 1049 fails for 389

701 - 1121 " 461

311 - 671 fails for 41.

300 - 600 341 -

330 - 570 371

360 - 540 401 - 581

390 - 510 431 - 551

420 - 480 461 repetition

This approach appears too difficult.

461 + 240 = 701; 461 + 660 = 1121

240 + 113 = 773; 660 + 113 = 773

240 + 251 = 911; 660 + 251 = 911

389 + 240 = 629; 389 + 660 = 1049

270 + 41 = 671; 630 + 41 = 671

A - a + D - a - c

+ D + A - a + d

2(A+D) - 3a - c + d

= A + B + C + D

252 − 78 = 174

103 − 71 = 221

78

Four primes to total 252.

(i) 31 + 47 + 107 + 67

A = 31, B = 47, C = 107, D = 67

a = -67 A - a = 37, B + a = 41, C + a = 101, D - a = 73

d = -30] 7, 71,

रविवार १२ अक्टूबर १९८० **SUNDAY 12** अश्विन शुदी ३ सं० २०३७

13	1	131
19	3	137
23	5	139
29	7	149
37	11	151
43	17	157
47	31	163
53	41	167
73	59	173
79	61	179
83	67	181
89	71	191
97	101	193
103	109	197
107	127	199
113	131	211
		223

980
383
397

Why take only the first 64 points?

Make S quite big

313, 467

109 + 128 + 127 + 1 + 4 = 260

990
331
439

383
6
377

990
637
353

307
30
277

301
30
269

79 + 131 + 337 + 443 = 990
47 + 211 + 293 + 439 = 990
103 + 227 + 307 + 353 = 990
113 + 241 + 277 + 359 = 990

1980

990
631
359

67

A = 79

A, A − a, A − a + d, A − 2a + d
B, B + a, B + a − d, B + 2a − d
C, C + a, C + d, C − a + d
D, D − a, D − d, D + a − d

B = 131, 137, 167, 173
A = 79, 73, 43, 37

47

A = 53 } 53, 47, 17, 11
D = 353 } 353, 347, 383, 389

53
12
35991
30
389

406
394
12

C = 263, A = 79
D = 337 B = 131

A	79, 173, 43, 37			
B	131, 137, 167, 173	a = 6, d = −30		
C	263, 269, 233, 227			
D	337, 331, 367, 373			

353, 347, 383, 389

47			
	131	263	
	53	353	
			269

A + D = 353 + 53 = 406
B + C = 263 + 131 = 394
A + D = B + C + 12

S = 800

$a = b,\ a + c = d,\ A + D = B + C + 2a$

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$B + a - c \quad B + a - d + a$

मंगलवार १४ अक्टूबर १९८० **TUESDAY 14** अश्विन शुदी ५ सं० २०३७

A−a	C+d	B+2a−d	D−a
D+a−d	B	C	A−a+d
C−a+d	A	D	B+a−d
B+a	D−d	A−2a+d	C+a

General Bergholz form for a 4th order nasik square

47	233	173	347
389	131	263	17
227	53	353	167
137	383	11	269

$S = 800$

$43 + 163 + 1 + 193 = 300$

$A + D = 370$

$D = 311$

406 − 83 = 323

406 − 89 = 323

406 − 73 = 333

29 16 = 200

(1) $a = 6,\ d = -30,\ A + D = 406,\ B + C = 394$

$A + B + C + D = 800$

$2(B + C) + 2a = 800$

$B + C + a = 400$

$B + C = 400 - a$

$A + D = 400 + a$

I have to find three more of this type, where

$59 + 60 = 119$

$A, A - a, A - a + d, A - 2a + d$

$B, B + a, B + a - d, B + 2a - d$

$C, C + a, C + d, C - a + d$

$D, D - a, D - d, D + a - d$

$a = 6,\ d = -30$

$A = 73, 67, 37, 31.$

$D = 2677, 2671, 2707, 2713$

2371

2383, 2377, 2347, 2341

103 − 23 = 126

112

2087, 2081, 2051, 2207, 2117, 2387, 2411, 2381

194

43 + 163 = 206

(1) $a = 6, d = -30$

A = 43, 53, 59, 73, 79, 103, 109, 173, 199, 233, 269
353, 373, 389, 599, 613, 683, 863, 983, 1019
1129, 1223, 1229, 1489, 1663, 1699, 1783, 1789, 1913
2383, 2699, 2713, 2719, 3733, 3803, 4603, 4679
4973, 4993, 5009

B (reverse order of A):- 1, 11, 17, 31, 37, 61, 67, 131, 157, 191, 227,
311, 331, 347, 557, 571, 641, 821, 941, 977
1087, 1181, 1187, 1447, 1621, 1657, 1741, 1747,
1871, 2341, 2657, 2671, 2677, 3691, 3761, 4561
4637, 4931, 4951, 4967. [Taking 4th term 1st in A]

C 37, 47, 53, 67, 73, 97, 103, 167, 193, 227, 263
(Taking 2nd term 1st in A) 347, 367, 383, 593, 607, 677, 857, 977, 1013, 1123,
1217, 1223, 1483, 1657, 1693, 1777, 1783, 1907, 2377
2693, 2707, 2713, 3727, 3797, 4597, 4673, 4967, 4987, 5003

D 7, 17, 23, 37, 43, 67, 73, 137, 163, 197, 233, 317, 337, 353
(Taking 3rd term 1st in A) 563, 577, 647, 827, 947, 983, 1093, 1187, 1193, 1453
1627, 1663, 1747, 1753, 1877, 2347, 2663, 2677, 2687
3697, 3767, 4567, 4643, 4937, 4957, 4973,

B = A − 42, C = A − 6, D = A − 36

A + D = 2A − 36, B + C = 2A − 48

∴ A + D = B + C + 12 is satisfied for corresponding terms.

But for the taking corresponding terms A+D + C+D will be different for different cases

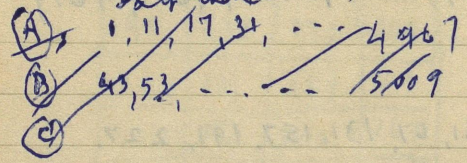
(2) $a = -6$, $d = 30$

(A) = (B) for the case $a = 6$, $d = -30$

(D) = (A) " "

(C) First term is the third term of the case $a = 6$, $d = -30$

(B) " Second " " " "



(A) 1, 11, 17, 31, 37, 61, 67, 131, 157, 191, 227, 311, 331, 347, 557, 571, 641, 821, 941, 977, 1087, 1181, 1187, 1447, 1621, 1657, 1741, 1747, 1871, 2341, 2657, 2671, 2677, 3691, 3761, 4561, 4637, 4931, 4951, 4967.

(B) 43, 53, 59, 73, 79, 103, 109, 173, 199, 233, 269, 353, 373, 389, 599, 613, 683, 863, 983, 1019, 1129, 1223, 1229, 1499, 1663, 1699, 1783, 1789, 1913, 2383, 2699, 2713, 2719, 3733, 3883, 4603, 4679, 4973, 4993, 5009

(C) 7, 17, 23, 37, 43, 67, 73, 137, 163, 197, 233, 317, 337, 353, 563, 577, 647, 827, 947, 983, 1093, 1187, 1193, 1453, 1627, 1663, 1747, 1753, 1877, 2347, 2663, 2677, 2683, 3697, 3767, 4567, 4643, 4937, 4957, 4973

(D) 37, 47, 53, 67, 73, 97, 103, 167, 193, 227, 263, 347, 367, 383, 593, 607, 677, 857, 977, 1013, 1123, 1217, 1223, 1483, 1657, 1693, 1777, 1783, 1907, 2377, 2693, 2707, 2713, 3727, 3797, 4597, 4673, 4967, 4987, 5003.

Perhaps need to consider cases (3) and (4) with $a = -6$, $d = -30$ and $a = 6$, $d = 30$

(5) $a = 30, d = -6$.

a_1	a_2	a_3	a_4	a_5	a_6
b_1	b_2	b_3	b_4	b_5	b_6
c_1	c_2	c_3	c_4	c_5	c_6
a_4'	a_5'	a_6'	a_1'	a_2'	a_3'
b_4'	b_5'	b_6'	b_1'	b_2'	b_3'
c_4'	c_5'	c_6'	c_1'	c_2'	c_3'

$a_1 + b_1 + c_1 = a_4 + b_4 + c_4$

a_1	a_2	a_3	a_4
b_1	b_2	b_3	b_4
a_3'	a_4'	a_1'	a_2'
b_3'	b_4'	b_1'	b_2'

$a_1 + c_5' + b_6' + a_1' + c_5 + b_6 = \frac{65}{6} = 5$

$a_1 + b_1 + c_1 + a_4' + b_4' + c_4' = 5$

$b_1 + a_2 + c_6' + b_1' + a_2' + c_6 = 5$

$a_1 + b_1 + c_1 = a_4 + b_4 + c_4$

1, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 71

$a = 10$

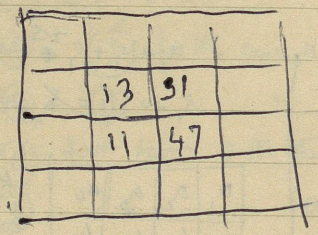
11, 13, 31, 47

6, 6, +6

	13	31	
	11	47	

A − a	C + a + c	B + b − c	D − b
D + a − d	B	C	A − a + d
C − b + d	A	D	B + b − d
B + b	D − a − c	A − b + c	C + a

$a = 6, b = 4, c = 16$



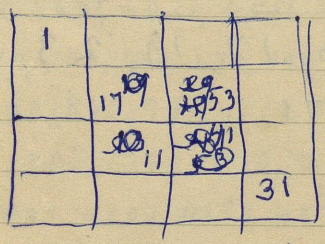
$C + a = 37$
$B + b = 17$
$D + a = 53$
$C - b = 27$
$A - a = 5$
$B + b =$
$D - a = 41$
$A - b = 7$

$A - b + c = 23$
$D - a - c = 25$ ×

102
54
48

1	23
3	29
5	31
7	37
11	41
13	47
17	53
19	71

$3 + 29 + 17 + 53 = 102$
$11 + 13 + 31 + 47 = 102$
$13 + 41 + 19 + 29$



567
331
236

58 177
34
163

$23 + 23$

11
5
9
37

$A = 13, a, B = 11, C = 37, D = 41$
$a = 10, b = 18, c = 24, d = -2$

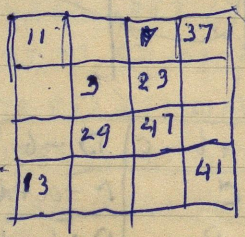
47

$37 - 18 = 19$

$11 - 24 + 18 = 5$

102
58
58

52



41

37

रविवार १९ अक्टूबर १९८० **SUNDAY 19** अश्विन शुदी १० सं० २०३७

11			41
	7	19	
	29	47	
13			37

48

102
48
54

48

218

a = 6, b = 18

102
78
24

52
52
50

24.

1 23
3 31
5 53
17 71.

B	x	y	C
C + x	C + a	D + b	A + y
D − y	D − b	A − a	
A			D

102
54
48
102
70
32

102
76
26

11	53	1	37
71	3	23	5
7	29	47	19
13	17	31	41

17

259

258
258
221

31 37 41 43 47 53 59 61

67 71 73 79 83 89 97 101

258
180
78

37 79
41 101

61	53	73	71
83	37	41	97
47	79	101	31
67	89	43	59

$2S/n = \frac{504}{4} = 126$

43	73	47	89
107	29	103	13
113	23	97	19
37	79	53	83

a_1	a_2	a_3	a_4
b_1	b_2	b_3	b_4
a_3'	a_4'	a_1'	a_2'
b_3'	b_4'	b_1'	b_2'

$a_1 + b_4' + a_1' + b_4 = S.$

$a_1 + b_1 + S - (a_3 + b_3) = S$

$a_1 + b_1 = a_3 + b_3$

a_1	a_2	a_3	a_4
b_1	b_2	b_3	b_4
b_4'	b_3'	b_2'	b_1'
a_4'	a_3'	a_2'	a_1'

$\cancel{F+G+y}$ $\cancel{F} + \cancel{G} + y - w = \cancel{F} + \cancel{G} - x - z$

$x + y + z = w$

$\frac{1068}{6} = 178$

a_1	a_2	a_3	a_4	a_5	a_6
b_1	b_2	b_3	b_4	b_5	b_6
c_1	c_2	c_3	c_4	c_5	c_6
a_4'	a_5'	a_6'	a_1'	a_2'	a_3'
b_4'	b_5'	b_6'	b_1'	b_2'	b_3'
c_4'	c_5'	c_6'	c_1'	c_2'	c_3'

$\frac{S}{3}$

$a_1 + b_1 + c_1 + S - (a_4 + b_4 + c_4) = S$

$a_1 + b_1 + c_1 = a_4 + b_4 + c_4$

$a_2 + b_2 + c_2 = a_5 + b_5 + c_5$

$a_3 + b_3 + c_3 = a_6 + b_6 + c_6$

$A_1 = A_4$

$A_2 = A_5$

$A_3 = A_6$

$A_1 + A_4 + A_2 + A_5 + A_3 + A_6 = 3S$

$2A_1 + 2A_2 + 2A_3 = 3S$

$A_1 + A_2 + A_3 = 3S/2$

360
197
163

360
163
197

$S = 1080$ (180)

$\frac{3240}{2} = 1620$

360 − 1 = 359 ✓
360 − 7 = 353 ✓
360 − 11 = 349 ✓
360 − 13 = 347 ✓
360 − 23 = 337 ✓
360 − 29 = 331 ✓
360 − 43 = 317 ✓
360 − 47 = 313 ✓
360 − 53 = 307 ✓
360 − 67 = 293 ✓
360 − 79 = 281 ✓
360 − 83 = 277 ✓
360 − 89 = 271 ✓
360 − 97 = 263 ✓
360 − 103 = 257 ✓
360 − 109 = 251 ✓
360 − 127 = 233 ✓
360 − 131 = 229 ✓
360 − 137 = 223 ✓
360 − 149 = 211 ✓
360 − 163 = 197 ✓
360 − 167 = 193 ✓
360 − 179 = 181 ✓

(23) associates

349	29	313	83	263	43
337	53	281	103	293	13
~~353~~	~~109~~	~~233~~	~~79~~	~~189~~	~~197~~
353					

349 | 337
29 | 53
313 | 281
83 | 103
263 | 223
43 | 83
1080 | 1080

1080 22 409
927
153 43
1007 13
1047
76
1083
1023
1021
59

353
67
251
223
197
1080
724
296

1080
932
146
1080
724
356
197
163

353
109
233

1080
695
385
109
276
179
97

353
109
131
89

223
83
306
293

1080
682
398

1080
864
216

353
127
197
89

1080
830
250

353
271
211
109

1080
872
208

347

बुधवार २२ अक्टूबर १९८० **WEDNESDAY 22** अश्विन शुदी १३ सं० २०३७

S/3 = 366

(1, 359)
(7, 353)
(11, 349)
(13, 347)
(23, 337)
(29, 331)
(43, 317)
(47, 313)
(53, 307)
(67, 293)
(79, 281)
(83, 277)
(89, 271)
(97, 263)
(103, 257)
(109, 251)
(127, 233)
(131, 229)
(137, 223)
(149, 211)
(163, 197)
(167, 193)
(179, 181)

×(7, 359)✓
(13, 353)✓
×(17, 349)✓
×(19, 347)✓
(29, 337)✓
×(53, 313)✓
×(59, 307)✓
×(73, 293)✓
(83, 283)
(89, 277)
(97, 269)
×(103, 263)✓
×(109, 257)✓
×(127, 239)✓
(137, 229)
×(139, 227)✓
(167, 199)
(173, 193)

1098

359
313
263
935
1098
163

1367

359
313
263
127
19
17
1098

162

1098
917
181
29
152

1145
1098
47
1788

1098
669
529

(83, 283)×
89, 277×
97, 269
167, 199
173, 193
137, 229×

97, 269
167, 199
173, 193

277
269
83
193

1098
629
469

1450
1098
352
292

83, 283
89, 277
97, 269
137, 229
167, 199
173, 193

280
188
172
92
32
20

1450
746
2196

1098

340

गुरुवार २३ अक्टूबर १९८० **THURSDAY 23** अश्विन शुदी १४/१५ सं० २०३७

(13, 353) ✓
(29, 337)
(59, 307) ✓
(73, 293)
(83, 283) ✓
(89, 277) ✓
(97, 269) ✓
(109, 257)
(137, 229) ✓
(139, 227)
(167, 199)
(173, 193)

1098
805
297

353
277
269
630

1098
161

1098
859
239

229
194
30

353
277
229
97
83
59
1098

337
293
229
97
83
59
1098

26

1506
1098
408

1506
1098
408
148
260

45.00
3.50
5.00
5.00

649
580
69

649
97

S = 1098

35/2 = 3 × 549 = 1647

549
(A+B+C) = 1647

600
500
400
1000

359
97
193
649

337
83
229
647

353
19
193
565

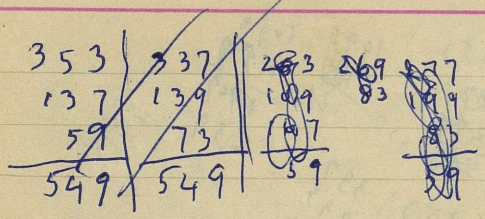
313

549
337
212
= 139+73

353
549
196

137
59
196

549
5
2



(359) 190 = 17+173 = 53+137

(353): 196 = 29+167 = 59+137

(349), 200 = 7+193 = 73+127

(347), 202 = 29+173

(337), 212 = 103+109 = 139+73 = 193+19

(313), 236 = 7+229 = 139+97 = 127+109

(307): 242 = 13+229 = 139+103 =

(293): 256 = 17+239 = 29+227 = 83+173
= 89+167

(283): 266 = 73+193 = 127+139

(277): 272 =

(269): 280 = 17+263 = 53+227

(263): 286 = 17+269 = 29+257 = 59+227

(257) 292 = 29+263 = 53+239

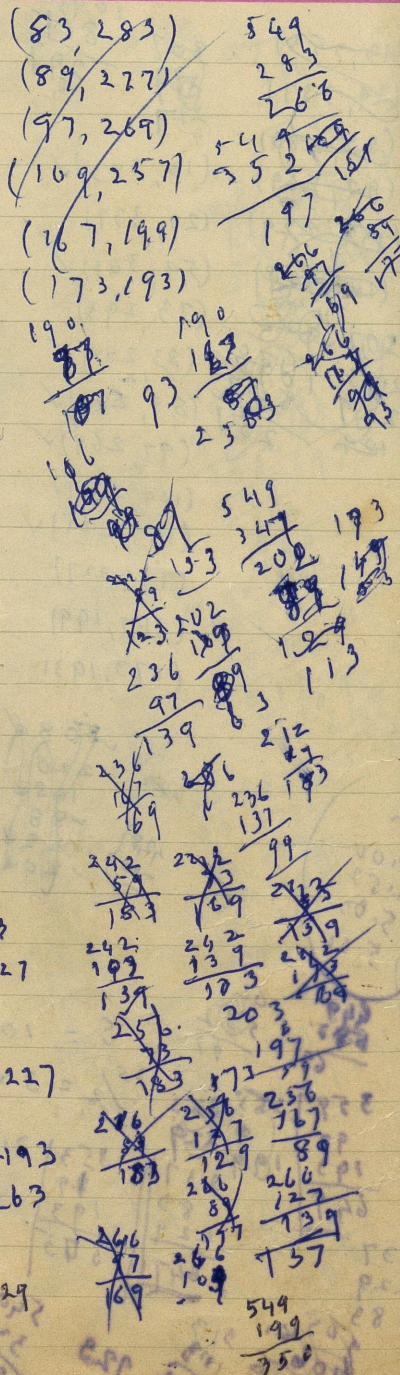
(239): 320 = 17+293 = 53+257 = 83+227
= 137+173

(229): 320 = 7+313 = 13+307 = 127+193

(227): 322 = 29+293 = 53+269 = 59+263

(199): 350 = 13+337 = 73+277

(193): 356 = 7+349 = 19+337 = 127+229



359	353	313	277	331	
137	187	139	199	109	
53	59	97	73	103	

359	277	269	313		
173	199	227	259		
17	73	53	107		

(359): $167 + 53 = 137 + 83$

(353): $199 - 59 = 173 + 53$

359	313	349	347	353	
127	137	137	109	167	
73	97	53	103	89	
559	549	539	559	549	

Jake S/3 = 482

(3, 479)
(19, 463)
(43, 439)
(61, 421)
(73, 409)
(103, 379)
(109, 373)
(151, 331)
(199, 283)
(211, 271)
(241, 241)

(5, 601)
(7, 599)
(13, 593)
(19, 587)
(29, 577)
(37, 569)
(43, 563)
(59, 547)
(83, 523)
(97, 509)
(103, 503)
(107, 499)
(127, 479)
(139, 467)
(149, 457)
(157, 449)
(163, 443)
(167, 439)
(173, 433)
(197, 409)
(223, 383)
(227, 379)
(233, 373)
(239, 367)

Jake S/3 = 606

(257, 349)
(269, 337)
(293, 313)

S = 1818

(5, 601)
(29, 577)
(43, 563)
(97, 509)
(127, 479)
(139, 467)
(157, 449)
(163, 443)
(197, 409)
(223, 383)
(269, 337)
(293, 313)

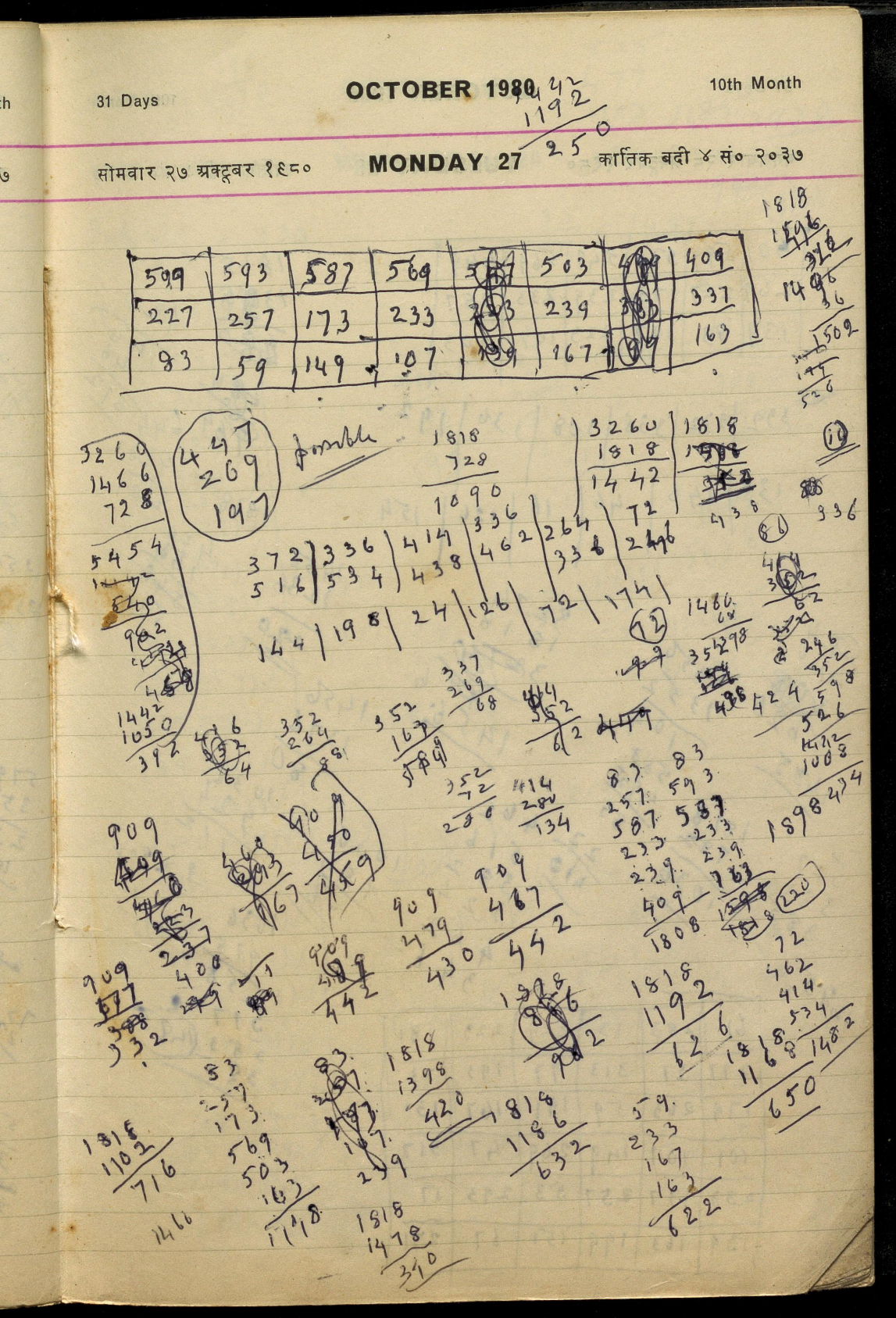
31 Days

OCTOBER 1980

10th Month

सोमवार २७ अक्टूबर १९८० **MONDAY 27** कार्तिक बदी ४ सं० २०३७

599	593	587	569	563	503	499	409
227	257	173	233	233	239	233	337
83	59	149	107	199	167	199	163



601	599	509	547	569	449
269	227	173	239	233	257
139	83	127	223	107	103

332	372	336	308	336	192
130	146	46	16	126	154

61	283	13	229	223	181
277	37	313	97	193	73
179	263	59	191	167	131
101	107	149	269	47	317
233	137	257	53	293	17
139	163	199	151	67	271

990
S = 2970

525
477
483 1485 2970

Take S/3 = 330

$\frac{3S}{2} = 1485$

S/3 = 606

$\frac{3S}{2} = \frac{1818 \times 3}{2}$

909 × 3

2727

(13, 317) ✓
(17, 313) ✓
(19, 311)
(23, 307)
(37, 293) ✓
(47, 283) ✓
(53, 277) ✓
(59, 271) ✓
(61, 269) ✓
(67, 263) ✓
(73, 257) ✓
(79, 251)
(89, 241)
(97, 233) ✓
(101, 229) ✓
(103, 227)
(107, 223) ✓
(131, 199) ✓
(137, 193) ✓
(139, 191) ✓
(149, 181) ✓
(151, 179) ✓
(157, 173)
(163, 167) ✓

330
277
59
590

330
127
203

330
131
199

331

317

351 53
48

299 79
48

277

5638

$\frac{3S}{2} = \frac{3 \times 990}{2}$

= 3 × 495 = 1485

S/2 = 495

302

Let us make a complete breakthrough using something other than S/3 = 330

218
99
139

218
107
117

218
131
87

3266
334

31 Days — OCTOBER 1980 — 10th Month

गुरुवार ३० अक्टूबर १९८० — THURSDAY 30 — कार्तिक बदी ७ सं० २०३७

Take $S/3 = 390$, $S = 1170$

$95/2 = 1755$

$615 + 573 + 567$

615:
(389): 226 = 59 + 167
(359): 256 = 17 + 239

573
(389): 194 = 37 + 157
(337): 236 = 73 + 163

567
(359): 218 = 79 + 139
(293): 274 = 191 + 83

615
(389): 226 = 59 + 167
(359): 256 = 17 + 239
= 23 + 233
= 59 + 197
= 83 + 173
= 107 + 149

$(a_3, b_3, c_3) = (389, 167, 59)$
$(359, 239, 17)$
$(359, 233, 23)$
$(359, 197, 59)$
$(359, 173, 83)$
$(359, 149, 107)$

(1, 389)
(7, 383)
(11, 379)
(17, 373)
(23, 367)
(31, 359)
(37, 353)
(41, 349)
(43, 347)
(53, 337)
(59, 331)
(73, 317)
(79, 311)
(83, 307)
(97, 293)
(107, 283)
(109, 281)
(113, 277)
(127, 263)
(139, 251)
(149, 241)
(151, 239)
(157, 233)
(163, 227)
(167, 223)
(179, 211)
(191, 199) (193, 197)

331 ✗
223 ✗
31 ✗
373 ✗
151 ✗
11 ✗
353 ✗
233 ✗
53 ✗
317 ✗
227 ✗
311 ✗
257 ✗
41 ✗
191 ✗
307 ✗

Month

२०३७

31 Days

OCTOBER 1980

10th Month (33)

शुक्रवार ३१ अक्टूबर १९८०

FRIDAY 31

कार्तिक बदी ८ सं० २०३७

389, 379, 349, 359, 337, 293
167, 157, 139, 239, 163, 191
59, 37, 79, 17, 73, 83

222, 222, 210, 120, 174, 102
108, 120, 60, 222, 90, 105

389, 379, 349, 359, 163, 293 → 1932
167, 157, 79, 239, 337, 191 → 1170
59, 37, 139, 17, 73, 83 → 408
330, 342, 210, 342, 90, 210

389, 37, 139, 359, 163, 83 → 1170
167, 157, 79, 239, 337, 191 → 1170
59, 379, 349, 17, 73, 293 → 1170.

389	37	139	359	163	83
167	157	79	239	337	191
59	379	349	17	73	293
31	227	307	1	353	251
151	53	199	223	233	311
373	317	97	331	11	41

Excellent after all.

615
573
569

389	37	139	83	163	359
167	157	79	191	337	239
59	379	349	293	73	17
373	317	97	41	11	331
151	53	199	311	233	223
31	227	307	251	353	1

(B)

Excellent associated but not nasik

251, 353, 1
311, 233, 223
41, 11, 331

41, 11, 331
311, 233, 223
251, 353, 1

139	37	389	83	163	359
79	157	167	191	337	239
349	379	59	293	73	17
307	227	31	251	353	1
199	53	151	311	233	223
97	317	373	41	11	331

(C)

(C) is obtained from (A) by permuting cols in order 3-2-1-6-5-4. which is transformation 0 for keeping nasik property invariant we find (C) is also nasik

Applying Planck's rule to (C) we get (D)

139	37	389	359	163	83
79	157	167	239	337	191
349	379	59	17	73	293
97	317	373	331	11	41
199	53	151	223	233	311
307	227	31	1	353	251

(D)

which is again associated but not nasik.

403

Hartigate transform of (A) which is nasik & after Planck's rule becomes nasik & associated

Instead of (A) we can take (A') with upper and lower half mid columns adding up to 567, 573 and 615 respectively

139	37	389	83	163	359
79	157	167	191	337	239
349	379	59	293	73	17
307	227	31	251	353	1
199	53	151	311	233	223
97	317	373	41	11	331

(A')

Applying Planck's rule to this we get (B')

139	37	389	359	163	83
79	157	167	239	337	191
349	379	59	17	73	293
97	317	373	331	11	41
199	53	151	223	233	311
307	227	31	1	353	251

(B')

which is again associated but not magic

90

सोमवार ३ नवम्बर १९८० **MONDAY 3** कार्तिक बदी ११ सं० २०३७

S = 2400
S/4 = 600

(1, 599)
(7, 593)
(13, 587)
(23, 577)
(29, 571)
(31, 569)
(37, 563)
(43, 557)
(53, 547)
(59, 541)
(79, 521)
(~~101, 509~~)
(97, 503)
(101, 499)
(109, 491)
(113, 487)
(137, 463)
(139, 461)
(151, 449)
(157, 443)

(167, 433)
(179, 421)
(181, 419)
(191, 409)
(199, 401)
(211, 389)
(227, 373)
(233, 367)
(241, 359)
(251, 349)
(263, 337)
(269, 331)
(283, 317)
(293, 307)

221

1032
499
553

33 in all (66) in all

मंगलवार ४ नवम्बर १९८० **TUESDAY 4** कार्तिक बदी १२ सं० २०३७

Case of n = 8 $S_1 + S_2 + S_3 + S_4 = 2S = 4800$.

593	577	587	571
109	463	563	499
461	419	331	389
157	359	307	
401	233	251	563
59	227	179	167
337	79	151	113
283	43	31	97
2400	2400	2400	1
			2400

(7, 593)
(109, 491)
(139, 461)
(157, 443)
(199, 401)
(59, 541)
(263, 337)
(283, 317)
(23, 577)
(137, 463)
(181, 419)
(241, 359)
(233, 367)
(227, 373)
(79, 521)
(43, 557)

I think I must take a bigger S so as to get more sets of associates

900
499
401

209

बुधवार ५ नवम्बर १९८० **WEDNESDAY 5** कार्तिक बदी १३ सं० २०३७

1	97	113	167	389	499	563	571
31	151	179	251	307	331		

S = 3600
S/4 = 900.

(13, 887)
(17, 883)
(19, 881)
(23, 877)
(37, 863)
(41, 859)
(43, 857)
(47, 853)
(61, 839)
(71, 829)
(73, 827)
(79, 821)
(89, 811)
(103, 797)
(113, 787)
(127, 773)
(131, 769)
(139, 761)
(149, 751)
(157, 743)
(167, 733)

(173, 727)
(181, 719)
(191, 709)
(199, 701)
(223, 677)
(227, 673)
(239, 661)
(241, 659)
(257, 643)
(269, 631)
(281, 619)
(283, 617)
(293, 607)
(307, 593)
(313, 587)
(331, 569)
(337, 563)
(353, 547)
(359, 541)
(379, 521)
(397, 503)

(401, 499)
(409, 491)
(421, 479)
(433, 467)
(439, 461)
(443, 457)

48 in all

1800
563
1237

278, 2284

48

326
278

684
278
962

604
302

481

1084
810
214
6682

684
326
1010
509

424

112 118
102 96

1800
716
1084
2654

424
2654
716
1938

969

onth

30 Days **NOVEMBER 1980** 11th Month

०३७

गुरुवार ६ नवम्बर १९८० **THURSDAY 6** कार्तिक बदी १४ सं० २०३७

887	881	827	769
797	773	751	643
677	673	661	~~677~~
587	593	541	~~677~~ 677
499	409	~~461~~ 461	563
113	181	191	443
23	47	~~89~~ 89	~~199~~ 199
17	43	~~79~~ 79	~~167~~ 167
			139
3600	3600	3600	3600

17, 23, 113, 499, 587, 677, 797, 887

43, 47, 181, 409, 593, 673, 773, 881

~~79~~, ~~89~~, 191, 461, 541, 661, 751, 827

~~139~~, ~~167~~, ~~199~~, 443, 563, 643, 677, 769

79 157 269

23 + 181 + 827 + 769 = 1800.

1, 7, 17, 23, 37, 53, 67, 73, 83, 89

101, 107, 137, 157, 163, 167, 173,

191, 193, 197, 223, 227, 229,

257, 263,

1, 7, 37, 67, 73

101, 107, 137, 167, 173

157, 163, 193, 223, 229

191, 197, 227, 257, 263

17, 23, 53, 83, 89

(1, 17, 101, 157, 191)

3803

6397 5399 18

24

6421 5417

11, 17, 29, 47, 71, 101, 131

821, 827, 839, 857, 881, 911, 941

1741, 1747, 1759, 1777, 1801, 1831, 1861

3761, 3767, 3779, 3797, 3821, 3851, 3881

5381, 5387, 5399, 5417, 5441, 5471, 5501

6361, 6367, 6379, 6397, 6421, 6451, 6481

9221, 9227, 9239, 9257, 9281, 9311, 9341

Hint R-M (1, -2) AB-M (1, -1)

Ex. by Johnson in J. R. M. Vol. 12(3), p. 267
of an example of the Schulshaw type 5th order square

389	563	1361	311	881
1151	101	1229	113	911
953	461	701	941	449
491	1289	173	1301	251
521	1091	41	839	1013

Analysing this starting with 41, using R.M (−1, −2) and D.M (0, 1)
I have the five sets

41, 101, 491, 881, 941 2455
113, 173, 563, 953, 1013
251, 311, 701, 1091, 1151
389, 449, 839, 1229, 1289
461, 521, 911, 1301, 1361

with row differences in all 5 rows being 60, 390, 390, 60
and in cols 72, 138, 138, 72 ie exactly of the Schulshaw
type. This type of differences in each row amounts to
sum of 1st term + 5th term = twice middle term } ie
" 2nd " + 4th " = " " } arranged perfectly
Similarly for the columns also

In fact this is exactly what is given by
Schulshaw. with the square is formed with −41
in the position (2, 0) instead of (2, 4) as in Schulshaw
Here the moves are (−1, −2) & (0, 1) while in Schulshaw the moves are
(1, 2) and (0, −1).

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रविवार ९ नवम्बर १९८० **SUNDAY 9** कार्तिक शुदी २ सं० २०३७

(1, 61) → 31
(1, 421) → 211
(1, 541) → 271
(1, 661) → 331
(1, 1201) → 601
(1, 1321) → 661
(1, 1381) → 691
(1, 1621) → 811
(1, 2341) → 1171

(A)

19000
14250
4750

14250
9500
4750

9500

2	1	8
3	9	7
4	5	6

500
1500
20 275

3	2	1	6
4	9	8	21
5	6	7	18
12	17	16	19

15

7	8	1	16
6	9	2	17
5	4	3	12
18	21	6	19

15

P, R, R, S
a, b, c, d

A+a	D+d	C+b	B+c
C+c	B+b	A+d	D+a
B+d	C+a	D+c	A+b
D+b	A+c	B+a	C+d

(1, 5, 9, 13), (0, 2, 3, 1)
(1, 3, 7, 5), (0, 8, 1, 9)

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

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

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

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

1	1	1	1
1	1	1	1

type IV

using ~~(1, 2, 3, 4), (0, 4, 8, 12)~~

(1, 4, 3, 2), (0, 12, 8, 4)

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

Type III

(1, 7, 5, 3), (0, 1, 8, 9)

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

Type V

(1, 2, 5, 8), (0, 2, 8, 10)

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

Type IV

(1, 2, 9, 10), (0, 8, 4, 2)

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

Type VI

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

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

0, 56, 56, 0,	8, 48, 48, 8,
56, 0, 0, 56,	48, 8, 8, 48
0, 56, 56, 0,	8, 48, 48, 8
56, 0, 0, 56,	48, 8, 8, 48

16, 40, 40, 16	24, 32, 32, 24
40, 16, 16, 40	32, 24, 24, 32
16, 40, 40, 16	24, 32, 32, 24
40, 16, 16, 40	32, 24, 24, 32

1, 8, 8, 1

~~1 + 2 + 4 + 13 + 17 + 18~~

1, 2, 3, 4	5, 6, 7, 8	0, 56, 56, 0	0, 56, 56, 0
8, 7, 6, 5	4, 3, 2, 1	8. 48, 48, 8	8, 48, 48, 8
8, 7, 6, 5	4, 3, 2, 1	16, 40, 40, 16	16, 40, 40, 16
1, 2, 3, 4	5, 6, 7, 8	24, 32, 32, 24	24, 32, 32, 24
1, 2, 3, 4	5, 6, 7, 8	32, 24, 24, 32	32, 24, 24, 32
8, 7, 6, 5	4, 3, 2, 1	40, 16, 16, 40	40, 16, 16, 40
8, 7, 6, 5	4, 3, 2, 1	48, 8, 8, 48	48, 8, 8, 48
1, 2, 3, 4	5, 6, 7, 8	56, 0, 0, 56	56, 0, 0, 56

$$\begin{vmatrix} a_1, b_1, b_2, a_2 \\ c_1, d_1, d_2, c_2 \\ b_1, a_1, a_2, b_2 \\ d_1, c_1, c_2, d_2 \end{vmatrix} Q_1(P) = Q_2(P) = Q_3(P) = Q_4(P)$$

$a_1 = 1, b_1 = 6$
$c_1 = 4, d_1 = 7$

$$Q_1(R) = \begin{vmatrix} a_1, a_2, a_2, a_1 \\ a_2, a_1, a_1, a_2 \\ a_1, a_2, a_2, a_1 \\ a_2, a_1, a_1, a_2 \end{vmatrix} \quad Q_2(R) = \begin{vmatrix} d_2, d_1, d_1, d_2 \\ d_1, d_2, d_2, d_1 \\ d_2, d_1, d_1, d_2 \\ d_1, d_2, d_2, d_1 \end{vmatrix}$$

$$Q_3(R) = \begin{vmatrix} a_2, a_1, a_1, a_2 \\ a_1, a_2, a_2, a_1 \\ a_2, a_1, a_1, a_2 \\ a_1, a_2, a_2, a_1 \end{vmatrix} \quad Q_4(R) = \begin{vmatrix} c_1, c_2, c_2, c_1 \\ c_2, c_1, c_1, c_2 \\ c_1, c_2, c_2, c_1 \\ c_2, c_1, c_1, c_2 \end{vmatrix}$$

गुरुवार १३ नवम्बर १९८० **THURSDAY 13** कार्तिक शुदी ५ सं० २०३७

I.D.M

(11 5) ✗

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

with (i, j)
$= (0, 4)$
& RM $(1, 1)$
BM $(0, -1)$
only upper diagonal is non-magic

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

Only one diagonal non-magic

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

Again only one diagonal n.m

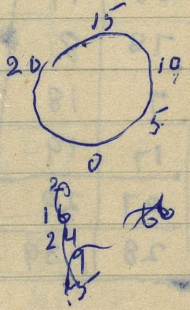
10	12	19	21	3
11	18	25	2	9
17	24	1	8	15
23	5	7	14	16
4	6	13	20	22

Again one diagonal non-magic

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

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

369
369

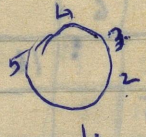


15	0	20	10	5
20	5	0	15	10
0	10	5	20	15
5	15	10	0	20
10	20	15	5	0

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

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

(3,1), (-1,1), (-3,1), (2,1)
(-1,1), (3,1), (-1,1), (-3,1)
(2,1), (-1,1), (3,1), (-1,1)
(-3,1), (2,1), (-1,1), (3,1)
(-1,1), (-3,1), (2,1), (-1,1)



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

17, 7, 6, 3, 2

both regular
non-magic

semi-magic square
q 7ij m/c p.66 q BIR I.
Hanukkah

$n = 9$ $(2, 8) = (3, 6)$ by D.D.M

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

0, 5, 10, 15, 20 Again semi-semi magic in upper diagonal.

	14			25			3	
		24			2			13
23						12		
	9			11			22	
		10			21			8
18			20			7		
	19			6			17	
		5			16			27
4			15			26		

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

fails at 27

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

19, 25, 7, 1, 13

21, 2, 9, 13, 20
15, 16, 23,

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रविवार १६ नवम्बर १९८० **SUNDAY 16** कार्तिक बुदी ९ सं० २०३७

	0	5	10	15	20
1	1	6	11	16	21
2	2	7	12	17	22
3	3	8	13	18	23
4	4	9	14	19	24
5	5	10	15	20	25

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

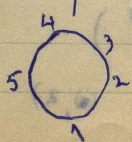
2	5	4	1	3
4	3	1	2	5
1	2	3	5	4
3	4	5	3	
5	1	2	4	

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

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

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

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



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

semi-semi

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

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

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

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

+

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

✓

✓ ✓

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

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

16	2	14	23	10
15	21	8	17	4
9	30	2	11	23
3	14			

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

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

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

$\begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$ (2, 2)

semi-semi

(1, 2)

$i = (1-1-1)2$ $(i, j) = (3, 2)$

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

$\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$

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मंगलवार १८ नवम्बर १९८० **TUESDAY 18** कार्तिक शुदी ११ सं० २०३७

2

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

(3, 1, 2, 5, 4)

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

11	17	24	8	5
5				

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

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

6	17	4	23	15
5	11	23		

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

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

1	22	19	13	10

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

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

$\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}_5$

$a-b=0,\ a+b\neq 0,\ a'\pm b'\neq 0$

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

40

75

65 − 25 = 40
65 + 10 = 75

Take $\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}_5$

& A.M(1,1) → B.M(3,0)

Then $i = (1-a-a')m,\ j = (1-b-b')m$ gives
$(i,j) = (3,2)$

with this (i,j) we have an associated magic square
Take another (i,j) say $(3,4)$ as above & then we get a
semi-magic square.

1	2	3	4	5	6	21
7	8	9	11	12	13	60
14	15	16	17	18	19	99
21	22	23	24	25	26	141
27	28	29	31	32	33	180
34	35	36	37	38	39	219
						720

1	2	3	4	5	6	21
33	12	11	9	8	27	100
14	15	18	17	16	21	120
26	25	22	23	24	19	120
7	28	29	31	32	13	140
39	38	37	36	35	34	219
						720

101

$\frac{120}{m} = 40$

$\frac{2s}{m} = \frac{720+2}{6} = 240$

$\frac{120+2}{6} = 240$

$\frac{240}{6} = 40$

120

$\frac{222}{6} = 37$

109

9	7
2	3

9	7
14	3

120

1	35	36	4	38	6
13	8	29	31	12	27
14	18	24	23	22	16
21	25	17	16	15	26
33	28	11	9	32	7
34	5	3	37	2	39

1, 2, 3, 4, 5, 6
7, 8, 9, 11, 12, 13
14, 15, 16, 17, 18, 19
21, 22, 23, 24, 25, 26
27, 28, 29, 31, 32, 33
34, 35, 36, 37, 38, 39

60
180

21
240

99
141

1	2	3	4	5	6
27	12	11	9	8	33
26	15	18	17	16	19
14	25	22	23	24	21
13	28	29	31	32	37
39	38	37	36	35	34

1	2	3	4	5	6
13	12	11	9	8	7
14	15	16	17	18	19
26	25	24	23	22	21
27	28	29	31	32	33
39	38	37	36	35	34

97
149

1	26	36	8	21	28
35	7	27	23	25	3
24	22	2	29	9	34
32	19	12	39	14	4
17	15	37	5	33	13
11	31	6	16	18	38

1	2	3	4	5	6
13	12	11	9	8	7
14	15	16	17	18	19
26	25	24	23	22	21
27	28	29	31	32	33
39	38	37	36	35	34

12, 15, 16, 17, 18, 19
28, 25, 24, 23, 22, 21

14, 17, 18, 15, 18, 19
26, 23, 24, 25, 22, 21

99
141

21

शुक्रवार २१ नवम्बर १९८० FRIDAY 21 कार्तिक शुदी १४ सं० २०३७

1	2	3	4	24	6
33	32	11	9	8	27
14	15	18	17	35	21
26	25	22	23	5	19
7	28	29	31	12	13
39	38	37	36	16	34

1	2	3	4	24	6	40
33	32	11	9	8	27	120
14	15	18	17	35	21	120
26	5	22	23	25	19	120
7	28	29	31	12	13	120
39	38	37	36	16	34	200

1, 2, 3, 4, 27, 6

39, 38, 37, 36, 13, 34

11, 15, 23, 22, 35, 21

29, 5, 18, 18, 25, 19

Month 30 Days **NOVEMBER 1980** 11th Month

२०३७ शनिवार २२ नवम्बर १९८० **SATURDAY 22** कार्तिक शुदी १५ सं० २०३७

22 1/2

Indian Bank — 8930.00

Vijaya Bank — 7430.00

Canara Bank — 16890.00

Total — 33250.00

23 litres @ 3.25 = 74.75

22 1/2 litres @ 3.60 = 81.00

1155.75

Leave 10

165.75

milk account for June.

Daily milk = 93.00

106.00

201.00

Leave 10.00

211.00

$a, a+d, a+2d$

$a+D,$

Total milk account = 211.00

165.75

376.75

$a+D+d$	a	$a+2D+d$
$a+D+d$ $(a+2D)$	$a+D+d$	$a+2d$
$a+d$	$a+2D+2d$	$a+D$

31 Days 23,000 DECEMBER 1980 2000 12th Month

शुक्रवार २६ दिसम्बर १९८० FRIDAY 26 पौष बदी ५ सं० २०३७

30,000

69

25,000
19,384
19,384
63,768
9,375
73,143

23/4

75,000
73,143
1,857
3000

418
384
34

2000
1823
3823

7

22½

75,000

9375

75,000
9375
65625
25000
40625 due
38802
1823

30 x 3.10
93.00

~~65625~~
~~25000~~
~~40625~~

3.60 x 22
720
720
79.20

30 x 3.60
108.00

19384
19418
38802

40725 Paid to Paid

9375
40725
25000
75,100

3183
1500
1683

36.00
1.80
34.20

69.00
5.75
79.20
1.80
81.00

10744.75
1683.00
9063.75

10744.75
1500.00
9244.75

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

Associates alloight.

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

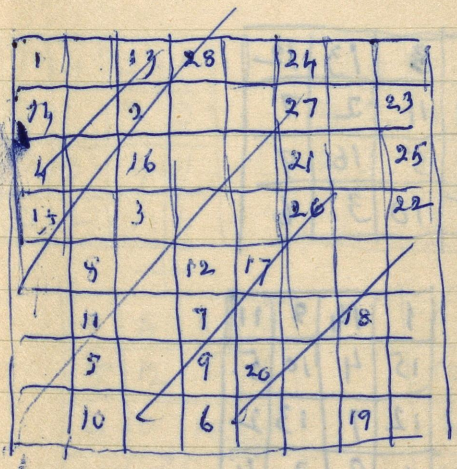
Using Planet's made above because this nothing ornate about this

~~Suppose Gaffe~~

~~8-7-6-5-4-3-2-1~~ 260 32

292 228 = 260-32

260+32.



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

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

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

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

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

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

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

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

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

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

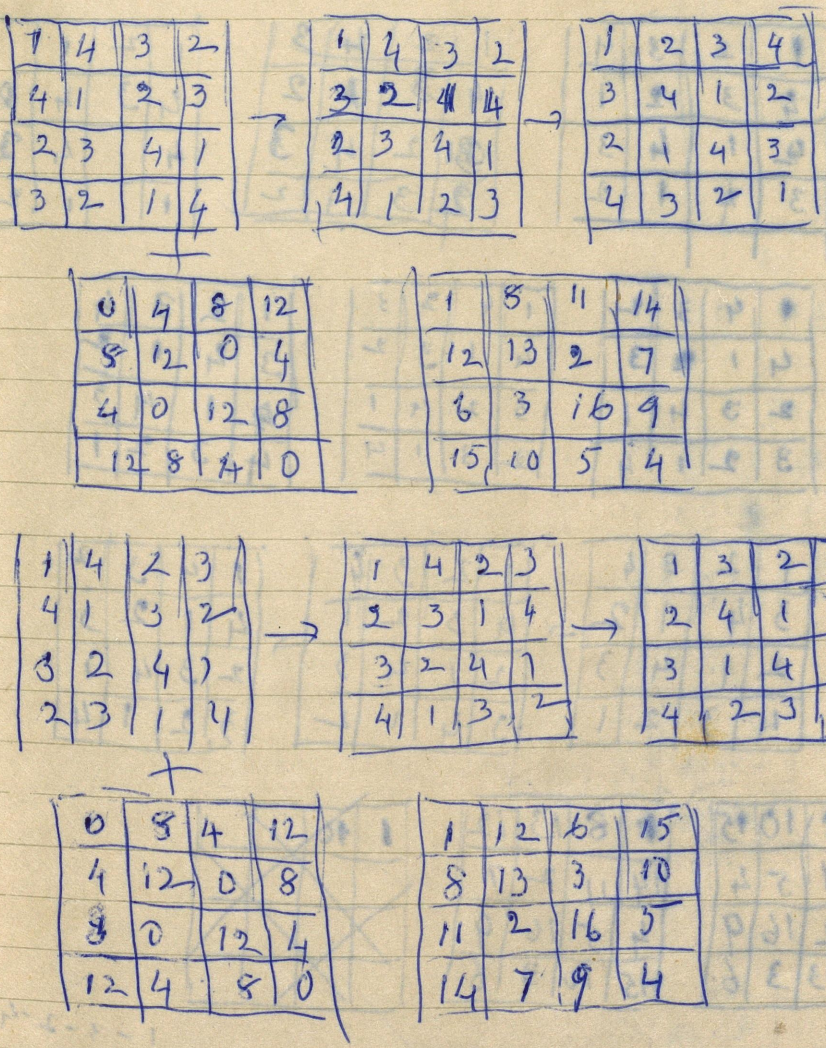
$\frac{117}{2} \times \frac{13}{4} = \frac{1521}{8} = 190.12$

$58\frac{1}{2}$

$3\frac{1}{4}$

186
13.10
199.10

200.12
199.10
399.22 ≈ 400



1, 2, 3, 4

1 3
4 2

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

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

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

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

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

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

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

→

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

→

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

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

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

1	16		

1 - 3 - 2 - 4.

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

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

0 4 6 12

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

$A + D = B + C$

$a + b = c + d$

$T = \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}$

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

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

$k = i + 2j$

$l = 2i + j$

$a_{11} \to a_{33}$

$a_{12} \to a_{14}$

$a_{13} \to a_{31}$

$a_{14} \to a_{12}$

$a_{21} \to a_{41}$

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

3 1 4 2

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

(2,2) (1,1)

$3(2i - k) = 3i$

$3(2i - l) = 3j$

$a_{11} \to a_{33}$

$a_{12} \to a_{14}$

$a_{13} \to a_{31}$

$a_{14} \to a_{12}$

$a_{21} \to a_{41}$

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

1 2 3 4

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

0 0
8 4
9 8
1 12

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

→

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

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

4			
	7		
		10	
			13

1, 4, 3, 2

1, 4, 7.

NOTES

3, 4, 5
7, 8, 9
11, 12, 13

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

8		6
	5	
4		2

8		4
	5	
6		2

2		6
	5	
4		8

2		4
	5	
6		8

4	11	9
13	8	3
7	5	12

4, 5, 6, 7, 8
10, 11, 12, 13, 14
16, 17, 18, 19, 20
22, 23, 24, 25, 26
28, 29, 30, 31, 32

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

$3 \cdot \frac{1}{4}$

$\frac{\cancel{56}^{14} \times 13}{\cancel{4}} = 182.00$

1.65

183.65

60
32
56 1/2

1/2
3.20
325
162

Form III

(Mysore Rule 5 (1) under Hindu Marriage Act 1955)

Certified that the above which contains Sl. 17 to Sl. No. 17 are duplicate copies of all Memoranda filed in the Registrar maintained by me under the Hindu Marriage Act 1955 (~~Act~~ 25 of 1955) during the month of August, 1977

30/8/77

Signature of Registrar of marriages
Bangalore

C. Sarpeshkar
25, Farrell Flats
Gordon Street
St. Augustine.
Trinidad - W.I.

Details re Ashok's marriage certificate sent to him today (6/10/80)

H.M. No. 17 / 7778 - Place and date of marriage, Ashok's signature, Nalini's signature & signatures of Y.V.S. Rau & myself and of B.K. [illegible] the officiating priest

Remittance Rs 11/- to R.B.I. B'lore under Challan B8.35 dated 24-8-1977 along with the memorandum received on 30.8.1977 & this memorandum is filed at serial No. 17 on p. 65 of Vol II of Register of marriage maintained under Hindu Marriage Act, 1955 (25 of 1925)

30/8/55 [P.T.O.]

Signature of Regr. of Marriages for Sub District under above Act
Jayanagar, B'lore.

Pr. of (A) — 3-2-1-6-5-3

139, 37, 389, 83, 163, 359,
79, 157, 167, 191, 337, 239,
349, 379, 59, 293, 73, 17,
307, 227, 31, 251, 353, 1,
199, 53, 151, 311, 233, 223.
97, 317, 373, 411, 11, 331.

by cols

346
233
113

219
207
197

either by rows.

349, 379, 59, 293, 73, 17
79, 157, 167, 191, 337, 239
139, 37, 389, 83, 163, 359
97, 317, 373, 41, 11, 331
199, 53, 151, 311, 233, 223
307, 227, 31, 251, 353, 1

$$\begin{vmatrix} a_1, & a_2, & b_1, & b_2 \\ c_1, & c_2, & d_1, & d_2 \\ a_2, & a_1, & b_2, & b_1 \\ c_2, & c_1, & d_2, & d_1 \end{vmatrix} \begin{matrix} = Q_1 \\ = Q_2 \\ = Q_3 \\ = Q_4 \end{matrix}$$

349, 379, 59, 17, 73, 293
79, 157, 167, 239, 337, 191
139, 37, 389, 359, 163, 83
307, 227, 31, 1, 353, 251
199, 53, 151, 223, 233, 311
97, 317, 373, 331, 11, 41

not nasik

1170
1112
58

350
227
123

2

446
127
573

199

201
139

171

233

376
199
177

199
163

139 + 223
197

213
183

573
211
362
223
139

374
211
163

163 + 211
183

179 + 197
183

181
193

909
443
466
139

367

466
197
269

2.50
0.50
1.00
0.50
4.50

337
269
68
6.40

352
68
420

3.10
4.00
9.90
2.10
4.50
23.60

178

309

443
269
197

227
257
269
233
167
337
1490

1818
1490
328

1818
609
1209

599
257
149
233
239
337
1508

1466
24
1442
1818

376

83
257
569
503
337
1818

90

83
257
269

1466
208
1674
1818
144

1818
931
887

227
257
447
931

1009
909
809

2727

227
259
269
755
809
1564

1818
755
1063

1818
1564
254

1009
601
408

601
269
139

547
239
223

1009
500

1009
416

1009
422

1009
577
432

1009
547
462

1009
569

1009
563
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239
223

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599
227
83

569
233
107

509
173
127

449
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103

809

809
443
346

337
269
68

809
587
222

809
509
300

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197
173

(13, 593)
(19, 587
(29, 577)
(43, 563)
(97, 509)
(103, 503)
(127, 479)
(149, 457)
(157, 449)
(163, 443)
(173, 433
(167, 439)
(197, 409)
(257, 349)
(293, 313)

1818
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574

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130
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433
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443
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409
400

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370

750
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420

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352
48

528

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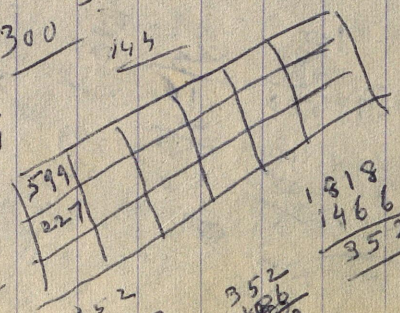
144

672
420
252

420
142
562

420
154
574



1818
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352

516
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164

352
174
424

352
186
478
424
376

223 x

~~409~~ +

~~443~~ 3

477, 483, 525

139, 163, 199, 151, 67, 271
61, 283, 13, 229, 223, 181
277, 37, 313, 97, 193, 93
179, 263, 59, 191, 167, 131
101, 107, 149, 269, 47, 317
233, 137, 257, 53, 293, 17

4-5-6-1-2-3

83, 163, 359, 139, 37, 389
191, 337, 239, 79, 157, 167
293, 73, 17, 349, 379, 59
251, 353, 1, 307, 227, 31
311, 233, 223, 199, 53, 151
41, 11, 331, 97, 317, 373

161 183 177 173

83, 163, 359, 389, 37, 139
191, 337, 239, 167, 157, 79
293, 73, 17, 59, 379, 349
41, 11, 331, 373, 317 97
311, 233, 223, 151, 53 199
251, 353, 1, 31, 227, 307

201
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139

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101

193
191
384

143
197

Clues to origin and destiny of cosmos

— will the Supercolliding Super Conductor get the funds?

PARTICLE physics is no trifling matter. Consider the latest plan of American scientists.

It will be the biggest undertaking in the history of pure science: the construction of a giant, atom-smashing particle accelerator that might help unveil the most basic constituents of the universe. With a circumference of 96 to 192 km., it will be the embodiment of Big Science.

Its host site will be the dominant centre for international physics well into the next century. But its estimated $4 billion price tag is forcing the scientific community in the U.S. to evaluate its priorities carefully in the light of limited federal funding for research.

Inside the accelerator's shielded underground tunnel, temperatures will exceed that of the hottest exploding star—100 million billion °F—as subatomic particles known as protons smack into each other at nearly light speed and break into tiny bits. Forty times more powerful than the biggest accelerators on Earth, the Supercolliding Super Conductor (SSC), as the machine is called, will thus enable scientists to make all sorts of conjectures about the fundamental nature of matter.

The SSC could, for example, help provide clues about the origin and destiny of the cosmos. It could help scientists determine whether the disparate forces of nature might be described in a series of simple, elegant equations. Many scientists say they believe that such a discovery could have profound, though as yet unimagined, practical implications just as the linking of electricity and magnetism in the late 19th century made possible much of this century's technology.

Congressional go-ahead

If it gets built, that is. The SSC's estimated $4 billion cost doesn't include operating expenses. An expenditure of that size would need congressional approval. Other big-ticket scientific projects, such as the proposed space station, will be looking for a congressional go-ahead at about the same time.

The question that will have to be faced is one echoed with increasing frequency in the U.S. about such high-budget scientific endeavours: Would the benefits gained from building the SSC outweigh the costs?

Scientifically, research is priceless in its own way and scientists say that few opportunites seem as timely as the vistas opened up by the SSC. Particle physics, its experts say, has reached a watershed. The world of the atom and the forces within it have been roughed out by a series of recent spectacular discoveries. But the picture is far from complete, and scientists are tantalised by the insights an instrument with the SSC's power could bring.

"Expect to see historic work coming from it," says the Harvard theoretician, Mr. Sheldon Glashow.

Practically, scientific research is an inherently risky proposition. Payoffs can never be predicted; in fact, an attempt to do just that would contradict the very nature of basic research. "When somebody wants you to tell them what you're going to discover in five or 10 years from now, what do you say?" asks Dr. Alvin Trivelpiece, director of the U.S. Department of Energy's Office of Energy Research. The most accurate answer is "Who knows?"

The Massachusetts Institute of Technology physicist, Mr. Samuel C. C. Ting, says. "Maybe we won't find anything." As unlikely as Dr. Ting thinks such an outcome might be, "that in itself would be very interesting."

The picture is complicated by more questions. Will a project as expensive and conspicuous as the SSC compete for funds with some of the less visible, but equally vital, research inhabiting the world of so-called "small" science? And since the SSC would be an international facility, should it seek monetary contributions from overseas?

Then there are the technical uncertainties, among them where the SSC would be located and how big it would be, which will command the attention of scientists around the U.S. over the next year. Dr. Trivelpiece's office at the DOE, which funds several smaller U.S. accelerators, is devoting $200 millions just to study the feasibility of such a behemoth. "There are simply no guarantees," he says. "The whole project could be scrapped."

Nevertheless, DOE officials say that by late 1986 the agency could be ready to recommend that the U.S. commit the necessary funds to build the SSC. If the support of Congress and the White House were to be speedily garnered—which observers say is far from certain—construction could begin in 1987. By the mid-1990s, the SSC would be ready to run.

For many scientists, that would not be a moment too soon. In the international ball game of physics, recent innings have gone to CERN, the atomic research centre straddling the Franco-Swiss border. During the 1970s, as unsteady federal funding in the U.S. barely maintained the number of particle physicists at a constant level, Europe's nations doubled theirs. As delays and cost overruns eventually defeated a U.S. plan for the world's most powerful accelerator—the Colliding Beam Accelerator (CBA) at Long Island's Brookhaven National Laboratory—CERN triumphantly laid plans for the 25 km. Large Electron-Positron (LEP) machine to loop beneath the dairy farms outside Geneva. Japan and the Soviet Union charged ahead on ambitious initiatives of their own.

Danger of falling behind

"The consensus has been that we are in danger of falling behind," says Dr. Leon Lederman, director of Illinois's Fermi National Accelerator Laboratory (Fermilab). That notion prompted a group of top scientists who advise the U.S. government on such matters to recommend two years ago that it move ahead on plans for the SSC.

Actually, Fermilab will soon have the world's most powerful accelerator when the 6.4 km. Tevatron is fired up to full energy later this year. It will be a short-lived preeminence, however. By 1986,the completion of LEP will mean the seesaw will have once again tilted back to CERN, and the Europeans will have regained the initiative.

That is an uncomfortable feeling for many U.S. scientists—accustomed as they are to the leadership role their country has played since the modern accelerator's invention on a Berkeley, California, workbench in 1927. It has also stirred concern about a "brain drain" as researchers head to Europe and even Japan for the largest and most powerful accelerator facilities.

"In physics, no one cares who comes in second," says MIT's Mr. Ting, who shared the 1976 Nobel Prize in physics for his discovery of a quark—an atomic building block—dubbed the J particle. It was found using what was then a state-of-the-art accelerator at Long Island's Brookhaven National Laboratory. Now, however, Mr. Ting does much of his experimentation at CERN. 'I have to go where the best science can be done", he explains.

One world, one science

Few activities are as collegial as high-energy physics in many respects. Researchers freely share data and regularly trek to seminars and international conferences. Competition, which tends to be more between labs than continents, is of a generally sporting nature. "It adds a little spice to things, but it's no driving force," says the Cornell physicist, Mr. Morry Tigner.

If current practices hold, accelerators such as the LEP or the SSC will be open to the best experiments from around the globe. So many scientists scoff at some of the hand-wringing.

"It's a lot of garbage," says Mr. Carlo Rubbia, who shared 1984's Nobel physics award. A Harvard professor and Italian citizen, he has experiments under way in Europe, and at various locales across the U.S. His prize-winning investigations at CERN required the services of 180 Ph.Ds from a dozen countries. "It's all one world, one science," he insists. "The important thing is not who makes the discovery but that it is made at all."

Where a discovery is made, however, can have consequences that reach far beyond the science community.

Particle accelerators on which modern high-energy physics depends have thrust forward the state of the art in nuclear medicine and X-ray imaging, in electronics and computer technology, helped pioneer the use of ultra-cold metals—called super conductors—to create faster and more powerful electrical devices, and the list goes on.

Construction companies near the accelerator site flourish. High-technology companies in the area reap a steady demand for their precision wares. Economists for CERN calculate that every franc invested in high-energy physics over the last decade produced six francs for European industry. "The economic benefits are undeniable," says the CERN director, Mr. William Sharper. Estimates for the U.S. go even higher. "Particle physics pays for itself," concludes Fermilab's Dr. Lederman. "The cost almost becomes trivial."

Political plum

No less significant is the effect that a vigorous, and local, research effort can have on potential future scientists. That in itself, SSC advocates say, is a powerful reason for going ahead with such a project. "You had a whole generation of Danish scientists and engineers because Neils Bohr made a name for himself," Dr. Lederman says of Denmark's famed theoretician. "What kind of signal will we be sending to students if the great science is done elsewhere?"

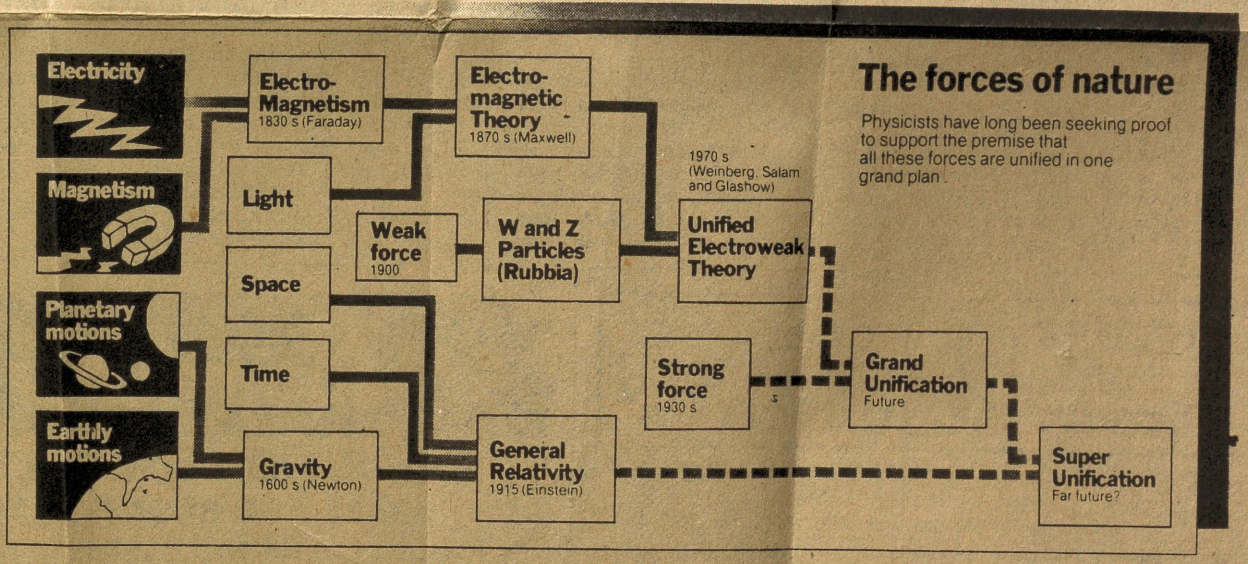
This all makes the project a political plum for the host region. Nearly every State in the U.S. has shown interest in having the SSC.

Such haggling makes an international accelerator programme even more difficult to carry off. "We do far better with international cooperation in experiments than with building accelerators", says CERN's Dr. Sharper. CERN itself, a high-energy physics consortium of 12 European nations, has experienced difficulties in keeping its members unified; currently, Britain is considering withdrawal from the group.

The difficulties are magnified, scientists say, when the proposed ventures involve intercontinental cooperation. This has so far frustrated attempts by several scientific groups to establish a "world accelerator", where several countries would share the financial burden of building it.

Some hope that the SSC might end up going part of the way toward that goal. "The SSC may be just the thing that will break the dam open and make it easier for other projects down the line," says the White House science office's deputy director, Mr. John McTague. The Presidential science adviser, Mr. George A. Keyworth II visited Japan recently and spoke to that country's government about possible scientific cooperation with the SSC.

The Canadian government also has expressed interest in participating. And studies commissioned by the 1982 Versailles summit of Western leaders are exploring ways to facilitate increased future cooperation in several technical and scientific fields, among them high-energy physics.—**Christian Science Monitor**



Banking on sympathy factor

From Our Staff Reporter

PONDICHERRY

About 3.93 lakh voters spread over Pondicherry, Karaikal, Mahe and Yanam regions will exercise their franchise on March 5 to elect 30 representatives to the Legislative Assembly at the sixth poll in the Union Territory of Pondicherry which merged *de jure* with the Indian Union in 1963. As per the revised voters' list as on January 31, 1985, there are 2,01,284 men and 1,92,188 women voters in this territory.

For this year's election there are as many as 119 aspirants including 31 independents. The party-wise break up of candidates is as follows: the DMK 22, the Congress (I) 20, the Janata 17, the All India Anna DMK 10, the CPI and the Congress (S) four each, the BJP and the DMKP three each, the CPI (M) and the Indian Union Muslim League two each and the Telugu Desam party one.

There are four women contestants also and the prominent among them is Mrs. Saraswathy Subbiah, former Deputy Chairman of Pondicherry Municipality and wife of the veteran CPI leader, Mr. V. Subbiah. She is concerned in a triangular contest in Cassicadai constituency as the CPI nominee. Another notable contestant is Mrs. S. Komala (DMK) in Tirubuvanai (reserved), also figuring in a triangular fight.

Straight contests for only 5 seats

There will be straight fights in five constituencies, triangular tussle in seven constituencies, four-cornered contests in nine, five-cornered ones in five, six-cornered in two, seven-cornered in one and eight-cornered in one.

The coming poll is virtually a fight between the DMK and the Congress (I), with the former seeking to wreak vengeance on the Congress (I) The sudden and dramatic pullout of the Congress (I) from the DMK-led coalition one fine morning led to the collapse of the ministry, dissolution of the Assembly and imposition of President's rule on June 24, 1983.

Of the five constituencies concerned in straight contests, the DMK and the AIADMK are involved in Embalom (reserved) in Pondicherry region and Neravy in Karaikal. The DMK and the Congress (I) are locked in the other three—Nettapakkam, Mannadipeth and Villianoor constituencies. The former Chief Minister and the DMK convener, Mr. D. Ramachandran seeking reelection from Mannadipeth is challenged by his Congress (I) rival, Mr. A. Krishnaswamy Gounder, a former Mayor of Mannadipeth. Mr. Gounder was out of active politics for a number of years, but has been pitted against the DMK now.

The poll in Neravy constituency involving two brothers in a straight contest will be watched with interest again. Mr. V. M. C. Sivakumar (DMK), Agriculture Minister in the dismissed coalition ministry is pitted against his elder brother, Mr. Varadapillai (AIADMK), a former PWD Minister. In the poll held in 1980 the same candidates were involved in a straight fight and Mr. Sivakumar emerged triumphant by a margin of 1362 votes.

The break in the DMK-Janata electoral alliance following differences between them over the allocation of Cassicadai constituency has led to the fielding of candidates by the Janata on its own in 17 constituencies. The three-cornered fight in seven constituencies has emerged largely because of the Janata fielding its own candidates against the DMK, the Congress (I), the CPI or the CPI (M).

Yanam candidate's record

The Telugu Desam has put up a candidate in the lone Yanam constituency which has the record of having returned Mr. Kamichetty Shri Prassourama Varaparasada Rao Naidu in all the elections held from 1964 in free Pondicherry. Mr. Kamichetty, in other words, wields personal influence in Yanam which has 8,034 voters. His party affiliation does not count.

The DMK-led front, which has on its side, the CPI, the CPI (M) and the IUML is trying to raise the bogey of Rodier mill before the electorate. The mill has remained closed for over two years now rendering 7,500 workers jobless and pushing them to stalk poverty. This issue was raised at the time of the Lok Sabha poll in December 1984, but it did not work to the expectations of the parties opposed to the Congress (I). The lone Lok Sabha constituency here has been retained by the Congress (I) and Mr. P. Shanmugham has been returned to the Lok Sabha again. A public meeting organised by the DMK a few days ago to introduce the front candidates by the DMK General Secretary, Mr. Anbazhagan did not attract a big crowd.

The Congress (I) continues to count on the sympathy wave as it did in December and the AIADMK, which is contesting 10 of the 30 constituencies as per its accord with the Congress (I), also relies on the sympathy factor towards the AIADMK found-leader and Chief Minister of Tamil Nadu, Mr. M. G. Ramachandran, who underwent a kidney transplant in the U.S. recently. The Congress (I) and the AIADMK are yet to come out with a formal election manifesto although the DMK has released its manifesto.

Merger, a non-issue

The issue of merger of Pondicherry which was primarily responsible for the landslide win of the DMK-Congress (I) alliance in the 1980 Assembly poll is being kindled again and the DMK feels that the people of Pondicherry should not feel that the threat of merger was over. According to it the Congress (I) could come out with a plan anytime to dismantle the separate identity of Pondicherry. As a rejoinder to this, the Congress (I) leaders recall the words of Jawaharlal Nehru who described Pondicherry as a "window of French culture". The Congress (I) also swears by the provision of the Treaty of Merger (transfering the French establishment to Indian union) which provides in one of its clauses for the continuation of the separate constitutional feature of Pondicherry as long as the people of the Union Territory wished. This merger issue did not help the parties opposed to the Congress (I), in the recent Lok Sabha poll.

The Youth Congress (I) has been given recognition in the coming poll. The youth leader, Mr. P. Kannan is in the electoral fray for the first time. He is a fearless orator and is facing the CPI, the Janata and the Congress (S) in a four-cornered contest in Cassicadai. This constituency has always had the record of returning the Congress except in 1977 when the Janata candidate wrested the seat from the Congress (I).

Since the Pondicherry Administration fears that anti-social elements might try to foment law and order problem during the poll, it has sought additional central forces. About five companies of the CRPF are being sought by the Government to ensure a free and fair poll.

Poll postponement in snow bound areas likely

SIMLA, Feb. 13.

The State Government has recommended to the Election Commission of India to have polling for the three snow-bound assembly seats of Kinnaur, Lahaul-Spiti and Bharmour during summer, it was officially stated here, today.

A notification to this effect is expected shortly from the Commission.

The remaining 65 constituencies go to the polls on March 5 next.—PTI.

Outwitted by spouses

BOMBA

Two Maharashtra Ministers found themselves being outwitted by their and another by his son as the Cong candidates' final list for the State A polls was out.

The 'not-really-unfortunates' were Baliram Hiray, Mrs. Pratibha Patil a Shivajirao Patil Nilangekar, Ministe Energy, Civil Supplies and Irrigatio respectively in the Vasantdada Pati

Dr. Hiray's wife, Mrs. Indirabai H given the Dabhadi constituency, wh husband was representing for over decade. Interestingly, she is facing sister-in-law, Mrs. Pushpatai Hiray Congress(S)—widow of the late Mi Venkatrao Hiray—among others.

While Mrs. Pratibha Patil was de party ticket, her husband, Mr. Devis Ramsingh Sekhawat got the nomin Amravati.

Mr. Shivajirao Patil Nilangekar fo son, Dilip, had replaced him in Nila constituency even as both son and filed their nominations on the Cong label.

However, once the list was out, th Ministers, all of whom had hopefully their nominations, beat a retreat.

In Chopda, Dr. Suresh Patil, husb the late Congress(I) Minister, Mrs. Sharadchandrika Patil, got the party tion.—PTI.

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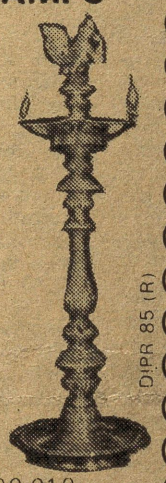

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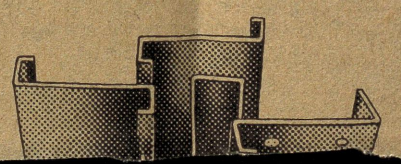

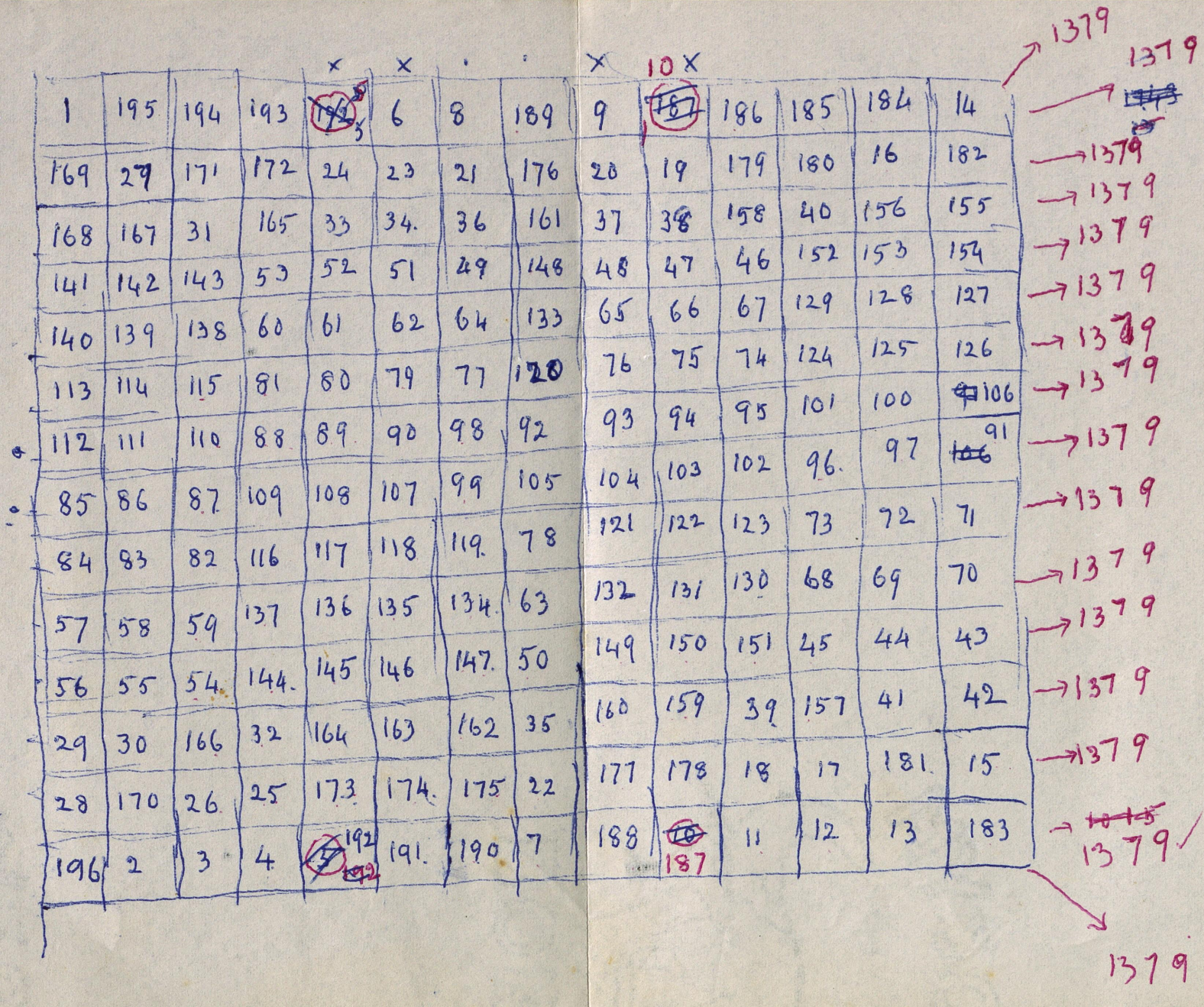
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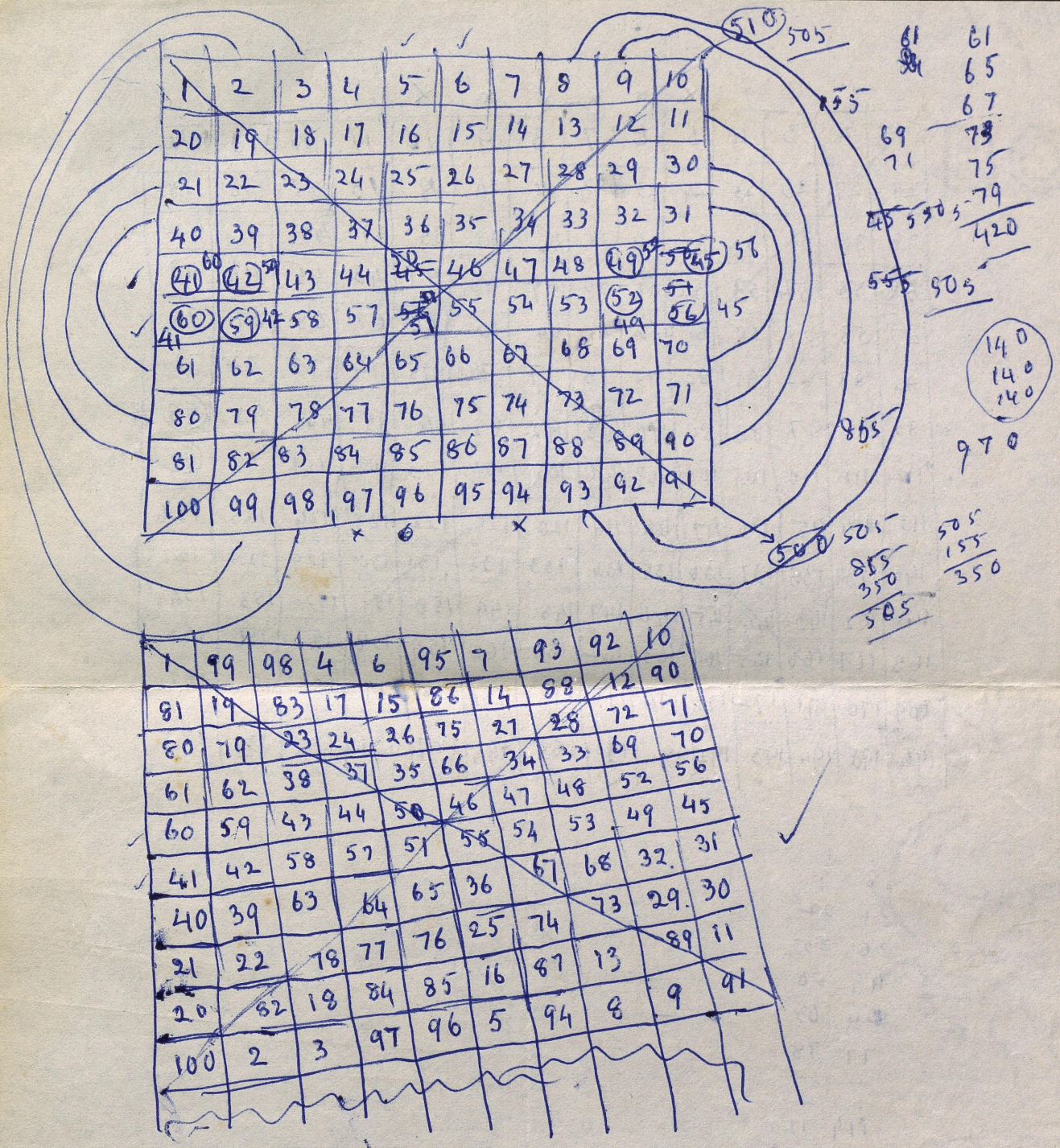
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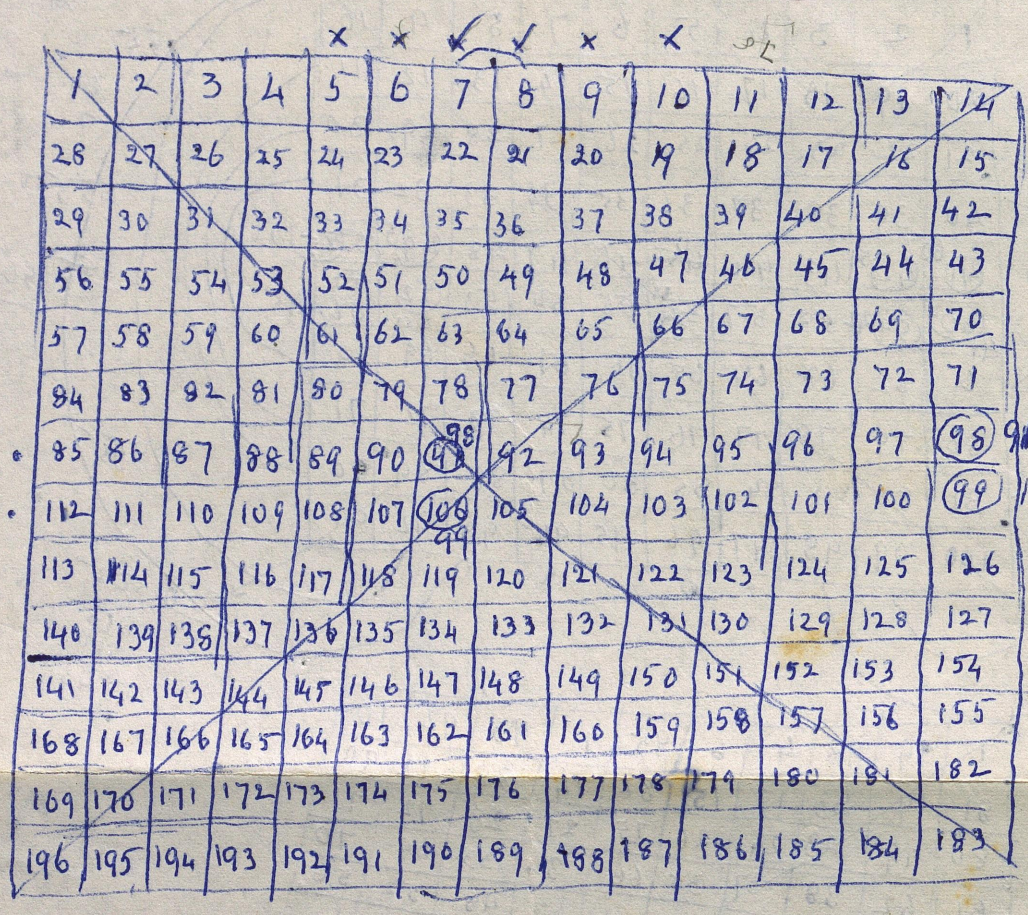

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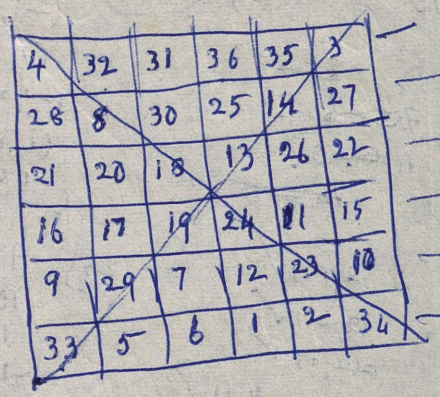

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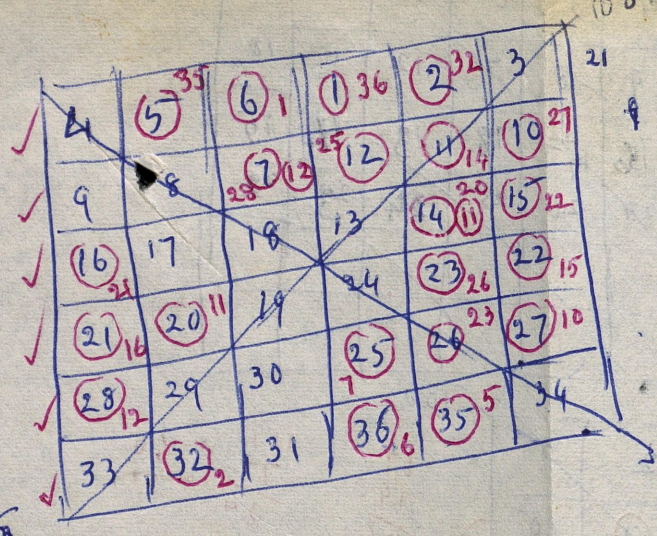

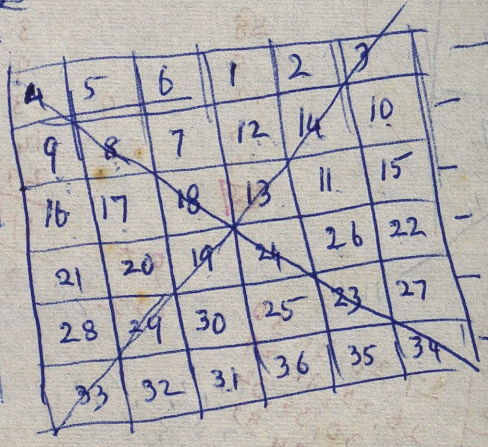

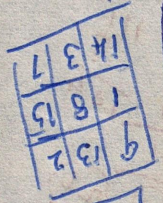

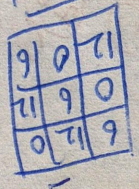

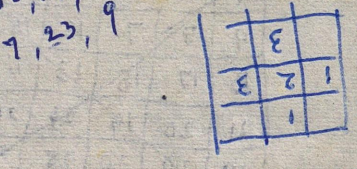

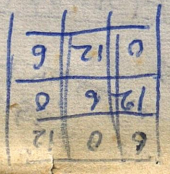

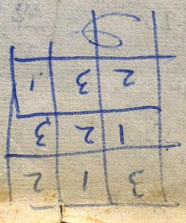

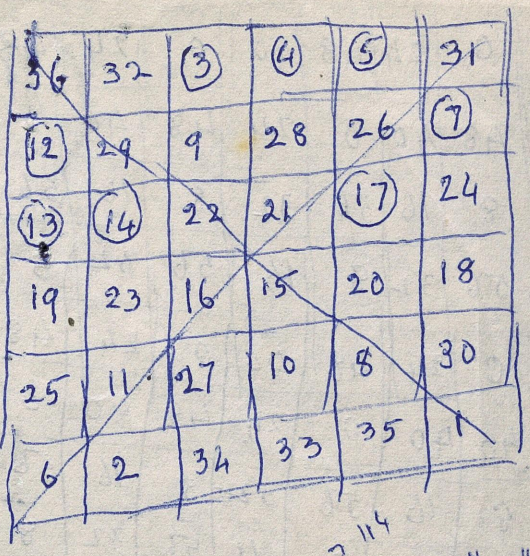

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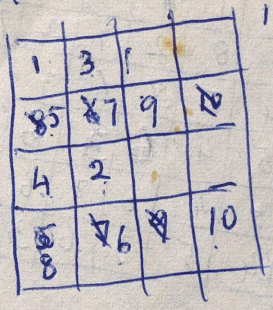

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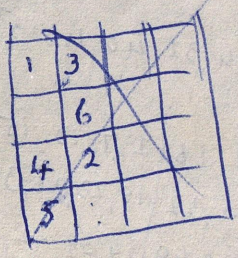
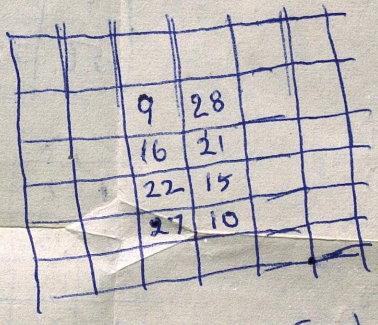
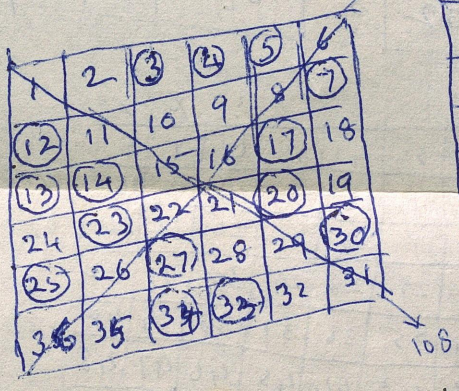
-1, 2
1, -2







114

108

105

1, 4, 5, 8
9, 12, 13, 16
17, 20, 21, 24
25, 28, 29, 32

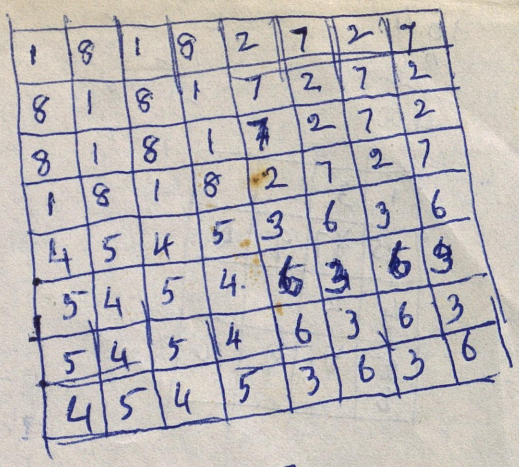
2, 6, 7, 11
2, 3, 6, 7

1, 8, 9, 16
17, 24, 25, 32
33, 40, 41, 48
49, 56, 57, 64

2, 7, 10, 15
18, 23, 26, 31
34, 39, 42, 47
50, 55, 58, 63

4, 5, 12, 13
20, 21, 28, 29
36, 37, 44, 45
52, 53, 60, 61

3, 6, 11, 14
19, 22, 27, 30
35, 38, 43, 46
51, 54, 59, 62



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4	5	4	5	3	6	3	6
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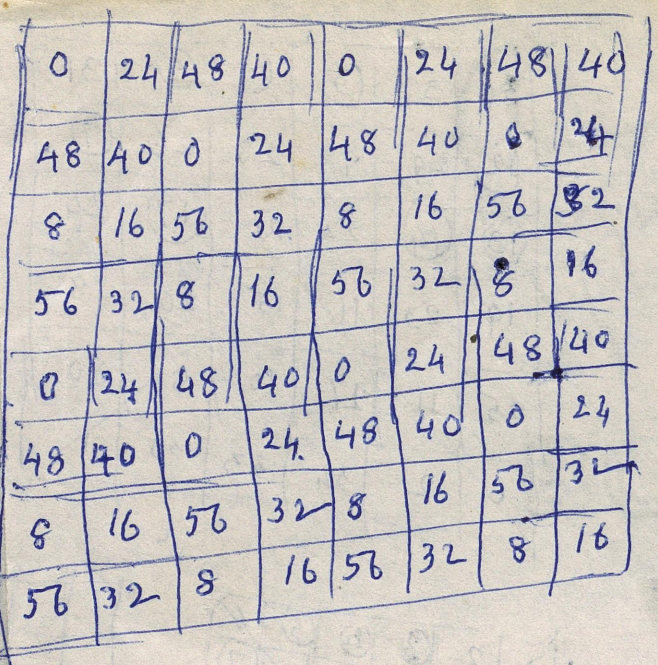

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56	32	8	16	56	32	8	16
0	24	48	40	0	24	48	40
48	40	0	24	48	40	0	24
8	16	56	32	8	16	56	32
56	32	8	16	56	32	8	16

0, 8, 16, 24, 32, 40, 48, 56

1, 8, 9, 16	2, 7, 10, 15
17, 24, 25, 32	18, 23, 26, 31
33, 40, 41, 48	34, 39, 42, 47
49, 56, 57, 64	50, 55, 58, 63

4, 5, 12, 13	3, 6, 11, 14
20, 21, 28, 29	19, 22, 27, 30
36, 37, 44, 45	35, 38, 43, 46
52, 53, 60, 61	51, 54, 59, 62

✓ x ? ? x ✓

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

1, 8, 9, 16	2, 7, 10, 15	3, 6, 11, 15
17, 24, 25, 32	18, 23, 26, 31	19, 23, 27, 30
33, 40, 41, 48	34, 39, 42, 47	35, 38, 43, 46
49, 56, 57, 58	50, 55, 58, 63	51, 54, 59, 62

4, 5, 12, 13
20, 21, 28, 29
36, 37, 44, 45
52, 53, 60, 61

$S = a + (a+d) + \dots + \{a + (n-1)d\}$

$= na + \frac{1}{2}n(n-1)d$

$= \frac{n}{2}\{2a + (n-1)d\}$.