

BIRTHDAY MAGIC SQUARE

Dear teachers, we shall introduce on Srinivasa Ramanujan Birthday through magic square in the class room at high school level to know better, one of the contributions of Ramanujan. It will enrich mathematics learning and ensure developing interest among students. By learning magic square the students may commemorate Birthday of Ramanujan, falls on 22nd December 1887.



Formula 1 , for the formulation of magic square

A	B	C	D
D+1	C-1	B-3	A+3
B-2	A+2	D+2	C-2
C+1	D-1	A+1	B-1

Putting $A=22, B=12, C=18$ and $D=87$ in formula 1, we get the greatest mathematician BIRTHDAY MAGIC SQUARE

22	12	18	87
88	17	9	25
10	24	89	16
19	86	23	11

From the table, we can get the so many properties

(i) Sum of the numbers of any column is 139

$$C_1 \Rightarrow A + D + 1 + B - 2 + C + 1 = A + B + C + D$$

$$C_2 \Rightarrow B + C - 1 + A + 2 + D - 1 = A + B + C + D$$

$$C_3 \Rightarrow C + B - 3 + D + 2 + A + 1 = A + B + C + D$$

$$C_4 \Rightarrow D + A + 3 + C - 2 + B - 1 = A + B + C + D$$

(ii) Sum of the numbers of any row is 139

$$R_1 \Rightarrow A + B + C + D$$

$$R_2 \Rightarrow D + 1 + C - 1 + B - 3 + A + 3 = A + B + C + D$$

$$R_3 \Rightarrow B - 2 + A + 2 + D + 2 + C - 2 = A + B + C + D$$

$$R_4 \Rightarrow C + 1 + D - 1 + A + 1 + B - 1 = A + B + C + D$$

(iii) Sum of numbers of any diagonals is 139

$$D_1 = A + C - 1 + D + 2 + B - 1 = A + B + C + D$$

$$D_2 = C + 1 + A + 2 + B - 3 + D = A + B + C + D$$

(iv) Sum of the corner number is 139

$$[A + B + C + 1 + B - 1] = A + B + C + D$$

(v) Sum of the corner square is 139

$$A + B + D + 1 + C - 1 = A + B + C + D$$

$$C + D + B - 3 + A + 3 = A + B + C + D$$

$$B - 2 + A + 2 + C + 1 + D - 1 = A + B + C + D$$

$$D + 2 + C - 2 + A + 1 + B - 1 = A + B + C + D$$

(vi) Sum of the middle square is 139

$$(C - 1 + B - 3 + A + 2 + D + 2) = A + B + C + D$$

Formula (2) similarly one can find another type of formula table

A	B	C	D
C+3	D-3	A+3	B-3
D-2	C-2	B+2	A+2
B-1	A+5	D-5	C+1

Solution:

22	12	18	87
21	84	25	09
85	11	14	24
11	27	82	19

Formula (3)

A	B	C	D
C-1	D+1	A-1	B+1
D+1	C+1	B-1	A-1
B	A-2	D+2	C

Solution:

22	12	18	87
17	88	21	13
88	19	11	21
12	20	89	18

This experience will be developing creative skills ,as one can find on their own different types of formula and compute it to form his own birthday magic square. This interest will let students to introduce Birthday magic square to his friends/brothers/sisters/teachers. This was fitted gift by Ramannujan to the students of nation.

Author: K.Thirumurugan, He has been actively engaged in the school maths,joyful teaching of math , discovering innovative idea ,served on resource person,published several papers and articles.