

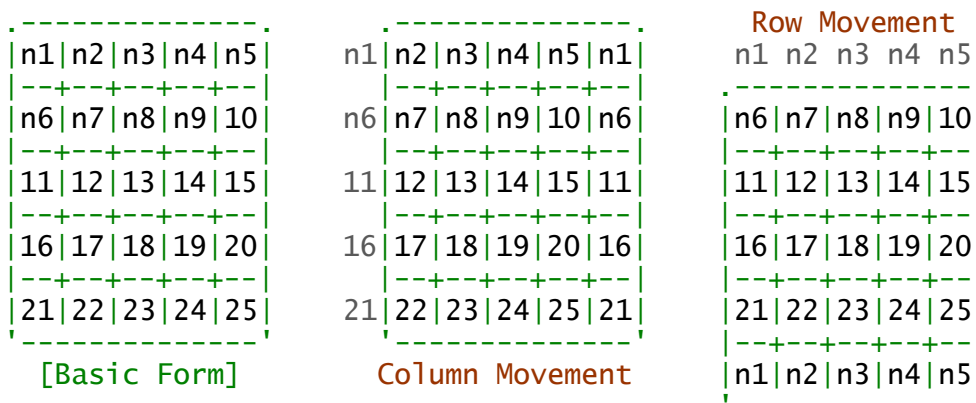
Chapter 3: New Algebraic Study of Magic Squares 5x5: Kanji Setsuda

Section 2: New Study of Pandiagonal Magic Squares of Order 5

#1. Basic Conditions for Pan-Diagonal Type

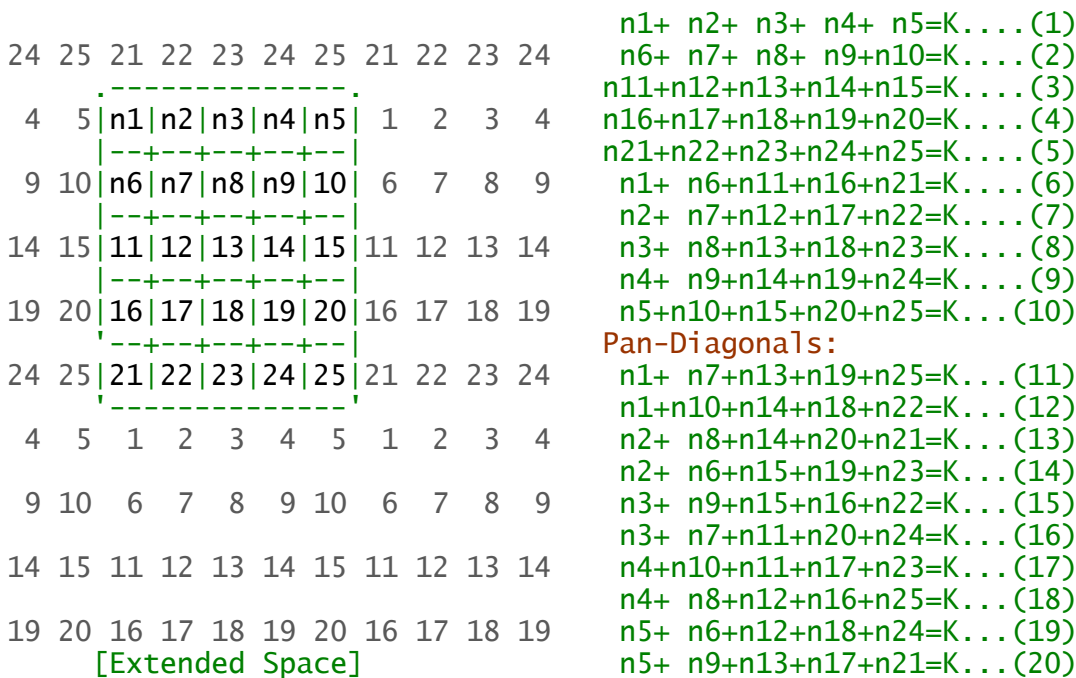
The unique movability of a line is one of the important properties of Pan-diagonal Magic Squares. You can move the whole row or column on the edge of the square far to the opposite side and put it beyond the other edge. The basic character of pandiagonal magic square is not changed at all even after the movement. Each sum of new diagonals is always equal to the magic constant.

[Figure 1: Pan-Diagonal Magic Square 5x5]
 ** Unique Movement of the Whole Line **



The 'Pan-Diagonals' are invented for this purpose. There are ten pan-diagonals in each pan-magic square of order 5. Watch at the next basic form and conditions.

[Figure 2: Pan-Magic Square 5x5
 Basic Form & Basic Conditions: K=65;]



The 'Extended Space' above is invented so that you could easily find where any pandiagonal is placed. You could see it in a 'straight line' here. Any new square could also be found by moving the square frame of 5 x 5 in the wide space.

I like to start all of our discussion simply with this extended space and the basic conditions at this definition stage.

#2. Some Interesting Properties of this Type

[1] $n_1+n_2+n_5+n_6+n_{21}=65$; $n_1+n_7+n_{10}+n_{22}+n_{25}=65$; ...

They seem to be true, but are they really true?

[Figure 3: Pan-Magic Square 5x5
Extended Space & Interesting Properties]

13	14	15	11	12	13	14	(1)+(6)
	-----						$n_1+ n_2+ n_3+ n_4+ n_5=K\dots(1)$
18	19	20	16	17	18	19	+) $n_1+ n_6+n_{11}+n_{16}+n_{21}=K\dots(6)$
	-+-+--						-----
23	24	25	21	22	23	24	$n_1+n_2+n_3+n_4+n_5+n_6+n_{11}+n_{16}+n_{21}=2*K$
	-+-+--						$(n_1+n_2+n_5+n_6+n_{21})+(n_1+n_3+n_4+n_{11}+n_{16})=2K\dots(21)$
3	n4	n5	n1	n2	n3	4	(11)+(12)
	-+-+--						$n_1+ n_7+n_{13}+n_{19}+n_{25}=K\dots(11)$
8	n9	10	n6	n7	n8	9	+) $n_1+n_{10}+n_{14}+n_{18}+n_{22}=K\dots(12)$
	-+-+--						-----
13	14	15	11	12	13	14	$(n_1+n_7+n_{10}+n_{22}+n_{25})+(n_1+n_{13}+n_{14}+n_{18}+n_{19})=2K$
	-----						... (22)
18	19	20	16	17	18	19	Find where and how those 5 combined numbers of
	[Extended Space]						(21) and (22) are placed in the extended space.

In our pan-magic squares 5x5 it seems true that $(n_1+n_2+n_5+n_6+n_{21}) = (n_1+n_3+n_4+n_{11}+n_{16}) = (n_1+n_7+n_{10}+n_{22}+n_{25}) = (n_1+n_{13}+n_{14}+n_{18}+n_{19}) = K$

The Proof:

$$\begin{aligned}
 &(1)+(6)+(13)+(14)+(19)+(20) \\
 &n_1+ n_2+ n_3+ n_4+ n_5=K\dots(1) \\
 &n_1+ n_6+n_{11}+n_{16}+n_{21}=K\dots(6) \\
 &n_2+ n_8+n_{14}+n_{20}+n_{21}=K\dots(13) \\
 &n_2+ n_6+n_{15}+n_{19}+n_{23}=K\dots(14) \\
 &n_5+ n_6+n_{12}+n_{18}+n_{24}=K\dots(19) \\
 &+)n_5+ n_9+n_{13}+n_{17}+n_{21}=K\dots(20) \\
 &----- \\
 &n_1+n_1+n_2+n_2+n_2+n_3+n_4+n_5+n_5+n_5+n_6+n_6+n_6+n_8+n_9+n_{11}+n_{12}+n_{13}+n_{14}+n_{15}+n_{16}+n_{17} \\
 &+n_{18}+n_{19}+n_{20}+n_{21}+n_{21}+n_{21}+n_{23}+n_{24}=6*K \\
 &(n_1+n_2+n_3+n_4+n_5+n_6+n_8+n_9+n_{11}+n_{12}+n_{13}+n_{14}+n_{15}+n_{16}+n_{17}+n_{18}+n_{19}+n_{20}+n_{21}+n_{23}+n_{24}) \\
 &+(n_1+n_2+n_5+n_6+n_{21})+(n_2+n_5+n_6+n_{21})=6*K \\
 &\text{Add } (n_1+n_7+n_{10}+n_{22}+n_{25}) \text{ to both sides.} \\
 &(n_1+n_2+n_3+n_4+n_5+\dots+n_{24}+n_{25})+2*(n_1+n_2+n_5+n_6+n_{21})=6*K+(n_1+n_7+n_{10}+n_{22}+n_{25}) \\
 &5*K+2*(n_1+n_2+n_5+n_6+n_{21})=6*K+(n_1+n_7+n_{10}+n_{22}+n_{25}) \\
 &\text{Therefore } 2*(n_1+n_2+n_5+n_6+n_{21})=K+(n_1+n_7+n_{10}+n_{22}+n_{25})\dots(23)
 \end{aligned}$$

$$\begin{aligned}
 &(3)+(4)+(8)+(9)+(11)+(12) \\
 &n_{11}+n_{12}+n_{13}+n_{14}+n_{15}=K\dots(3) \\
 &n_{16}+n_{17}+n_{18}+n_{19}+n_{20}=K\dots(4) \\
 &n_3+ n_8+n_{13}+n_{18}+n_{23}=K\dots(8) \\
 &n_4+ n_9+n_{14}+n_{19}+n_{24}=K\dots(9) \\
 &n_1+ n_7+n_{13}+n_{19}+n_{25}=K\dots(11) \\
 &+)n_1+n_{10}+n_{14}+n_{18}+n_{22}=K\dots(12) \\
 &----- \\
 &n_1+n_1+n_3+n_4+n_7+n_8+n_9+n_{10}+n_{11}+n_{12}+n_{13}+n_{13}+n_{14}+n_{14}+n_{14}+n_{15}+n_{16}+n_{17}+n_{18}+n_{18} \\
 &+n_{18}+n_{19}+n_{19}+n_{19}+n_{20}+n_{22}+n_{23}+n_{24}+n_{25}=6*K \\
 &(n_1+n_3+n_4+n_7+n_8+n_9+n_{10}+n_{11}+n_{12}+n_{13}+n_{14}+n_{15}+n_{16}+n_{17}+n_{18}+n_{19}+n_{20}+n_{22}+n_{23}+n_{24}+n_{25}) \\
 &+(n_1+n_{13}+n_{14}+n_{18}+n_{19})+(n_{13}+n_{14}+n_{18}+n_{19})=6*K \\
 &\text{Add } (n_1+n_2+n_5+n_6+n_{21}) \text{ to both sides.}
 \end{aligned}$$

$$(n1+n2+n3+n4+n5+\dots+n24+n25)+2*(n1+n13+n14+n18+n19)=6*K+(n1+n2+n5+n6+n21)$$

$$5*K+2*(n1+n13+n14+n18+n19)=6*K+(n1+n2+n5+n6+n21)$$

Therefore $2*(n1+n13+n14+n18+n19)=K+(n1+n2+n5+n6+n21)\dots(24)$

Compare (22), (23), (24)

$$(n1+n7+n10+n22+n25)+(n1+n13+n14+n18+n19)=2*K\dots(22)$$

$$2*(n1+n2+n5+n6+n21)=K+(n1+n7+n10+n22+n25)\dots(23)$$

$$2*(n1+n13+n14+n18+n19)=K+(n1+n2+n5+n6+n21)\dots(24)$$

Put the name for each:

$$n1+n2+n5+n6+n21=P; n1+n7+n10+n22+n25=Q; n1+n13+n14+n18+n19=R$$

$$Q+R=2K\dots(22)$$

$$2P=K+Q\dots(23)$$

$$2R=K+P\dots(24)$$

$$R=2K-Q; 2(2K-Q)=K+P; 4K-2Q=K+P; \text{Therefore } P=3K-2Q$$

$$2(3K-2Q)=K+Q; 6K-4Q=K+Q; 5K=5Q; \text{Therefore } Q=K$$

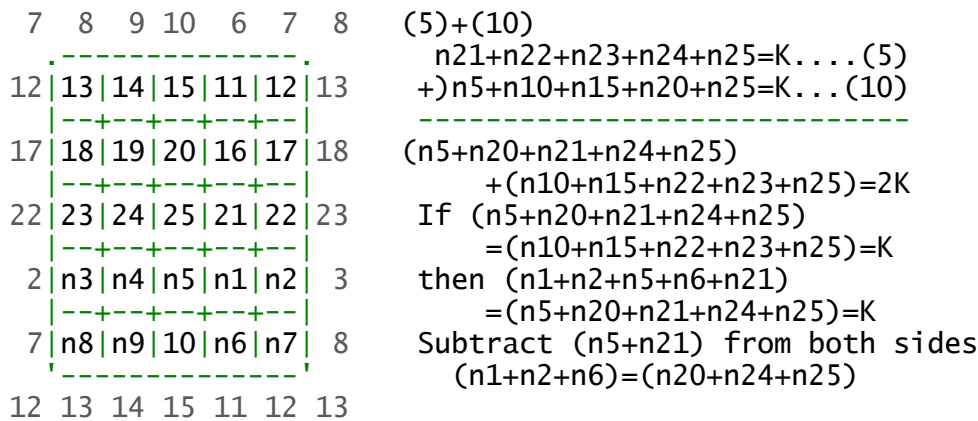
As a consequence $P=Q=R=K$; That means

$$n1+n2+n5+n6+n21=K; n1+n7+n10+n22+n25=K; n1+n13+n14+n18+n19=K\dots(25)$$

Bring them back to (21), and you will find $n1+n3+n4+n11+n16=K$

[2] $n1+n2+n6=n20+n24+n25; n4+n5+n10=n16+n21+n22;$
Are they really true?

[Figure 4: Extended Space around n25]



In any pan-magic square, whatever is true in one place must also be true in other places in the Extended Space.

If $(n1+n2+n5+n6+n21=65)$ is true, then $(n5+n20+n21+n24+n25=65)$ must be true.

Remove the common $(n5+n21)$ from both equations, and you will find

$$(n1+n2+n6=n20+n24+n25) \text{ is true.}$$

#3. What Patterns must be Unified into a Fundamental?

Take a look at the next figures below. They show how to make the Extended Space and how to read some different patterns out of it.

Suppose you could make a solution like No.1. Take every line on the four edges and move it far to the opposite side and put it beyond the other edge. Repeat the same movement as you like, and you will get the 'Extended Space' as shown right.

Move the 5x5 square frame downward, and you will find a new pattern with n1 on the bottom left. Take it out of the space and rewrite it as with n1 on the top left. You may rotate it 90~270 degrees clockwise, or reflect it by the diagonal. You can get the solution T2.

[Figure 5: Various Patterns taken out of the Extended Space]

No.1

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

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

[Extended Space] -->

You can find the 4 different patterns in all shown as below out of the extended space. All of them have the same rows and columns.

Although each pan-diagonal is quite different from the others, the sum is always equal to the magic constant. They are really pan-magic squares.

No.1/T0

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

/T1

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

/T2

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

/T3

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

The four above are made into the next four below under $n1 < n5 < n21$, and $n1 < n25$.

Normalized/T0

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

/T1

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

/T2

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

/T3

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

I like to consider these 4 patterns as the same one, and assume the solution /T0 as the representative solution. Those patterns taken out of the same Extended Space must be unified into a 'fundamental' solution, however different they might look.

#4. How Many Solutions could we Make?

Now let's make this type of magic square of order 5.

If you assume the basic conditions of Figure 2 at the definition stage and add the next normalizing inequality conditions $n_1 < n_5 < n_{21}$, $n_1 < n_{25}$, you could make the list of 3600 standard solutions in all.

Here you are at the compact list of 3600 Standard Solutions of our PDMS55.

**** Pan-Diagonal MS55: Compact List of 3600 Standard Solutions: Edition of 2015 ****

1/	37/	73/	109/	145/
1 7 13 24 20	1 8 12 24 20	1 9 12 23 20	1 10 12 23 19	1 12 8 24 20
14 25 16 2 8	14 25 16 3 7	13 25 16 4 7	13 24 16 5 7	9 25 16 2 13
17 3 9 15 21	18 2 9 15 21	19 2 8 15 21	20 2 8 14 21	17 3 14 10 21
10 11 22 18 4	10 11 23 17 4	10 11 24 17 3	9 11 25 17 3	15 6 22 18 4
23 19 5 6 12	22 19 5 6 13	22 18 5 6 14	22 18 4 6 15	23 19 5 11 7
181/	217/	253/	289/	325/
1 13 7 24 20	1 14 7 23 20	1 15 7 23 19	1 17 8 24 15	1 18 7 24 15
9 25 16 3 12	8 25 16 4 12	8 24 16 5 12	9 25 11 2 18	9 25 11 3 17
18 2 14 10 21	19 2 13 10 21	20 2 13 9 21	12 3 19 10 21	13 2 19 10 21
15 6 23 17 4	15 6 24 17 3	14 6 25 17 3	20 6 22 13 4	20 6 23 12 4
22 19 5 11 8	22 18 5 11 9	22 18 4 11 10	23 14 5 16 7	22 14 5 16 8
361/	397/	433/	469/	505/
1 19 7 23 15	1 20 7 23 14	1 22 8 19 15	1 23 7 19 15	1 24 7 18 15
8 25 11 4 17	8 24 11 5 17	9 20 11 2 23	9 20 11 3 22	8 20 11 4 22
14 2 18 10 21	15 2 18 9 21	12 3 24 10 16	13 2 24 10 16	14 2 23 10 16
20 6 24 12 3	19 6 25 12 3	25 6 17 13 4	25 6 18 12 4	25 6 19 12 3
22 13 5 16 9	22 13 4 16 10	18 14 5 21 7	17 14 5 21 8	17 13 5 21 9
541/	577/	613/	649/	685/
1 25 7 18 14	2 6 13 24 20	2 8 11 24 20	2 9 11 23 20	2 10 11 23 19
8 19 11 5 22	14 25 17 1 8	14 25 17 3 6	13 25 17 4 6	13 24 17 5 6
15 2 23 9 16	16 3 9 15 22	18 1 9 15 22	19 1 8 15 22	20 1 8 14 22
24 6 20 12 3	10 12 21 18 4	10 12 23 16 4	10 12 24 16 3	9 12 25 16 3
17 13 4 21 10	23 19 5 7 11	21 19 5 7 13	21 18 5 7 14	21 18 4 7 15
721/	757/	793/	829/	865/
2 11 8 24 20	2 13 6 24 20	2 14 6 23 20	2 15 6 23 19	2 16 8 24 15
9 25 17 1 13	9 25 17 3 11	8 25 17 4 11	8 24 17 5 11	9 25 12 1 18
16 3 14 10 22	18 1 14 10 22	19 1 13 10 22	20 1 13 9 22	11 3 19 10 22
15 7 21 18 4	15 7 23 16 4	15 7 24 16 3	14 7 25 16 3	20 7 21 13 4
23 19 5 12 6	21 19 5 12 8	21 18 5 12 9	21 18 4 12 10	23 14 5 17 6
901/	937/	973/	1009/	1045/
2 18 6 24 15	2 19 6 23 15	2 20 6 23 14	2 21 8 19 15	2 23 6 19 15
9 25 12 3 16	8 25 12 4 16	8 24 12 5 16	9 20 12 1 23	9 20 12 3 21
13 1 19 10 22	14 1 18 10 22	15 1 18 9 22	11 3 24 10 17	13 1 24 10 17
20 7 23 11 4	20 7 24 11 3	19 7 25 11 3	25 7 16 13 4	25 7 18 11 4
21 14 5 17 8	21 13 5 17 9	21 13 4 17 10	18 14 5 22 6	16 14 5 22 8
1081/	1117/	1153/	1189/	1225/
2 24 6 18 15	2 25 6 18 14	3 6 12 24 20	3 7 11 24 20	3 9 11 22 20
8 20 12 4 21	8 19 12 5 21	14 25 18 1 7	14 25 18 2 6	12 25 18 4 6
14 1 23 10 17	15 1 23 9 17	16 2 9 15 23	17 1 9 15 23	19 1 7 15 23
25 7 19 11 3	24 7 20 11 3	10 13 21 17 4	10 13 22 16 4	10 13 24 16 2
16 13 5 22 9	16 13 4 22 10	22 19 5 8 11	21 19 5 8 12	21 17 5 8 14
1261/	1297/	1333/	1369/	1405/
3 10 11 22 19	3 11 7 24 20	3 12 6 24 20	3 14 6 22 20	3 15 6 22 19
12 24 18 5 6	9 25 18 1 12	9 25 18 2 11	7 25 18 4 11	7 24 18 5 11
20 1 7 14 23	16 2 14 10 23	17 1 14 10 23	19 1 12 10 23	20 1 12 9 23
9 13 25 16 2	15 8 21 17 4	15 8 22 16 4	15 8 24 16 2	14 8 25 16 2
21 17 4 8 15	22 19 5 13 6	21 19 5 13 7	21 17 5 13 9	21 17 4 13 10
1441/	1477/	1513/	1549/	1585/
3 16 7 24 15	3 17 6 24 15	3 19 6 22 15	3 20 6 22 14	3 21 7 19 15
9 25 13 1 17	9 25 13 2 16	7 25 13 4 16	7 24 13 5 16	9 20 13 1 22
11 2 19 10 23	12 1 19 10 23	14 1 17 10 23	15 1 17 9 23	11 2 24 10 18
20 8 21 12 4	20 8 22 11 4	20 8 24 11 2	19 8 25 11 2	25 8 16 12 4
22 14 5 18 6	21 14 5 18 7	21 12 5 18 9	21 12 4 18 10	17 14 5 23 6

1621/ 3 22 6 19 15 9 20 13 2 21 12 1 24 10 18 25 8 17 11 4 16 14 5 23 7	1657/ 3 24 6 17 15 7 20 13 4 21 14 1 22 10 18 25 8 19 11 2 16 12 5 23 9	1693/ 3 25 6 17 14 7 19 13 5 21 15 1 22 9 18 24 8 20 11 2 16 12 4 23 10	1729/ 4 6 12 23 20 13 25 19 1 7 16 2 8 15 24 10 14 21 17 3 22 18 5 9 11	1765/ 4 7 11 23 20 13 25 19 2 6 17 1 8 15 24 10 14 22 16 3 21 18 5 9 12
1801/ 4 8 11 22 20 12 25 19 3 6 18 1 7 15 24 10 14 23 16 2 21 17 5 9 13	1837/ 4 10 11 22 18 12 23 19 5 6 20 1 7 13 24 8 14 25 16 2 21 17 3 9 15	1873/ 4 11 7 23 20 8 25 19 1 12 16 2 13 10 24 15 9 21 17 3 22 18 5 14 6	1909/ 4 12 6 23 20 8 25 19 2 11 17 1 13 10 24 15 9 22 16 3 21 18 5 14 7	1945/ 4 13 6 22 20 7 25 19 3 11 18 1 12 10 24 15 9 23 16 2 21 17 5 14 8
1981/ 4 15 6 22 18 7 23 19 5 11 20 1 12 8 24 13 9 25 16 2 21 17 3 14 10	2017/ 4 16 7 23 15 8 25 14 1 17 11 2 18 10 24 20 9 21 12 3 22 13 5 19 6	2053/ 4 17 6 23 15 8 25 14 2 16 12 1 18 10 24 20 9 22 11 3 21 13 5 19 7	2089/ 4 18 6 22 15 7 25 14 3 16 13 1 17 10 24 20 9 23 11 2 21 12 5 19 8	2125/ 4 20 6 22 13 7 23 14 5 16 15 1 17 8 24 18 9 25 11 2 21 12 3 19 10
2161/ 4 21 7 18 15 8 20 14 1 22 11 2 23 10 19 25 9 16 12 3 17 13 5 24 6	2197/ 4 22 6 18 15 8 20 14 2 21 12 1 23 10 19 25 9 17 11 3 16 13 5 24 7	2233/ 4 23 6 17 15 7 20 14 3 21 13 1 22 10 19 25 9 18 11 2 16 12 5 24 8	2269/ 4 25 6 17 13 7 18 14 5 21 15 1 22 8 19 23 9 20 11 2 16 12 3 24 10	2305/ 5 6 12 23 19 13 24 20 1 7 16 2 8 14 25 9 15 21 17 3 22 18 4 10 11
2341/ 5 7 11 23 19 13 24 20 2 6 17 1 8 14 25 9 15 22 16 3 21 18 4 10 12	2377/ 5 8 11 22 19 12 24 20 3 6 18 1 7 14 25 9 15 23 16 2 21 17 4 10 13	2413/ 5 9 11 22 18 12 23 20 4 6 19 1 7 13 25 8 15 24 16 2 21 17 3 10 14	2449/ 5 11 7 23 19 8 24 20 1 12 16 2 13 9 25 14 10 21 17 3 22 18 4 15 6	2485/ 5 12 6 23 19 8 24 20 2 11 17 1 13 9 25 14 10 22 16 3 21 18 4 15 7
2521/ 5 13 6 22 19 7 24 20 3 11 18 1 12 9 25 14 10 23 16 2 21 17 4 15 8	2557/ 5 14 6 22 18 7 23 20 4 11 19 1 12 8 25 13 10 24 16 2 21 17 3 15 9	2593/ 5 16 7 23 14 8 24 15 1 17 11 2 18 9 25 19 10 21 12 3 22 13 4 20 6	2629/ 5 17 6 23 14 8 24 15 2 16 12 1 18 9 25 19 10 22 11 3 21 13 4 20 7	2665/ 5 18 6 22 14 7 24 15 3 16 13 1 17 9 25 19 10 23 11 2 21 12 4 20 8
2701/ 5 19 6 22 13 7 23 15 4 16 14 1 17 8 25 18 10 24 11 2 21 12 3 20 9	2737/ 5 21 7 18 14 8 19 15 1 22 11 2 23 9 20 24 10 16 12 3 17 13 4 25 6	2773/ 5 22 6 18 14 8 19 15 2 21 12 1 23 9 20 24 10 17 11 3 16 13 4 25 7	2809/ 5 23 6 17 14 7 19 15 3 21 13 1 22 9 20 24 10 18 11 2 16 12 4 25 8	2845/ 5 24 6 17 13 7 18 15 4 21 14 1 22 8 20 23 10 19 11 2 16 12 3 25 9
2881/ 6 2 13 24 20 14 25 16 7 3 17 8 4 15 21 5 11 22 18 9 23 19 10 1 12	2899/ 6 3 12 24 20 14 25 16 8 2 18 7 4 15 21 5 11 23 17 9 22 19 10 1 13	2917/ 6 4 12 23 20 13 25 16 9 2 19 7 3 15 21 5 11 24 17 8 22 18 10 1 14	2935/ 6 5 12 23 19 13 24 16 10 2 20 7 3 14 21 4 11 25 17 8 22 18 9 1 15	2953/ 6 12 23 4 20 3 19 10 11 22 15 21 2 18 9 17 8 14 25 1 24 5 16 7 13
2959/ 6 13 22 4 20 2 19 10 11 23 15 21 3 17 9 18 7 14 25 1 24 5 16 8 12	2965/ 6 14 22 3 20 2 18 10 11 24 15 21 4 17 8 19 7 13 25 1 23 5 16 9 12	2971/ 6 15 22 3 19 2 18 9 11 25 14 21 5 17 8 20 7 13 24 1 23 4 16 10 12	2977/ 6 17 23 4 15 3 14 10 16 22 20 21 2 13 9 12 8 19 25 1 24 5 11 7 18	2983/ 6 18 22 4 15 2 14 10 16 23 20 21 3 12 9 13 7 19 25 1 24 5 11 8 17
2989/ 6 19 22 3 15 2 13 10 16 24 20 21 4 12 8 14 7 18 25 1 23 5 11 9 17	2995/ 6 20 22 3 14 2 13 9 16 25 19 21 5 12 8 15 7 18 24 1 23 4 11 10 17	3001/ 6 22 18 4 15 3 14 10 21 17 25 16 2 13 9 12 8 24 20 1 19 5 11 7 23	3007/ 6 23 17 4 15 2 14 10 21 18 25 16 3 12 9 13 7 24 20 1 19 5 11 8 22	3013/ 6 24 17 3 15 2 13 10 21 19 25 16 4 12 8 14 7 23 20 1 18 5 11 9 22

3019/ 6 25 17 3 14 2 13 9 21 20 24 16 5 12 8 15 7 23 19 1 18 4 11 10 22	3025/ 7 1 13 24 20 14 25 17 6 3 16 8 4 15 22 5 12 21 18 9 23 19 10 2 11	3043/ 7 3 11 24 20 14 25 17 8 1 18 6 4 15 22 5 12 23 16 9 21 19 10 2 13	3061/ 7 4 11 23 20 13 25 17 9 1 19 6 3 15 22 5 12 24 16 8 21 18 10 2 14	3079/ 7 5 11 23 19 13 24 17 10 1 20 6 3 14 22 4 12 25 16 8 21 18 9 2 15
3097/ 7 11 23 4 20 3 19 10 12 21 15 22 1 18 9 16 8 14 25 2 24 5 17 6 13	3103/ 7 13 21 4 20 1 19 10 12 23 15 22 3 16 9 18 6 14 25 2 24 5 17 8 11	3109/ 7 14 21 3 20 1 18 10 12 24 15 22 4 16 8 19 6 13 25 2 23 5 17 9 11	3115/ 7 15 21 3 19 1 18 9 12 25 14 22 5 16 8 20 6 13 24 2 23 4 17 10 11	3121/ 7 16 23 4 15 3 14 10 17 21 20 22 1 13 9 11 8 19 25 2 24 5 12 6 18
3127/ 7 18 21 4 15 1 14 10 17 23 20 22 3 11 9 13 6 19 25 2 24 5 12 8 16	3133/ 7 19 21 3 15 1 13 10 17 24 20 22 4 11 8 14 6 18 25 2 23 5 12 9 16	3139/ 7 20 21 3 14 1 13 9 17 25 19 22 5 11 8 15 6 18 24 2 23 4 12 10 16	3145/ 7 21 18 4 15 3 14 10 22 16 25 17 1 13 9 11 8 24 20 2 19 5 12 6 23	3151/ 7 23 16 4 15 1 14 10 22 18 25 17 3 11 9 13 6 24 20 2 19 5 12 8 21
3157/ 7 24 16 3 15 1 13 10 22 19 25 17 4 11 8 14 6 23 20 2 18 5 12 9 21	3163/ 7 25 16 3 14 1 13 9 22 20 24 17 5 11 8 15 6 23 19 2 18 4 12 10 21	3169/ 8 1 12 24 20 14 25 18 6 2 16 7 4 15 23 5 13 21 17 9 22 19 10 3 11	3187/ 8 2 11 24 20 14 25 18 7 1 17 6 4 15 23 5 13 22 16 9 21 19 10 3 12	3205/ 8 4 11 22 20 12 25 18 9 1 19 6 2 15 23 5 13 24 16 7 21 17 10 3 14
3223/ 8 5 11 22 19 12 24 18 10 1 20 6 2 14 23 4 13 25 16 7 21 17 9 3 15	3241/ 8 11 22 4 20 2 19 10 13 21 15 23 1 17 9 16 7 14 25 3 24 5 18 6 12	3247/ 8 12 21 4 20 1 19 10 13 22 15 23 2 16 9 17 6 14 25 3 24 5 18 7 11	3253/ 8 14 21 2 20 1 17 10 13 24 15 23 4 16 7 19 6 12 25 3 22 5 18 9 11	3259/ 8 15 21 2 19 1 17 9 13 25 14 23 5 16 7 20 6 12 24 3 22 4 18 10 11
3265/ 8 16 22 4 15 2 14 10 18 21 20 23 1 12 9 11 7 19 25 3 24 5 13 6 17	3271/ 8 17 21 4 15 1 14 10 18 22 20 23 2 11 9 12 6 19 25 3 24 5 13 7 16	3277/ 8 19 21 2 15 1 12 10 18 24 20 23 4 11 7 14 6 17 25 3 22 5 13 9 16	3283/ 8 20 21 2 14 1 12 9 18 25 19 23 5 11 7 15 6 17 24 3 22 4 13 10 16	3289/ 8 21 17 4 15 2 14 10 23 16 25 18 1 12 9 11 7 24 20 3 19 5 13 6 22
3295/ 8 22 16 4 15 1 14 10 23 17 25 18 2 11 9 12 6 24 20 3 19 5 13 7 21	3301/ 8 24 16 2 15 1 12 10 23 19 25 18 4 11 7 14 6 22 20 3 17 5 13 9 21	3307/ 8 25 16 2 14 1 12 9 23 20 24 18 5 11 7 15 6 22 19 3 17 4 13 10 21	3313/ 9 1 12 23 20 13 25 19 6 2 16 7 3 15 24 5 14 21 17 8 22 18 10 4 11	3331/ 9 2 11 23 20 13 25 19 7 1 17 6 3 15 24 5 14 22 16 8 21 18 10 4 12
3349/ 9 3 11 22 20 12 25 19 8 1 18 6 2 15 24 5 14 23 16 7 21 17 10 4 13	3367/ 9 5 11 22 18 12 23 19 10 1 20 6 2 13 24 3 14 25 16 7 21 17 8 4 15	3385/ 9 11 22 3 20 2 18 10 14 21 15 24 1 17 8 16 7 13 25 4 23 5 19 6 12	3391/ 9 12 21 3 20 1 18 10 14 22 15 24 2 16 8 17 6 13 25 4 23 5 19 7 11	3397/ 9 13 21 2 20 1 17 10 14 23 15 24 3 16 7 18 6 12 25 4 22 5 19 8 11
3403/ 9 15 21 2 18 1 17 8 14 25 13 24 5 16 7 20 6 12 23 4 22 3 19 10 11	3409/ 9 16 22 3 15 2 13 10 19 21 20 24 1 12 8 11 7 18 25 4 23 5 14 6 17	3415/ 9 17 21 3 15 1 13 10 19 22 20 24 2 11 8 12 6 18 25 4 23 5 14 7 16	3421/ 9 18 21 2 15 1 12 10 19 23 20 24 3 11 7 13 6 17 25 4 22 5 14 8 16	3427/ 9 20 21 2 13 1 12 8 19 25 18 24 5 11 7 15 6 17 23 4 22 3 14 10 16
3433/ 9 21 17 3 15 2 13 10 24 16 25 19 1 12 8 11 7 23 20 4 18 5 14 6 22	3439/ 9 22 16 3 15 1 13 10 24 17 25 19 2 11 8 12 6 23 20 4 18 5 14 7 21	3445/ 9 23 16 2 15 1 12 10 24 18 25 19 3 11 7 13 6 22 20 4 17 5 14 8 21	3451/ 9 25 16 2 13 1 12 8 24 20 23 19 5 11 7 15 6 22 18 4 17 3 14 10 21	3457/ 10 1 12 23 19 13 24 20 6 2 16 7 3 14 25 4 15 21 17 8 22 18 9 5 11

3475/ 10 2 11 23 19 13 24 20 7 1 17 6 3 14 25 4 15 22 16 8 21 18 9 5 12	3493/ 10 3 11 22 19 12 24 20 8 1 18 6 2 14 25 4 15 23 16 7 21 17 9 5 13	3511/ 10 4 11 22 18 12 23 20 9 1 19 6 2 13 25 3 15 24 16 7 21 17 8 5 14	3529/ 10 11 22 3 19 2 18 9 15 21 14 25 1 17 8 16 7 13 24 5 23 4 20 6 12	3535/ 10 12 21 3 19 1 18 9 15 22 14 25 2 16 8 17 6 13 24 5 23 4 20 7 11
3541/ 10 13 21 2 19 1 17 9 15 23 14 25 3 16 7 18 6 12 24 5 22 4 20 8 11	3547/ 10 14 21 2 18 1 17 8 15 24 13 25 4 16 7 19 6 12 23 5 22 3 20 9 11	3553/ 10 16 22 3 14 2 13 9 20 21 19 25 1 12 8 11 7 18 24 5 23 4 15 6 17	3559/ 10 17 21 3 14 1 13 9 20 22 19 25 2 11 8 12 6 18 24 5 23 4 15 7 16	3565/ 10 18 21 2 14 1 12 9 20 23 19 25 3 11 7 13 6 17 24 5 22 4 15 8 16
3571/ 10 19 21 2 13 1 12 8 20 24 18 25 4 11 7 14 6 17 23 5 22 3 15 9 16	3577/ 10 21 17 3 14 2 13 9 25 16 24 20 1 12 8 11 7 23 19 5 18 4 15 6 22	3583/ 10 22 16 3 14 1 13 9 25 17 24 20 2 11 8 12 6 23 19 5 18 4 15 7 21	3589/ 10 23 16 2 14 1 12 9 25 18 24 20 3 11 7 13 6 22 19 5 17 4 15 8 21	3595/ 10 24 16 2 13 1 12 8 25 19 23 20 4 11 7 14 6 22 18 5 17 3 15 9 21

[Count = 3600] OK!

** Calculated and Listed by Kanji Setsuda on
Jan.21, 2015 with MacOSX 10.10.1 & Xcode 6.1.1 **

If you assume $n_1=1$ and $n_5 < n_{21}$, $n_2 < n_5$, $n_6 < n_{21}$, you will get the smart list of 144 'Fundamental Solutions'.

It might take a lot of time to calculate and count such a large square as of order 5. Why don't you use positively such equations as $n_1+n_2+n_5+n_6+n_{21}=65$; and $n_1+n_3+n_7+n_{11}+n_{13}=65$? That could surely save your time, but it would neither spoil your total survey, nor make you miss any solutions you should have got.

** Pan-Diagonal MS55: List of 144 Fundamental Solutions: Edition of 2015 **

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

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

76/ 1 10 13 24 17 14 22 16 5 8 20 3 9 12 21 7 11 25 18 4 23 19 2 6 15	77/ 1 10 14 22 18 12 23 16 5 9 20 4 7 13 21 8 11 25 19 2 24 17 3 6 15	78/ 1 10 14 23 17 13 22 16 5 9 20 4 8 12 21 7 11 25 19 3 24 18 2 6 15	79/ 1 10 17 23 14 18 24 11 5 7 15 2 8 19 21 9 16 25 12 3 22 13 4 6 20	80/ 1 10 17 24 13 19 23 11 5 7 15 2 9 18 21 8 16 25 12 4 22 14 3 6 20
81/ 1 10 18 22 14 17 24 11 5 8 15 3 7 19 21 9 16 25 13 2 23 12 4 6 20	82/ 1 10 18 24 12 19 22 11 5 8 15 3 9 17 21 7 16 25 13 4 23 14 2 6 20	83/ 1 10 19 22 13 17 23 11 5 9 15 4 7 18 21 8 16 25 14 2 24 12 3 6 20	84/ 1 10 19 23 12 18 22 11 5 9 15 4 8 17 21 7 16 25 14 3 24 13 2 6 20	85/ 1 10 22 13 19 12 18 4 6 25 9 21 15 17 3 20 2 8 24 11 23 14 16 5 7
86/ 1 10 22 14 18 12 19 3 6 25 8 21 15 17 4 20 2 9 23 11 24 13 16 5 7	87/ 1 10 22 18 14 17 13 4 6 25 9 21 20 12 3 15 2 8 24 16 23 19 11 5 7	88/ 1 10 22 19 13 17 14 3 6 25 8 21 20 12 4 15 2 9 23 16 24 18 11 5 7	89/ 1 10 23 12 19 13 17 4 6 25 9 21 15 18 2 20 3 7 24 11 22 14 16 5 8	90/ 1 10 23 14 17 13 19 2 6 25 7 21 15 18 4 20 3 9 22 11 24 12 16 5 8
91/ 1 10 23 17 14 18 12 4 6 25 9 21 20 13 2 15 3 7 24 16 22 19 11 5 8	92/ 1 10 23 19 12 18 14 2 6 25 7 21 20 13 4 15 3 9 22 16 24 17 11 5 8	93/ 1 10 24 12 18 14 17 3 6 25 8 21 15 19 2 20 4 7 23 11 22 13 16 5 9	94/ 1 10 24 13 17 14 18 2 6 25 7 21 15 19 3 20 4 8 22 11 23 12 16 5 9	95/ 1 10 24 17 13 19 12 3 6 25 8 21 20 14 2 15 4 7 23 16 22 18 11 5 9
96/ 1 10 24 18 12 19 13 2 6 25 7 21 20 14 3 15 4 8 22 16 23 17 11 5 9	97/ 1 12 8 24 20 9 25 16 2 13 17 3 14 10 21 15 6 22 18 4 23 19 5 11 7	98/ 1 12 8 25 19 10 24 16 2 13 17 3 15 9 21 14 6 22 18 5 23 20 4 11 7	99/ 1 12 9 23 20 8 25 16 2 14 17 4 13 10 21 15 6 22 19 3 24 18 5 11 7	100/ 1 12 9 25 18 10 23 16 2 14 17 4 15 8 21 13 6 22 19 5 24 20 3 11 7
101/ 1 12 10 23 19 8 24 16 2 15 17 5 13 9 21 14 6 22 20 3 25 18 4 11 7	102/ 1 12 10 24 18 9 23 16 2 15 17 5 14 8 21 13 6 22 20 4 25 19 3 11 7	103/ 1 12 23 9 20 8 19 5 11 22 15 21 7 18 4 17 3 14 25 6 24 10 16 2 13	104/ 1 12 23 10 19 8 20 4 11 22 14 21 7 18 5 17 3 15 24 6 25 9 16 2 13	105/ 1 12 24 8 20 9 18 5 11 22 15 21 7 19 3 17 4 13 25 6 23 10 16 2 14
106/ 1 12 24 10 18 9 20 3 11 22 13 21 7 19 5 17 4 15 23 6 25 8 16 2 14	107/ 1 12 25 8 19 10 18 4 11 22 14 21 7 20 3 17 5 13 24 6 23 9 16 2 15	108/ 1 12 25 9 18 10 19 3 11 22 13 21 7 20 4 17 5 14 23 6 24 8 16 2 15	109/ 1 13 7 24 20 9 25 16 3 12 18 2 14 10 21 15 6 23 17 4 22 19 5 11 8	110/ 1 13 7 25 19 10 24 16 3 12 18 2 15 9 21 14 6 23 17 5 22 20 4 11 8
111/ 1 13 9 22 20 7 25 16 3 14 18 4 12 10 21 15 6 23 19 2 24 17 5 11 8	112/ 1 13 9 25 17 10 22 16 3 14 18 4 15 7 21 12 6 23 19 5 24 20 2 11 8	113/ 1 13 10 22 19 7 24 16 3 15 18 5 12 9 21 14 6 23 20 2 25 17 4 11 8	114/ 1 13 10 24 17 9 22 16 3 15 18 5 14 7 21 12 6 23 20 4 25 19 2 11 8	115/ 1 13 22 9 20 7 19 5 11 23 15 21 8 17 4 18 2 14 25 6 24 10 16 3 12
116/ 1 13 22 10 19 7 20 4 11 23 14 21 8 17 5 18 2 15 24 6 25 9 16 3 12	117/ 1 13 24 7 20 9 17 5 11 23 15 21 8 19 2 18 4 12 25 6 22 10 16 3 14	118/ 1 13 24 10 17 9 20 2 11 23 12 21 8 19 5 18 4 15 22 6 25 7 16 3 14	119/ 1 13 25 7 19 10 17 4 11 23 14 21 8 20 2 18 5 12 24 6 22 9 16 3 15	120/ 1 13 25 9 17 10 19 2 11 23 12 21 8 20 4 18 5 14 22 6 24 7 16 3 15
121/ 1 14 7 23 20 8 25 16 4 12 19 2 13 10 21 15 6 24 17 3 22 18 5 11 9	122/ 1 14 7 25 18 10 23 16 4 12 19 2 15 8 21 13 6 24 17 5 22 20 3 11 9	123/ 1 14 8 22 20 7 25 16 4 13 19 3 12 10 21 15 6 24 18 2 23 17 5 11 9	124/ 1 14 8 25 17 10 22 16 4 13 19 3 15 7 21 12 6 24 18 5 23 20 2 11 9	125/ 1 14 10 22 18 7 23 16 4 15 19 5 12 8 21 13 6 24 20 2 25 17 3 11 9

126/ 1 14 10 23 17 8 22 16 4 15 19 5 13 7 21 12 6 24 20 3 25 18 2 11 9	127/ 1 14 22 8 20 7 18 5 11 24 15 21 9 17 3 19 2 13 25 6 23 10 16 4 12	128/ 1 14 22 10 18 7 20 3 11 24 13 21 9 17 5 19 2 15 23 6 25 8 16 4 12	129/ 1 14 23 7 20 8 17 5 11 24 15 21 9 18 2 19 3 12 25 6 22 10 16 4 13	130/ 1 14 23 10 17 8 20 2 11 24 12 21 9 18 5 19 3 15 22 6 25 7 16 4 13
131/ 1 14 25 7 18 10 17 3 11 24 13 21 9 20 2 19 5 12 23 6 22 8 16 4 15	132/ 1 14 25 8 17 10 18 2 11 24 12 21 9 20 3 19 5 13 22 6 23 7 16 4 15	133/ 1 15 7 23 19 8 24 16 5 12 20 2 13 9 21 14 6 25 17 3 22 18 4 11 10	134/ 1 15 7 24 18 9 23 16 5 12 20 2 14 8 21 13 6 25 17 4 22 19 3 11 10	135/ 1 15 8 22 19 7 24 16 5 13 20 3 12 9 21 14 6 25 18 2 23 17 4 11 10
136/ 1 15 8 24 17 9 22 16 5 13 20 3 14 7 21 12 6 25 18 4 23 19 2 11 10	137/ 1 15 9 22 18 7 23 16 5 14 20 4 12 8 21 13 6 25 19 2 24 17 3 11 10	138/ 1 15 9 23 17 8 22 16 5 14 20 4 13 7 21 12 6 25 19 3 24 18 2 11 10	139/ 1 15 22 8 19 7 18 4 11 25 14 21 10 17 3 20 2 13 24 6 23 9 16 5 12	140/ 1 15 22 9 18 7 19 3 11 25 13 21 10 17 4 20 2 14 23 6 24 8 16 5 12
141/ 1 15 23 7 19 8 17 4 11 25 14 21 10 18 2 20 3 12 24 6 22 9 16 5 13	142/ 1 15 23 9 17 8 19 2 11 25 12 21 10 18 4 20 3 14 22 6 24 7 16 5 13	143/ 1 15 24 7 18 9 17 3 11 25 13 21 10 19 2 20 4 12 23 6 22 8 16 5 14	144/ 1 15 24 8 17 9 18 2 11 25 12 21 10 19 3 20 4 13 22 6 23 7 16 5 14	

[Count = 144] OK!

** Calculated and Listed by Kanji Setsuda on
Jan.21, 2015 with MacOSX 10.10.1 & Xcode 6.1.1 **

These solutions are essentially the same with the ones Prof. Mutsumi Suzuki discovered before. He presented the perfect list of his own in his page. I just verified it for his great achievement.

But what do these 'Fundamental Solutions' mean?

Could we really make these 144 into the 3600 Standard Solutions?

I should say "yes". Let me carry the 'Extended Space' at the beginning here again.

24 25 21 22 23 24 25 21 22 23 24	n1+ n2+ n3+ n4+ n5=K....(1)
4 5 n1 n2 n3 n4 n5 1 2 3 4	n6+ n7+ n8+ n9+n10=K....(2)
9 10 n6 n7 n8 n9 10 6 7 8 9	n11+n12+n13+n14+n15=K....(3)
14 15 11 12 13 14 15 11 12 13 14	n16+n17+n18+n19+n20=K....(4)
19 20 16 17 18 19 20 16 17 18 19	n21+n22+n23+n24+n25=K....(5)
24 25 21 22 23 24 25 21 22 23 24	n1+ n6+n11+n16+n21=K....(6)
4 5 1 2 3 4 5 1 2 3 4	n2+ n7+n12+n17+n22=K....(7)
9 10 6 7 8 9 10 6 7 8 9	n3+ n8+n13+n18+n23=K....(8)
14 15 11 12 13 14 15 11 12 13 14	n4+ n9+n14+n19+n24=K....(9)
19 20 16 17 18 19 20 16 17 18 19	n5+n10+n15+n20+n25=K....(10)
[Extended Space]	Pan-Diagonals:
	n1+ n7+n13+n19+n25=K....(11)
	n1+n10+n14+n18+n22=K....(12)
	n2+ n8+n14+n20+n21=K....(13)
	n2+ n6+n15+n19+n23=K....(14)
	n3+ n9+n15+n16+n22=K....(15)
	n3+ n7+n11+n20+n24=K....(16)
	n4+n10+n11+n17+n23=K....(17)
	n4+ n8+n12+n16+n25=K....(18)
	n5+ n6+n12+n18+n24=K....(19)
	n5+ n9+n13+n17+n21=K....(20)

** Conceptual Diagrams for the 24 Pan-magic Shift Transformations **

[Original] 0/T	1/T	2/T	3/T	4/T
1 2 3 4 5	5 1 2 3 4	4 5 1 2 3	3 4 5 1 2	2 3 4 5 1
6 7 8 9 10	10 6 7 8 9	9 10 6 7 8	8 9 10 6 7	7 8 9 10 6
11 12 13 14 15	15 11 12 13 14	14 15 11 12 13	13 14 15 11 12	12 13 14 15 11
16 17 18 19 20	20 16 17 18 19	19 20 16 17 18	18 19 20 16 17	17 18 19 20 16
21 22 23 24 25	25 21 22 23 24	24 25 21 22 23	23 24 25 21 22	22 23 24 25 21
5/T	6/T	7/T	8/T	9/T
21 22 23 24 25	25 21 22 23 24	24 25 21 22 23	23 24 25 21 22	22 23 24 25 21
1 2 3 4 5	5 1 2 3 4	4 5 1 2 3	3 4 5 1 2	2 3 4 5 1
6 7 8 9 10	10 6 7 8 9	9 10 6 7 8	8 9 10 6 7	7 8 9 10 6
11 12 13 14 15	15 11 12 13 14	14 15 11 12 13	13 14 15 11 12	12 13 14 15 11
16 17 18 19 20	20 16 17 18 19	19 20 16 17 18	18 19 20 16 17	17 18 19 20 16
10/T	11/T	12/T	13/T	14/T
16 17 18 19 20	20 16 17 18 19	19 20 16 17 18	18 19 20 16 17	17 18 19 20 16
21 22 23 24 25	25 21 22 23 24	24 25 21 22 23	23 24 25 21 22	22 23 24 25 21
1 2 3 4 5	5 1 2 3 4	4 5 1 2 3	3 4 5 1 2	2 3 4 5 1
6 7 8 9 10	10 6 7 8 9	9 10 6 7 8	8 9 10 6 7	7 8 9 10 6
11 12 13 14 15	15 11 12 13 14	14 15 11 12 13	13 14 15 11 12	12 13 14 15 11
15/T	16/T	17/T	18/T	19/T
11 12 13 14 15	15 11 12 13 14	14 15 11 12 13	13 14 15 11 12	12 13 14 15 11
16 17 18 19 20	20 16 17 18 19	19 20 16 17 18	18 19 20 16 17	17 18 19 20 16
21 22 23 24 25	25 21 22 23 24	24 25 21 22 23	23 24 25 21 22	22 23 24 25 21
1 2 3 4 5	5 1 2 3 4	4 5 1 2 3	3 4 5 1 2	2 3 4 5 1
6 7 8 9 10	10 6 7 8 9	9 10 6 7 8	8 9 10 6 7	7 8 9 10 6
20/T	21/T	22/T	23/T	24/T
6 7 8 9 10	10 6 7 8 9	9 10 6 7 8	8 9 10 6 7	7 8 9 10 6
11 12 13 14 15	15 11 12 13 14	14 15 11 12 13	13 14 15 11 12	12 13 14 15 11
16 17 18 19 20	20 16 17 18 19	19 20 16 17 18	18 19 20 16 17	17 18 19 20 16
21 22 23 24 25	25 21 22 23 24	24 25 21 22 23	23 24 25 21 22	22 23 24 25 21
1 2 3 4 5	5 1 2 3 4	4 5 1 2 3	3 4 5 1 2	2 3 4 5 1

Of course, you can find and take out the one with 1~24/T on its left top by moving the square frame in the Extended Space as you like.

Let's regard this as a transformation process, and make the original into 24 different objects for each(25 objects including the original).

Let me show you the first results of my experiment. Input one of the fundamental forms to this transformation process, and you should get its output of 25 patterns reformed automatically. But, they are almost unsatisfactory without any modification. You should make each result reflect or rotate into the standard form, if necessary.

** Pan-Diagonal Magic /Squares of Order 5: **

** Transformation Test: Making Fundamental Solution into Standard **

[1/F]

1/S	0/S	0/S	0/S	0/S
1 7 13 24 20	20 1 7 13 24	24 20 1 7 13	13 24 20 1 7	7 13 24 20 1
14 25 16 2 8	8 14 25 16 2	2 8 14 25 16	16 2 8 14 25	25 16 2 8 14
17 3 9 15 21	21 17 3 9 15	15 21 17 3 9	9 15 21 17 3	3 9 15 21 17
10 11 22 18 4	4 10 11 22 18	18 4 10 11 22	22 18 4 10 11	11 22 18 4 10
23 19 5 6 12	12 23 19 5 6	6 12 23 19 5	5 6 12 23 19	19 5 6 12 23
0/S	0/S	0/S	2305/S	0/S
23 19 5 6 12	12 23 19 5 6	6 12 23 19 5	5 6 12 23 19	19 5 6 12 23
1 7 13 24 20	20 1 7 13 24	24 20 1 7 13	13 24 20 1 7	7 13 24 20 1
14 25 16 2 8	8 14 25 16 2	2 8 14 25 16	16 2 8 14 25	25 16 2 8 14
17 3 9 15 21	21 17 3 9 15	15 21 17 3 9	9 15 21 17 3	3 9 15 21 17
10 11 22 18 4	4 10 11 22 18	18 4 10 11 22	22 18 4 10 11	11 22 18 4 10
0/S	1837/S	0/S	0/S	0/S
10 11 22 18 4	4 10 11 22 18	18 4 10 11 22	22 18 4 10 11	11 22 18 4 10
23 19 5 6 12	12 23 19 5 6	6 12 23 19 5	5 6 12 23 19	19 5 6 12 23
1 7 13 24 20	20 1 7 13 24	24 20 1 7 13	13 24 20 1 7	7 13 24 20 1
14 25 16 2 8	8 14 25 16 2	2 8 14 25 16	16 2 8 14 25	25 16 2 8 14
17 3 9 15 21	21 17 3 9 15	15 21 17 3 9	9 15 21 17 3	3 9 15 21 17

0/S	0/S	0/S	0/S	1229/S
17 3 9 15 21	21 17 3 9 15	15 21 17 3 9	9 15 21 17 3	3 9 15 21 17
10 11 22 18 4	4 10 11 22 18	18 4 10 11 22	22 18 4 10 11	11 22 18 4 10
23 19 5 6 12	12 23 19 5 6	6 12 23 19 5	5 6 12 23 19	19 5 6 12 23
1 7 13 24 20	20 1 7 13 24	24 20 1 7 13	13 24 20 1 7	7 13 24 20 1
14 25 16 2 8	8 14 25 16 2	2 8 14 25 16	16 2 8 14 25	25 16 2 8 14
0/S	0/S	616/S	0/S	0/S
14 25 16 2 8	8 14 25 16 2	2 8 14 25 16	16 2 8 14 25	25 16 2 8 14
17 3 9 15 21	21 17 3 9 15	15 21 17 3 9	9 15 21 17 3	3 9 15 21 17
10 11 22 18 4	4 10 11 22 18	18 4 10 11 22	22 18 4 10 11	11 22 18 4 10
23 19 5 6 12	12 23 19 5 6	6 12 23 19 5	5 6 12 23 19	19 5 6 12 23
1 7 13 24 20	20 1 7 13 24	24 20 1 7 13	13 24 20 1 7	7 13 24 20 1

You can remake these results and get them smart under $n1 < n25$, $n1 < n5 < n21$. You can easily find and identify your result with the one in the old 3600 solutions list.

**** Pan-Diagonal Magic Squares of Order 5 ****

** Abstract List of Transformations: Making 144 Fundamental into 3600 Standard **

[1/F]

1/S	2946/S	2736/S	2777/S	431/S
1 7 13 24 20	6 5 19 23 12	5 19 23 12 6	5 22 9 16 13	1 20 24 13 7
14 25 16 2 8	18 22 11 10 4	22 11 10 4 18	6 18 15 2 24	14 8 2 16 25
17 3 9 15 21	15 9 3 17 21	9 3 17 21 15	12 4 21 8 20	17 21 15 9 3
10 11 22 18 4	2 16 25 14 8	16 25 14 8 2	23 10 17 14 1	10 4 18 22 11
23 19 5 6 12	24 13 7 1 20	13 7 1 20 24	19 11 3 25 7	23 12 6 5 19
2116/S	2164/S	2735/S	2305/S	3522/S
4 18 22 11 10	4 21 8 20 12	5 19 23 12 6	5 6 12 23 19	10 4 18 22 11
21 15 9 3 17	10 17 14 1 23	13 7 1 20 24	13 24 20 1 7	17 21 15 9 3
8 2 16 25 14	11 3 25 7 19	16 25 14 8 2	16 2 8 14 25	14 8 2 16 25
20 24 13 7 1	22 9 16 13 5	9 3 17 21 15	9 15 21 17 3	1 20 24 13 7
12 6 5 19 23	18 15 2 24 6	22 11 10 4 18	22 18 4 10 11	23 12 6 5 19
2115/S	1837/S	3357/S	1500/S	1696/S
4 18 22 11 10	4 10 11 22 18	9 3 17 21 15	3 17 21 15 9	3 25 7 19 11
12 6 5 19 23	12 23 19 5 6	16 25 14 8 2	25 14 8 2 16	9 16 13 5 22
20 24 13 7 1	20 1 7 13 24	13 7 1 20 24	7 1 20 24 13	15 2 24 6 18
8 2 16 25 14	8 14 25 16 2	5 19 23 12 6	19 23 12 6 5	21 8 20 12 4
21 15 9 3 17	21 17 3 9 15	22 11 10 4 18	11 10 4 18 22	17 14 1 23 10
3194/S	900/S	1081/S	1499/S	1229/S
8 2 16 25 14	2 16 25 14 8	2 24 6 18 15	3 17 21 15 9	3 9 15 21 17
20 24 13 7 1	24 13 7 1 20	8 20 12 4 21	11 10 4 18 22	11 22 18 4 10
12 6 5 19 23	6 5 19 23 12	14 1 23 10 17	19 23 12 6 5	19 5 6 12 23
4 18 22 11 10	18 22 11 10 4	25 7 19 11 3	7 1 20 24 13	7 13 24 20 1
21 15 9 3 17	15 9 3 17 21	16 13 5 22 9	25 14 8 2 16	25 16 2 8 14
473/S	899/S	616/S	3036/S	432/S
1 23 10 17 14	2 16 25 14 8	2 8 14 25 16	7 1 20 24 13	1 20 24 13 7
7 19 11 3 25	15 9 3 17 21	15 21 17 3 9	19 23 12 6 5	23 12 6 5 19
13 5 22 9 16	18 22 11 10 4	18 4 10 11 22	11 10 4 18 22	10 4 18 22 11
24 6 18 15 2	6 5 19 23 12	6 12 23 19 5	3 17 21 15 9	17 21 15 9 3
20 12 4 21 8	24 13 7 1 20	24 20 1 7 13	25 14 8 2 16	14 8 2 16 25

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19/S	882/S	1141/S	3133/S	413/S
1 7 23 14 20	2 16 15 24 8	2 25 18 6 14	7 19 21 3 15	1 20 14 23 7
13 19 5 6 22	25 9 3 17 11	8 11 4 22 20	1 13 10 17 24	13 22 6 5 19
10 21 12 18 4	18 12 21 10 4	24 17 10 13 1	20 22 4 11 8	10 4 18 12 21
17 3 9 25 11	6 5 19 13 22	15 3 21 19 7	14 6 18 25 2	17 11 25 9 3
24 15 16 2 8	14 23 7 1 20	16 9 12 5 23	23 5 12 9 16	24 8 2 16 15
3286/S	881/S	638/S	1486/S	1609/S
8 20 22 4 11	2 16 15 24 8	2 8 24 15 16	3 17 11 25 9	3 21 19 7 15
2 14 6 18 25	14 23 7 1 20	14 20 1 7 23	21 10 4 18 12	9 12 5 23 16
16 23 5 12 9	6 5 19 13 22	6 22 13 19 5	19 13 22 6 5	25 18 6 14 2
15 7 19 21 3	18 12 21 10 4	18 4 10 21 12	7 1 20 14 23	11 4 22 20 8
24 1 13 10 17	25 9 3 17 11	25 11 17 3 9	15 24 8 2 16	17 10 13 1 24

2100/S	2228/S	3412/S	1485/S	1255/S
4 18 12 21 10	4 22 20 8 11	9 16 23 5 12	3 17 11 25 9	3 9 25 11 17
22 6 5 19 13	10 13 1 24 17	3 15 7 19 21	15 24 8 2 16	15 16 2 8 24
20 14 23 7 1	21 19 7 15 3	17 24 1 13 10	7 1 20 14 23	7 23 14 20 1
8 2 16 15 24	12 5 23 16 9	11 8 20 22 4	19 13 22 6 5	19 5 6 22 13
11 25 9 3 17	18 6 14 2 25	25 2 14 6 18	21 10 4 18 12	21 12 18 4 10

2099/S	1855/S	2718/S	2828/S	3563/S
4 18 12 21 10	4 10 21 12 18	5 19 13 22 6	5 23 16 9 12	10 17 24 1 13
11 25 9 3 17	11 17 3 9 25	23 7 1 20 14	6 14 2 25 18	4 11 8 20 22
8 2 16 15 24	8 24 15 16 2	16 15 24 8 2	22 20 8 11 4	18 25 2 14 6
20 14 23 7 1	20 1 7 23 14	9 3 17 11 25	13 1 24 17 10	12 9 16 23 5
22 6 5 19 13	22 13 19 5 6	12 21 10 4 18	19 7 15 3 21	21 3 15 7 19

524/S	2987/S	2717/S	2323/S	414/S
1 24 17 10 13	6 18 25 2 14	5 19 13 22 6	5 6 22 13 19	1 20 14 23 7
7 15 3 21 19	5 12 9 16 23	12 21 10 4 18	12 18 4 10 21	24 8 2 16 15
23 16 9 12 5	19 21 3 15 7	9 3 17 11 25	9 25 11 17 3	17 11 25 9 3
14 2 25 18 6	13 10 17 24 1	16 15 24 8 2	16 2 8 24 15	10 4 18 12 21
20 8 11 4 22	22 4 11 8 20	23 7 1 20 14	23 14 20 1 7	13 22 6 5 19

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37/S	2945/S	2730/S	2813/S	429/S
1 8 12 24 20	6 5 19 22 13	5 19 22 13 6	5 23 9 16 12	1 20 24 12 8
14 25 16 3 7	17 23 11 10 4	23 11 10 4 17	6 17 15 3 24	14 7 3 16 25
18 2 9 15 21	15 9 2 18 21	9 2 18 21 15	13 4 21 7 20	18 21 15 9 2
10 11 23 17 4	3 16 25 14 7	16 25 14 7 3	22 10 18 14 1	10 4 17 23 11
22 19 5 6 13	24 12 8 1 20	12 8 1 20 24	19 11 2 25 8	22 13 6 5 19

2080/S	2162/S	2729/S	2307/S	3520/S
4 17 23 11 10	4 21 7 20 13	5 19 22 13 6	5 6 13 22 19	10 4 17 23 11
21 15 9 2 18	10 18 14 1 22	12 8 1 20 24	12 24 20 1 8	18 21 15 9 2
7 3 16 25 14	11 2 25 8 19	16 25 14 7 3	16 3 7 14 25	14 7 3 16 25
20 24 12 8 1	23 9 16 12 5	9 2 18 21 15	9 15 21 18 2	1 20 24 12 8
13 6 5 19 22	17 15 3 24 6	23 11 10 4 17	23 17 4 10 11	22 13 6 5 19

2079/S	1838/S	3339/S	924/S	1120/S
4 17 23 11 10	4 10 11 23 17	9 2 18 21 15	2 18 21 15 9	2 25 8 19 11
13 6 5 19 22	13 22 19 5 6	16 25 14 7 3	25 14 7 3 16	9 16 12 5 23
20 24 12 8 1	20 1 8 12 24	12 8 1 20 24	8 1 20 24 12	15 3 24 6 17
7 3 16 25 14	7 14 25 16 3	5 19 22 13 6	19 22 13 6 5	21 7 20 13 4
21 15 9 2 18	21 18 2 9 15	23 11 10 4 17	11 10 4 17 23	18 14 1 22 10

3050/S	1476/S	1657/S	923/S	653/S
7 3 16 25 14	3 16 25 14 7	3 24 6 17 15	2 18 21 15 9	2 9 15 21 18
20 24 12 8 1	24 12 8 1 20	7 20 13 4 21	11 10 4 17 23	11 23 17 4 10
13 6 5 19 22	6 5 19 22 13	14 1 22 10 18	19 22 13 6 5	19 5 6 13 22
4 17 23 11 10	17 23 11 10 4	25 8 19 11 2	8 1 20 24 12	8 12 24 20 1
21 15 9 2 18	15 9 2 18 21	16 12 5 23 9	25 14 7 3 16	25 16 3 7 14

437/S	1475/S	1192/S	3180/S	430/S
1 22 10 18 14	3 16 25 14 7	3 7 14 25 16	8 1 20 24 12	1 20 24 12 8
8 19 11 2 25	15 9 2 18 21	15 21 18 2 9	19 22 13 6 5	22 13 6 5 19
12 5 23 9 16	17 23 11 10 4	17 4 10 11 23	11 10 4 17 23	10 4 17 23 11
24 6 17 15 3	6 5 19 22 13	6 13 22 19 5	2 18 21 15 9	18 21 15 9 2
20 13 4 21 7	24 12 8 1 20	24 20 1 8 12	25 14 7 3 16	14 7 3 16 25

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55/S	1458/S	1717/S	3277/S	411/S
1 8 22 14 20	3 16 15 24 7	3 25 17 6 14	8 19 21 2 15	1 20 14 22 8
12 19 5 6 23	25 9 2 18 11	7 11 4 23 20	1 12 10 18 24	12 23 6 5 19
10 21 13 17 4	17 13 21 10 4	24 18 10 12 1	20 23 4 11 7	10 4 17 13 21
18 2 9 25 11	6 5 19 12 23	15 2 21 19 8	14 6 17 25 3	18 11 25 9 2
24 15 16 3 7	14 22 8 1 20	16 9 13 5 22	22 5 13 9 16	24 7 3 16 15

3142/S	1457/S	1214/S	910/S	1033/S
7 20 23 4 11	3 16 15 24 7	3 7 24 15 16	2 18 11 25 9	2 21 19 8 15
3 14 6 17 25	14 22 8 1 20	14 20 1 8 22	21 10 4 17 13	9 13 5 22 16
16 22 5 13 9	6 5 19 12 23	6 23 12 19 5	19 12 23 6 5	25 17 6 14 3
15 8 19 21 2	17 13 21 10 4	17 4 10 21 13	8 1 20 14 22	11 4 23 20 7
24 1 12 10 18	25 9 2 18 11	25 11 18 2 9	15 24 7 3 16	18 10 12 1 24

2064/S	2264/S	3410/S	909/S	679/S
4 17 13 21 10	4 23 20 7 11	9 16 22 5 13	2 18 11 25 9	2 9 25 11 18
23 6 5 19 12	10 12 1 24 18	2 15 8 19 21	15 24 7 3 16	15 16 3 7 24
20 14 22 8 1	21 19 8 15 2	18 24 1 12 10	8 1 20 14 22	8 22 14 20 1
7 3 16 15 24	13 5 22 16 9	11 7 20 23 4	19 12 23 6 5	19 5 6 23 12
11 25 9 2 18	17 6 14 3 25	25 3 14 6 17	21 10 4 17 13	21 13 17 4 10

2063/S	1856/S	2714/S	2792/S	3569/S
4 17 13 21 10	4 10 21 13 17	5 19 12 23 6	5 22 16 9 13	10 18 24 1 12
11 25 9 2 18	11 18 2 9 25	22 8 1 20 14	6 14 3 25 17	4 11 7 20 23
7 3 16 15 24	7 24 15 16 3	16 15 24 7 3	23 20 7 11 4	17 25 3 14 6
20 14 22 8 1	20 1 8 22 14	9 2 18 11 25	12 1 24 18 10	13 9 16 22 5
23 6 5 19 12	23 12 19 5 6	13 21 10 4 17	19 8 15 2 21	21 2 15 8 19

530/S	2981/S	2713/S	2329/S	412/S
1 24 18 10 12	6 17 25 3 14	5 19 12 23 6	5 6 23 12 19	1 20 14 22 8
8 15 2 21 19	5 13 9 16 22	13 21 10 4 17	13 17 4 10 21	24 7 3 16 15
22 16 9 13 5	19 21 2 15 8	9 2 18 11 25	9 25 11 18 2	18 11 25 9 2
14 3 25 17 6	12 10 18 24 1	16 15 24 7 3	16 3 7 24 15	10 4 17 13 21
20 7 11 4 23	23 4 11 7 20	22 8 1 20 14	22 14 20 1 8	12 23 6 5 19

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73/S	2943/S	2694/S	2849/S	423/S
1 9 12 23 20	6 5 18 22 14	5 18 22 14 6	5 24 8 16 12	1 20 23 12 9
13 25 16 4 7	17 24 11 10 3	24 11 10 3 17	6 17 15 4 23	13 7 4 16 25
19 2 8 15 21	15 8 2 19 21	8 2 19 21 15	14 3 21 7 20	19 21 15 8 2
10 11 24 17 3	4 16 25 13 7	16 25 13 7 4	22 10 19 13 1	10 3 17 24 11
22 18 5 6 14	23 12 9 1 20	12 9 1 20 23	18 11 2 25 9	22 14 6 5 18

1504/S	1586/S	2693/S	2309/S	3502/S
3 17 24 11 10	3 21 7 20 14	5 18 22 14 6	5 6 14 22 18	10 3 17 24 11
21 15 8 2 19	10 19 13 1 22	12 9 1 20 23	12 23 20 1 9	19 21 15 8 2
7 4 16 25 13	11 2 25 9 18	16 25 13 7 4	16 4 7 13 25	13 7 4 16 25
20 23 12 9 1	24 8 16 12 5	8 2 19 21 15	8 15 21 19 2	1 20 23 12 9
14 6 5 18 22	17 15 4 23 6	24 11 10 3 17	24 17 3 10 11	22 14 6 5 18

1503/S	1262/S	3195/S	960/S	1122/S
3 17 24 11 10	3 10 11 24 17	8 2 19 21 15	2 19 21 15 8	2 25 9 18 11
14 6 5 18 22	14 22 18 5 6	16 25 13 7 4	25 13 7 4 16	8 16 12 5 24
20 23 12 9 1	20 1 9 12 23	12 9 1 20 23	9 1 20 23 12	15 4 23 6 17
7 4 16 25 13	7 13 25 16 4	5 18 22 14 6	18 22 14 6 5	21 7 20 14 3
21 15 8 2 19	21 19 2 8 15	24 11 10 3 17	11 10 3 17 24	19 13 1 22 10

3068/S	2052/S	2233/S	959/S	617/S
7 4 16 25 13	4 16 25 13 7	4 23 6 17 15	2 19 21 15 8	2 8 15 21 19
20 23 12 9 1	23 12 9 1 20	7 20 14 3 21	11 10 3 17 24	11 24 17 3 10
14 6 5 18 22	6 5 18 22 14	13 1 22 10 19	18 22 14 6 5	18 5 6 14 22
3 17 24 11 10	17 24 11 10 3	25 9 18 11 2	9 1 20 23 12	9 12 23 20 1
21 15 8 2 19	15 8 2 19 21	16 12 5 24 8	25 13 7 4 16	25 16 4 7 13

438/S	2051/S	1768/S	3324/S	424/S
1 22 10 19 13	4 16 25 13 7	4 7 13 25 16	9 1 20 23 12	1 20 23 12 9
9 18 11 2 25	15 8 2 19 21	15 21 19 2 8	18 22 14 6 5	22 14 6 5 18
12 5 24 8 16	17 24 11 10 3	17 3 10 11 24	11 10 3 17 24	10 3 17 24 11
23 6 17 15 4	6 5 18 22 14	6 14 22 18 5	2 19 21 15 8	19 21 15 8 2
20 14 3 21 7	23 12 9 1 20	23 20 1 9 12	25 13 7 4 16	13 7 4 16 25

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91/S	2034/S	2293/S	3421/S	407/S
1 9 22 13 20	4 16 15 23 7	4 25 17 6 13	9 18 21 2 15	1 20 13 22 9
12 18 5 6 24	25 8 2 19 11	7 11 3 24 20	1 12 10 19 23	12 24 6 5 18
10 21 14 17 3	17 14 21 10 3	23 19 10 12 1	20 24 3 11 7	10 3 17 14 21
19 2 8 25 11	6 5 18 12 24	15 2 21 18 9	13 6 17 25 4	19 11 25 8 2
23 15 16 4 7	13 22 9 1 20	16 8 14 5 22	22 5 14 8 16	23 7 4 16 15

3144/S	2033/S	1790/S	946/S	1027/S
7 20 24 3 11	4 16 15 23 7	4 7 23 15 16	2 19 11 25 8	2 21 18 9 15
4 13 6 17 25	13 22 9 1 20	13 20 1 9 22	21 10 3 17 14	8 14 5 22 16
16 22 5 14 8	6 5 18 12 24	6 24 12 18 5	18 12 24 6 5	25 17 6 13 4
15 9 18 21 2	17 14 21 10 3	17 3 10 21 14	9 1 20 13 22	11 3 24 20 7
23 1 12 10 19	25 8 2 19 11	25 11 19 2 8	15 23 7 4 16	19 10 12 1 23

1488/S	1688/S	3266/S	945/S	643/S
3 17 14 21 10	3 24 20 7 11	8 16 22 5 14	2 19 11 25 8	2 8 25 11 19
24 6 5 18 12	10 12 1 23 19	2 15 9 18 21	15 23 7 4 16	15 16 4 7 23
20 13 22 9 1	21 18 9 15 2	19 23 1 12 10	9 1 20 13 22	9 22 13 20 1
7 4 16 15 23	14 5 22 16 8	11 7 20 24 3	18 12 24 6 5	18 5 6 24 12
11 25 8 2 19	17 6 13 4 25	25 4 13 6 17	21 10 3 17 14	21 14 17 3 10

1487/S	1280/S	2678/S	2791/S	3575/S
3 17 14 21 10	3 10 21 14 17	5 18 12 24 6	5 22 16 8 14	10 19 23 1 12
11 25 8 2 19	11 19 2 8 25	22 9 1 20 13	6 13 4 25 17	3 11 7 20 24
7 4 16 15 23	7 23 15 16 4	16 15 23 7 4	24 20 7 11 3	17 25 4 13 6
20 13 22 9 1	20 1 9 22 13	8 2 19 11 25	12 1 23 19 10	14 8 16 22 5
24 6 5 18 12	24 12 18 5 6	14 21 10 3 17	18 9 15 2 21	21 2 15 9 18

494/S	2982/S	2677/S	2335/S	408/S
1 23 19 10 12	6 17 25 4 13	5 18 12 24 6	5 6 24 12 18	1 20 13 22 9
9 15 2 21 18	5 14 8 16 22	14 21 10 3 17	14 17 3 10 21	23 7 4 16 15
22 16 8 14 5	18 21 2 15 9	8 2 19 11 25	8 25 11 19 2	19 11 25 8 2
13 4 25 17 6	12 10 19 23 1	16 15 23 7 4	16 4 7 23 15	10 3 17 14 21
20 7 11 3 24	24 3 11 7 20	22 9 1 20 13	22 13 20 1 9	12 24 6 5 18

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109/S	2925/S	2118/S	2273/S	387/S
1 10 12 23 19	6 4 18 22 15	4 18 22 15 6	4 25 8 16 12	1 19 23 12 10
13 24 16 5 7	17 25 11 9 3	25 11 9 3 17	6 17 14 5 23	13 7 5 16 24
20 2 8 14 21	14 8 2 20 21	8 2 20 21 14	15 3 21 7 19	20 21 14 8 2
9 11 25 17 3	5 16 24 13 7	16 24 13 7 5	22 9 20 13 1	9 3 17 25 11
22 18 4 6 15	23 12 10 1 19	12 10 1 19 23	18 11 2 24 10	22 15 6 4 18

1510/S	1585/S	2117/S	1733/S	3358/S
3 17 25 11 9	3 21 7 19 15	4 18 22 15 6	4 6 15 22 18	9 3 17 25 11
21 14 8 2 20	9 20 13 1 22	12 10 1 19 23	12 23 19 1 10	20 21 14 8 2
7 5 16 24 13	11 2 24 10 18	16 24 13 7 5	16 5 7 13 24	13 7 5 16 24
19 23 12 10 1	25 8 16 12 4	8 2 20 21 14	8 14 21 20 2	1 19 23 12 10
15 6 4 18 22	17 14 5 23 6	25 11 9 3 17	25 17 3 9 11	22 15 6 4 18

1509/S	1226/S	3197/S	996/S	1086/S
3 17 25 11 9	3 9 11 25 17	8 2 20 21 14	2 20 21 14 8	2 24 10 18 11
15 6 4 18 22	15 22 18 4 6	16 24 13 7 5	24 13 7 5 16	8 16 12 4 25
19 23 12 10 1	19 1 10 12 23	12 10 1 19 23	10 1 19 23 12	14 5 23 6 17
7 5 16 24 13	7 13 24 16 5	4 18 22 15 6	18 22 15 6 4	21 7 19 15 3
21 14 8 2 20	21 20 2 8 14	25 11 9 3 17	11 9 3 17 25	20 13 1 22 9

3086/S	2628/S	2809/S	995/S	615/S
7 5 16 24 13	5 16 24 13 7	5 23 6 17 14	2 20 21 14 8	2 8 14 21 20
19 23 12 10 1	23 12 10 1 19	7 19 15 3 21	11 9 3 17 25	11 25 17 3 9
15 6 4 18 22	6 4 18 22 15	13 1 22 9 20	18 22 15 6 4	18 4 6 15 22
3 17 25 11 9	17 25 11 9 3	24 10 18 11 2	10 1 19 23 12	10 12 23 19 1
21 14 8 2 20	14 8 2 20 21	16 12 4 25 8	24 13 7 5 16	24 16 5 7 13

436/S	2627/S	2344/S	3468/S	388/S
1 22 9 20 13	5 16 24 13 7	5 7 13 24 16	10 1 19 23 12	1 19 23 12 10
10 18 11 2 24	14 8 2 20 21	14 21 20 2 8	18 22 15 6 4	22 15 6 4 18
12 4 25 8 16	17 25 11 9 3	17 3 9 11 25	11 9 3 17 25	9 3 17 25 11
23 6 17 14 5	6 4 18 22 15	6 15 22 18 4	2 20 21 14 8	20 21 14 8 2
19 15 3 21 7	23 12 10 1 19	23 19 1 10 12	24 13 7 5 16	13 7 5 16 24

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127/S	2610/S	2869/S	3565/S	371/S
1 10 22 13 19	5 16 14 23 7	5 24 17 6 13	10 18 21 2 14	1 19 13 22 10
12 18 4 6 25	24 8 2 20 11	7 11 3 25 19	1 12 9 20 23	12 25 6 4 18
9 21 15 17 3	17 15 21 9 3	23 20 9 12 1	19 25 3 11 7	9 3 17 15 21
20 2 8 24 11	6 4 18 12 25	14 2 21 18 10	13 6 17 24 5	20 11 24 8 2
23 14 16 5 7	13 22 10 1 19	16 8 15 4 22	22 4 15 8 16	23 7 5 16 14

3138/S	2609/S	2366/S	982/S	1028/S
7 19 25 3 11	5 16 14 23 7	5 7 23 14 16	2 20 11 24 8	2 21 18 10 14
5 13 6 17 24	13 22 10 1 19	13 19 1 10 22	21 9 3 17 15	8 15 4 22 16
16 22 4 15 8	6 4 18 12 25	6 25 12 18 4	18 12 25 6 4	24 17 6 13 5
14 10 18 21 2	17 15 21 9 3	17 3 9 21 15	10 1 19 13 22	11 3 25 19 7
23 1 12 9 20	24 8 2 20 11	24 11 20 2 8	14 23 7 5 16	20 9 12 1 23

1492/S	1724/S	3265/S	981/S	637/S
3 17 15 21 9	3 25 19 7 11	8 16 22 4 15	2 20 11 24 8	2 8 24 11 20
25 6 4 18 12	9 12 1 23 20	2 14 10 18 21	14 23 7 5 16	14 16 5 7 23
19 13 22 10 1	21 18 10 14 2	20 23 1 12 9	10 1 19 13 22	10 22 13 19 1
7 5 16 14 23	15 4 22 16 8	11 7 19 25 3	18 12 25 6 4	18 4 6 25 12
11 24 8 2 20	17 6 13 5 24	24 5 13 6 17	21 9 3 17 15	21 15 17 3 9
1491/S	1244/S	2102/S	2215/S	3431/S
3 17 15 21 9	3 9 21 15 17	4 18 12 25 6	4 22 16 8 15	9 20 23 1 12
11 24 8 2 20	11 20 2 8 24	22 10 1 19 13	6 13 5 24 17	3 11 7 19 25
7 5 16 14 23	7 23 14 16 5	16 14 23 7 5	25 19 7 11 3	17 24 5 13 6
19 13 22 10 1	19 1 10 22 13	8 2 20 11 24	12 1 23 20 9	15 8 16 22 4
25 6 4 18 12	25 12 18 4 6	15 21 9 3 17	18 10 14 2 21	21 2 14 10 18
500/S	2980/S	2101/S	1759/S	372/S
1 23 20 9 12	6 17 24 5 13	4 18 12 25 6	4 6 25 12 18	1 19 13 22 10
10 14 2 21 18	4 15 8 16 22	15 21 9 3 17	15 17 3 9 21	23 7 5 16 14
22 16 8 15 4	18 21 2 14 10	8 2 20 11 24	8 24 11 20 2	20 11 24 8 2
13 5 24 17 6	12 9 20 23 1	16 14 23 7 5	16 5 7 23 14	9 3 17 15 21
19 7 11 3 25	25 3 11 7 19	22 10 1 19 13	22 13 19 1 10	12 25 6 4 18

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145/S	3154/S	2788/S	2787/S	428/S
1 12 8 24 20	7 23 19 5 11	5 22 14 16 8	5 22 14 16 8	1 20 24 8 12
9 25 16 2 13	4 15 6 22 18	19 6 3 25 12	11 18 10 2 24	9 13 2 16 25
17 3 14 10 21	21 17 3 14 10	23 15 17 9 1	7 4 21 13 20	17 21 10 14 3
15 6 22 18 4	13 9 25 16 2	7 4 21 13 20	23 15 17 9 1	15 4 18 22 6
23 19 5 11 7	20 1 12 8 24	11 18 10 2 24	19 6 3 25 12	23 7 11 5 19
2174/S	2173/S	2732/S	2449/S	3001/S
4 21 13 20 7	4 21 13 20 7	5 19 23 7 11	5 11 7 23 19	6 22 18 4 15
18 10 2 24 11	15 17 9 1 23	8 12 1 20 24	8 24 20 1 12	3 14 10 21 17
22 14 16 8 5	6 3 25 12 19	16 25 9 13 2	16 2 13 9 25	25 16 2 13 9
6 3 25 12 19	22 14 16 8 5	14 3 17 21 10	14 10 21 17 3	12 8 24 20 1
15 17 9 1 23	18 10 2 24 11	22 6 15 4 18	22 18 4 15 6	19 5 11 7 23
2113/S	1981/S	3577/S	1706/S	1705/S
4 18 22 6 15	4 15 6 22 18	10 21 17 3 14	3 25 12 19 6	3 25 12 19 6
7 11 5 19 23	7 23 19 5 11	2 13 9 25 16	17 9 1 23 15	14 16 8 5 22
20 24 8 12 1	20 1 12 8 24	24 20 1 12 8	21 13 20 7 4	10 2 24 11 18
13 2 16 25 9	13 9 25 16 2	11 7 23 19 5	10 2 24 11 18	21 13 20 7 4
21 10 14 3 17	21 17 3 14 10	18 4 15 6 22	14 16 8 5 22	17 9 1 23 15
3451/S	1088/S	1087/S	1496/S	1373/S
9 25 16 2 13	2 24 11 18 10	2 24 11 18 10	3 17 21 10 14	3 14 10 21 17
1 12 8 24 20	16 8 5 22 14	13 20 7 4 21	6 15 4 18 22	6 22 18 4 15
23 19 5 11 7	25 12 19 6 3	9 1 23 15 17	19 23 7 11 5	19 5 11 7 23
15 6 22 18 4	9 1 23 15 17	25 12 19 6 3	12 1 20 24 8	12 8 24 20 1
17 3 14 10 21	13 20 7 4 21	16 8 5 22 14	25 9 13 2 16	25 16 2 13 9
483/S	896/S	760/S	3305/S	484/S
1 23 15 17 9	2 16 25 9 13	2 13 9 25 16	8 24 20 1 12	1 23 15 17 9
12 19 6 3 25	10 14 3 17 21	10 21 17 3 14	5 11 7 23 19	20 7 4 21 13
8 5 22 14 16	18 22 6 15 4	18 4 15 6 22	22 18 4 15 6	24 11 18 10 2
24 11 18 10 2	11 5 19 23 7	11 7 23 19 5	14 10 21 17 3	8 5 22 14 16
20 7 4 21 13	24 8 12 1 20	24 20 1 12 8	16 2 13 9 25	12 19 6 3 25

[109/F]

181/S	3298/S	2824/S	2823/S	427/S
1 13 7 24 20	8 22 19 5 11	5 23 14 16 7	5 23 14 16 7	1 20 24 7 13
9 25 16 3 12	4 15 6 23 17	19 6 2 25 13	11 17 10 3 24	9 12 3 16 25
18 2 14 10 21	21 18 2 14 10	22 15 18 9 1	8 4 21 12 20	18 21 10 14 2
15 6 23 17 4	12 9 25 16 3	8 4 21 12 20	22 15 18 9 1	15 4 17 23 6
22 19 5 11 8	20 1 13 7 24	11 17 10 3 24	19 6 2 25 13	22 8 11 5 19
2170/S	2169/S	2726/S	2451/S	3007/S
4 21 12 20 8	4 21 12 20 8	5 19 22 8 11	5 11 8 22 19	6 23 17 4 15
17 10 3 24 11	15 18 9 1 22	7 13 1 20 24	7 24 20 1 13	2 14 10 21 18
23 14 16 7 5	6 2 25 13 19	16 25 9 12 3	16 3 12 9 25	25 16 3 12 9
6 2 25 13 19	23 14 16 7 5	14 2 18 21 10	14 10 21 18 2	13 7 24 20 1
15 18 9 1 22	17 10 3 24 11	23 6 15 4 17	23 17 4 15 6	19 5 11 8 22

2077/S	1982/S	3579/S	1130/S	1129/S
4 17 23 6 15	4 15 6 23 17	10 21 18 2 14	2 25 13 19 6	2 25 13 19 6
8 11 5 19 22	8 22 19 5 11	3 12 9 25 16	18 9 1 22 15	14 16 7 5 23
20 24 7 13 1	20 1 13 7 24	24 20 1 13 7	21 12 20 8 4	10 3 24 11 17
12 3 16 25 9	12 9 25 16 3	11 8 22 19 5	10 3 24 11 17	21 12 20 8 4
21 10 14 2 18	21 18 2 14 10	17 4 15 6 23	14 16 7 5 23	18 9 1 22 15

3452/S	1664/S	1663/S	920/S	797/S
9 25 16 3 12	3 24 11 17 10	3 24 11 17 10	2 18 21 10 14	2 14 10 21 18
1 13 7 24 20	16 7 5 23 14	12 20 8 4 21	6 15 4 17 23	6 23 17 4 15
22 19 5 11 8	25 13 19 6 2	9 1 22 15 18	19 22 8 11 5	19 5 11 8 22
15 6 23 17 4	9 1 22 15 18	25 13 19 6 2	13 1 20 24 7	13 7 24 20 1
18 2 14 10 21	12 20 8 4 21	16 7 5 23 14	25 9 12 3 16	25 16 3 12 9

447/S	1472/S	1336/S	3161/S	448/S
1 22 15 18 9	3 16 25 9 12	3 12 9 25 16	7 24 20 1 13	1 22 15 18 9
13 19 6 2 25	10 14 2 18 21	10 21 18 2 14	5 11 8 22 19	20 8 4 21 12
7 5 23 14 16	17 23 6 15 4	17 4 15 6 23	23 17 4 15 6	24 11 17 10 3
24 11 17 10 3	11 5 19 22 8	11 8 22 19 5	14 10 21 18 2	7 5 23 14 16
20 8 4 21 12	24 7 13 1 20	24 20 1 13 7	16 3 12 9 25	13 19 6 2 25

[121/F]

217/S	3442/S	2860/S	2859/S	421/S
1 14 7 23 20	9 22 18 5 11	5 24 13 16 7	5 24 13 16 7	1 20 23 7 14
8 25 16 4 12	3 15 6 24 17	18 6 2 25 14	11 17 10 4 23	8 12 4 16 25
19 2 13 10 21	21 19 2 13 10	22 15 19 8 1	9 3 21 12 20	19 21 10 13 2
15 6 24 17 3	12 8 25 16 4	9 3 21 12 20	22 15 19 8 1	15 3 17 24 6
22 18 5 11 9	20 1 14 7 23	11 17 10 4 23	18 6 2 25 14	22 9 11 5 18

1594/S	1593/S	2690/S	2453/S	3013/S
3 21 12 20 9	3 21 12 20 9	5 18 22 9 11	5 11 9 22 18	6 24 17 3 15
17 10 4 23 11	15 19 8 1 22	7 14 1 20 23	7 23 20 1 14	2 13 10 21 19
24 13 16 7 5	6 2 25 14 18	16 25 8 12 4	16 4 12 8 25	25 16 4 12 8
6 2 25 14 18	24 13 16 7 5	13 2 19 21 10	13 10 21 19 2	14 7 23 20 1
15 19 8 1 22	17 10 4 23 11	24 6 15 3 17	24 17 3 15 6	18 5 11 9 22

1501/S	1406/S	3581/S	1134/S	1133/S
3 17 24 6 15	3 15 6 24 17	10 21 19 2 13	2 25 14 18 6	2 25 14 18 6
9 11 5 18 22	9 22 18 5 11	4 12 8 25 16	19 8 1 22 15	13 16 7 5 24
20 23 7 14 1	20 1 14 7 23	23 20 1 14 7	21 12 20 9 3	10 4 23 11 17
12 4 16 25 8	12 8 25 16 4	11 9 22 18 5	10 4 23 11 17	21 12 20 9 3
21 10 13 2 19	21 19 2 13 10	17 3 15 6 24	13 16 7 5 24	19 8 1 22 15

3308/S	2240/S	2239/S	956/S	761/S
8 25 16 4 12	4 23 11 17 10	4 23 11 17 10	2 19 21 10 13	2 13 10 21 19
1 14 7 23 20	16 7 5 24 13	12 20 9 3 21	6 15 3 17 24	6 24 17 3 15
22 18 5 11 9	25 14 18 6 2	8 1 22 15 19	18 22 9 11 5	18 5 11 9 22
15 6 24 17 3	8 1 22 15 19	25 14 18 6 2	14 1 20 23 7	14 7 23 20 1
19 2 13 10 21	12 20 9 3 21	16 7 5 24 13	25 8 12 4 16	25 16 4 12 8

449/S	2048/S	1912/S	3155/S	450/S
1 22 15 19 8	4 16 25 8 12	4 12 8 25 16	7 23 20 1 14	1 22 15 19 8
14 18 6 2 25	10 13 2 19 21	10 21 19 2 13	5 11 9 22 18	20 9 3 21 12
7 5 24 13 16	17 24 6 15 3	17 3 15 6 24	24 17 3 15 6	23 11 17 10 4
23 11 17 10 4	11 5 18 22 9	11 9 22 18 5	13 10 21 19 2	7 5 24 13 16
20 9 3 21 12	23 7 14 1 20	23 20 1 14 7	16 4 12 8 25	14 18 6 2 25

[133/F]

253/S	3586/S	2284/S	2283/S	385/S
1 15 7 23 19	10 22 18 4 11	4 25 13 16 7	4 25 13 16 7	1 19 23 7 15
8 24 16 5 12	3 14 6 25 17	18 6 2 24 15	11 17 9 5 23	8 12 5 16 24
20 2 13 9 21	21 20 2 13 9	22 14 20 8 1	10 3 21 12 19	20 21 9 13 2
14 6 25 17 3	12 8 24 16 5	10 3 21 12 19	22 14 20 8 1	14 3 17 25 6
22 18 4 11 10	19 1 15 7 23	11 17 9 5 23	18 6 2 24 15	22 10 11 4 18

1592/S	1591/S	2114/S	1877/S	3019/S
3 21 12 19 10	3 21 12 19 10	4 18 22 10 11	4 11 10 22 18	6 25 17 3 14
17 9 5 23 11	14 20 8 1 22	7 15 1 19 23	7 23 19 1 15	2 13 9 21 20
25 13 16 7 4	6 2 24 15 18	16 24 8 12 5	16 5 12 8 24	24 16 5 12 8
6 2 24 15 18	25 13 16 7 4	13 2 20 21 9	13 9 21 20 2	15 7 23 19 1
14 20 8 1 22	17 9 5 23 11	25 6 14 3 17	25 17 3 14 6	18 4 11 10 22

** Calculated and Listed by Kanji Setsuda on
 Jan. 24, 2015 with MacOSX 10.10.1 & Xcode 6.1.1 **

You could surely have got all the 3600 Standard Solutions from 144 Fundamental Solutions. You could never make any other type of solutions. You could have neither duplications, nor drop-offs of any solution.

It means these 144 solutions are really 'fundamental' to all those 3600 solutions.

#5. How to Identify your Solution with the Fundamental?

Suppose you get an answer as below, for instance.

Which Fundamental Solution is it identified with?

First of all, you have to make the individual Extended Space for your answer.

Move the 5x5 square frame in the space and find a new square with 1 on the tops.

If you want n1=1 on the top left, rotate or reflect it as you like.

[Figure 7:

How to Identify your Answer with the Fundamental]

```

[Your Answer]      24 17 10  3 11 24 17 10  3 11
 5 13 21 19  7    5 13 21 19  7  5 13 21 19  7
16  9  2 15 23    16  9  2 15 23 16  9  2 15 23
12 25 18  6  4  -> 12 25 18  6  4 12 25 18  6  4
 8  1 14 22 20    8  1 14 22 20  8  1 14 22 20
24 17 10  3 11    24 17 10  3 11 24 17 10  3 11
                    5 13 21 19  7  5 13 21 19  7
Make[Extended Space] 16  9  2 15 23 16  9  2 15 23
Find another MS55PD 12 25 18  6  4 12 25 18  6  4
  Take this out ✓
                    ✓   Reflect left/right
14 22 20  8  1    1  8 20 22 14
10  3 11 24 17    17 24 11  3 10
21 19  7  5 13  -> 13  5  7 19 21
 2 15 23 16  9    9 16 23 15  2
18  6  4 12 25    25 12  4  6 18
                    [Goal]: No.35/F]
  
```

The list of 144 Fundamental Solutions in page 8~11 in this article would tell you the answer you want. It is made under the normalizing conditions: n1=1, n5<n21, n2<n5 and n6<n21.

If you could transform your answer into the last pattern shown above, you will finally find it in the list: the Fundamental Solution No.35!

(Written on Aug. 27, Dec. 27, 2001; Revised on May 27, 2005;
 Recalculated recently on Jan. 24, 2015 by Kanji Setsuda;
 with MacOSX 10.10.1 and Xcode 6.1.1)

 E-Mail Address: jag12001@nifty.com

<< Appendix: List of the New Program for PDMS55 >>

```

/** Pan-Diagonal Magic Squares of Order 5: **
/** Compact List of 3600 Standard Solutions **
/** 'PDMS55SS.c': Dictated by Kanji Setsuda **
/** on Feb. 8, 2005; Sep.10, 2006; **
/** Revised on Jan.21, 2015 **
/** with MacOSX 10.10.1 & Xcode 6.1.1 **
//
/** Basic Form for PDMS55 ** * A Model Solution *
// 22 23 24 25 21 22 23 24 25 21 22 23 24
//
// 2 3 4 5 | 1 2 3 4 5 | 1 2 3 4 | 1 7 | 13 | 24 | 20 |
// |-----| |-----| |-----|
// 7 8 9 10 | 6 7 8 9 10 | 6 7 8 9 | 14 | 25 | 16 | 2 | 8 |
// |-----| |-----| |-----|
// 12 13 14 15 | 11 12 13 14 15 | 11 12 13 14 | 17 | 3 | 9 | 15 | 21 |
// |-----| |-----| |-----|
// 17 18 19 20 | 16 17 18 19 20 | 16 17 18 19 | 10 | 11 | 22 | 18 | 4 |
// |-----| |-----| |-----|
// 22 23 24 25 | 21 22 23 24 25 | 21 22 23 24 | 23 | 19 | 5 | 6 | 12 |
// |-----| |-----| |-----|
// 2 3 4 5 1 2 3 4 5 1 2 3 4
//
/** Basic Conditions for PDMS55 **
// n1+n2+n3+n4+n5=C ...rw1; | n1+n6+n11+n16+n21=C ...cl1;
// n6+n7+n8+n9+n10=C ...rw2; | n2+n7+n12+n17+n22=C ...cl2;
// n11+n12+n13+n14+n15=C ...rw3; | n3+n8+n13+n18+n23=C ...cl3;
// n16+n17+n18+n19+n20=C ...rw4; | n4+n9+n14+n19+n24=C ...cl4;
// n21+n22+n23+n24+n25=C ...rw5; | n5+n10+n15+n20+n25=C ...cl5;
/** Pan-diagonal Conditions for PDPMS55 **
// n1+n7+n13+n19+n25=C ...pd1; | n1+n10+n14+n18+n22=C ...pb1;
// n2+n8+n14+n20+n21=C ...pd2; | n2+n6+n15+n19+n23=C ...pb2;
// n3+n9+n15+n16+n22=C ...pd3; | n3+n7+n11+n20+n24=C ...pb3;
// n4+n10+n11+n17+n23=C ...pd4; | n4+n8+n12+n16+n25=C ...pb4;
// n5+n6+n12+n18+n24=C ...pd5; | n5+n9+n13+n17+n21=C ...pb5;
/** Normalizing Inequality Conditions **
// n1<n5<n21 and n1<n25;
//
#include <stdio.h>
//
short int cnt;
short LSM, CC, cnt2, cnt3;
short nm[26], uflg[26];
short tnm[6][26];
//
void stp01(void), stp02(void), stp03(void), stp04(void);
void stp05(void), stp06(void), stp07(void), stp08(void);
void stp09(void), stp10(void), stp11(void), stp12(void);
void stp13(void), stp14(void), stp15(void), stp16(void);
void stp17(void), stp18(void), stp19(void), stp20(void);
void stp21(void), stp22(void), stp23(void), stp24(void);
void stp25(void);
void ansprint(void);
void prans(short x);
//
/** Main Program *
int main(){
short n;
printf("\n");
printf("*** Pan-Diagonal Magic Squares 5x5: Compact List of 3600 Standard Solutions **\n");
for(n=0;n<26;n++){nm[n]=0; uflg[n]=0;}
LSM=65; CC=26; cnt=0; cnt3=0;
stp01(); /* Begin The Calculations *
if(cnt3>0){prans(cnt3);}
printf(" [Count = %d] OK!\n",cnt);

```

```

printf("\n");
printf("** Calculated and Listed by Kanji Setsuda on\n");
printf("  Jan.21, 2015 with MacOSX 10.10.1 & Xcode 6.1.1 **\n");
printf("\n");
return 0;
}
/* Begin The Calculations *
/* Define Level 1: *
/* Set n1 *
void stp01(){
short a;
for(a=1;a<13;a++){
if(uflg[a]==0){
nm[1]=a; uflg[a]=1;
stp02();
uflg[a]=0;}
}
}
/* Set n2 *
void stp02(){
short a;
for(a=1;a<26;a++){
if(uflg[a]==0){cnt2=0;
nm[2]=a; uflg[a]=1;
stp03();
uflg[a]=0;}
}
}
/* Set n3 *
void stp03(){
short a;
for(a=1;a<26;a++){
if(uflg[a]==0){
nm[3]=a; uflg[a]=1;
stp04();
uflg[a]=0;}
}
}
/* Set n4 *
void stp04(){
short a;
for(a=1;a<26;a++){
if(uflg[a]==0){
nm[4]=a; uflg[a]=1;
stp05();
uflg[a]=0;}
}
}
/* Set n5=LSM-n1-n2-n3-n4 & n5>n1 *
void stp05(){
short a;
a=LSM-nm[1]-nm[2]-nm[3]-nm[4];
if((nm[1]<a)&&(a<26)){
if(uflg[a]==0){
nm[5]=a; uflg[a]=1;
stp06();
uflg[a]=0;}}
}
/* Set n6 *
void stp06(){
short a;
for(a=1;a<26;a++){
if(uflg[a]==0){
nm[6]=a; uflg[a]=1;

```

```

        stp07();
        uflg[a]=0;}
    }
}
/** Set n11 *
void stp07(){
    short a;
    for(a=1;a<26;a++){
        if(uflg[a]==0){
            nm[11]=a; uflg[a]=1;
            stp08();
            uflg[a]=0;}
        }
}
/** Set n16 *
void stp08(){
    short a;
    for(a=1;a<26;a++){
        if(uflg[a]==0){
            nm[16]=a; uflg[a]=1;
            stp09();
            uflg[a]=0;}
        }
}
/** Set n21=LSM-n1-n6-n11-n16 & n21>n5 *
void stp09(){
    short a,b;
    a=LSM-nm[1]-nm[6]-nm[11]-nm[16];
    b=LSM-nm[1]-nm[2]-nm[5]-nm[6];
    if((nm[5]<a)&&(a<26)){
        if((uflg[a]==0)&&(a==b)){
            nm[21]=a; uflg[a]=1;
            stp10();
            uflg[a]=0;}}
}
/** Set n25(>n1) *
void stp10(){
    short a;
    for(a=25;a>nm[1];a--){
        if(uflg[a]==0){
            nm[25]=a; uflg[a]=1;
            stp11();
            uflg[a]=0;}
        }
}
/** Set n13=LSM-n1-n5-n21-n25 *
void stp11(){
    short a;
    a=LSM-nm[1]-nm[5]-nm[21]-nm[25];
    if((0<a)&&(a<26)){
        if(uflg[a]==0){
            nm[13]=a; uflg[a]=1;
            stp12();
            uflg[a]=0;}}
}
/** Level 2: *
/** Set n7=LSM-n1-n3-n11-n13 *
void stp12(){
    short a;
    a=LSM-nm[1]-nm[3]-nm[11]-nm[13];
    if((0<a)&&(a<26)){
        if(uflg[a]==0){
            nm[7]=a; uflg[a]=1;
            stp13();

```



```

        uflg[a]=0;}}
}
/** Set n19=LSM-n1-n7-n13-n25 *
void stp13(){
short a;
a=LSM-nm[1]-nm[7]-nm[13]-nm[25];
if((0<a)&&(a<26)){
if(uflg[a]==0){
nm[19]=a; uflg[a]=1;
stp14();
uflg[a]=0;}}
}
/** Set n10=LSM-n1-n4-n5-n25 *
void stp14(){
short a;
a=LSM-nm[1]-nm[4]-nm[5]-nm[25];
if((0<a)&&(a<26)){
if(uflg[a]==0){
nm[10]=a; uflg[a]=1;
stp15();
uflg[a]=0;}}
}
/** Set n8 *
void stp15(){
short a;
for(a=1;a<26;a++){
if(uflg[a]==0){
nm[8]=a; uflg[a]=1;
stp16();
uflg[a]=0;}}
}
}
/** Set n12=LSM-n4-n8-n16-n25 *
void stp16(){
short a;
a=LSM-nm[4]-nm[8]-nm[16]-nm[25];
if((0<a)&&(a<26)){
if(uflg[a]==0){
nm[12]=a; uflg[a]=1;
stp17();
uflg[a]=0;}}
}
}
/** Set n9=LSM-n6-n7-n8-n10 *
void stp17(){
short a;
a=LSM-nm[6]-nm[7]-nm[8]-nm[10];
if((0<a)&&(a<26)){
if(uflg[a]==0){
nm[9]=a; uflg[a]=1;
stp18();
uflg[a]=0;}}
}
}
/** Set n17=LSM-n5-n9-n13-n21 *
void stp18(){
short a;
a=LSM-nm[5]-nm[9]-nm[13]-nm[21];
if((0<a)&&(a<26)){
if(uflg[a]==0){
nm[17]=a; uflg[a]=1;
stp19();
uflg[a]=0;}}
}
}
/** Set n22=LSM-n2-n7-n12-n17 *
void stp19(){

```

```

short a;
a=LSM-nm[2]-nm[7]-nm[12]-nm[17];
if((0<a)&&(a<26)){
    if(uflg[a]==0){
        nm[22]=a; uflg[a]=1;
        stp20();
        uflg[a]=0;}}
}
/* Level 3: *
/* Set n14=LSM-n2-n4-n8-n12 *
void stp20(){
short a;
a=LSM-nm[2]-nm[4]-nm[8]-nm[12];
if((0<a)&&(a<26)){
    if(uflg[a]==0){
        nm[14]=a; uflg[a]=1;
        stp21();
        uflg[a]=0;}}
}
/* Set n15=LSM-n11-n12-n13-n14 *
void stp21(){
short a,b;
a=LSM-nm[11]-nm[12]-nm[13]-nm[14];
b=LSM-nm[3]-nm[9]-nm[16]-nm[22];
if((0<a)&&(a<26)&&(a==b)){
    if(uflg[a]==0){
        nm[15]=a; uflg[a]=1;
        stp22();
        uflg[a]=0;}}
}
/* Set n20=LSM-n5-n10-n15-n25 *
void stp22(){
short a,b;
a=LSM-nm[5]-nm[10]-nm[15]-nm[25];
b=LSM-nm[2]-nm[8]-nm[14]-nm[21];
if((0<a)&&(a<26)&&(a==b)){
    if(uflg[a]==0){
        nm[20]=a; uflg[a]=1;
        stp23();
        uflg[a]=0;}}
}
/* Set n18=LSM-n16-n17-n19-n20 *
void stp23(){
short a,b;
a=LSM-nm[16]-nm[17]-nm[19]-nm[20];
b=LSM-nm[1]-nm[10]-nm[14]-nm[22];
if((0<a)&&(a<26)&&(a==b)){
    if(uflg[a]==0){
        nm[18]=a; uflg[a]=1;
        stp24();
        uflg[a]=0;}}
}
/* Set n23=LSM-n3-n8-n13-n18 *
void stp24(){
short a,b,c;
a=LSM-nm[3]-nm[8]-nm[13]-nm[18];
b=LSM-nm[2]-nm[6]-nm[15]-nm[19];
c=LSM-nm[4]-nm[10]-nm[11]-nm[17];
if((0<a)&&(a<26)&&(a==b)&&(a==c)){
    if(uflg[a]==0){
        nm[23]=a; uflg[a]=1;
        stp25();
        uflg[a]=0;}}
}

```

```

/** Set n24=LSM-n4-n9-n14-n19 *
void stp25(){
short a,b,c,d;
a=LSM-nm[4]-nm[9]-nm[14]-nm[19];
b=LSM-nm[21]-nm[22]-nm[23]-nm[25];
c=LSM-nm[3]-nm[7]-nm[11]-nm[20];
d=LSM-nm[5]-nm[6]-nm[12]-nm[18];
if((0<a)&&(a<26)){
    if((a==b)&&(a==c)&&(a==d)){
        if(uflg[a]==0){
            nm[24]=a; uflg[a]=1;
            ansprint();
            uflg[a]=0;}}}
}
//
/** Print the Answers *
void ansprint(){
short n;
cnt++; cnt2++;
if(cnt2==1){
    for(n=1;n<26;n++){tnm[cnt3][n]=nm[n];}
    tnm[cnt3][0]=cnt;
    cnt3++; if(cnt3==5){prans(cnt3); cnt3=0;}}
}
//
/** Print the Answers: Sub *
void prans(short x){
short l,l5,m,n;
for(n=0;n<x;n++){printf("%15d/ ",tnm[n][0]);}
printf("\n");
for(l=0;l<5;l++){l5=l*5;
    for(m=0;m<x;m++){
        printf(" %3d%3d%3d%3d%3d ",
            tnm[m][l5+1],tnm[m][l5+2],tnm[m][l5+3],tnm[m][l5+4],tnm[m][l5+5]);
    }
    printf("\n");
}
}
//
//(End_Of_File)

```