Magic Squares

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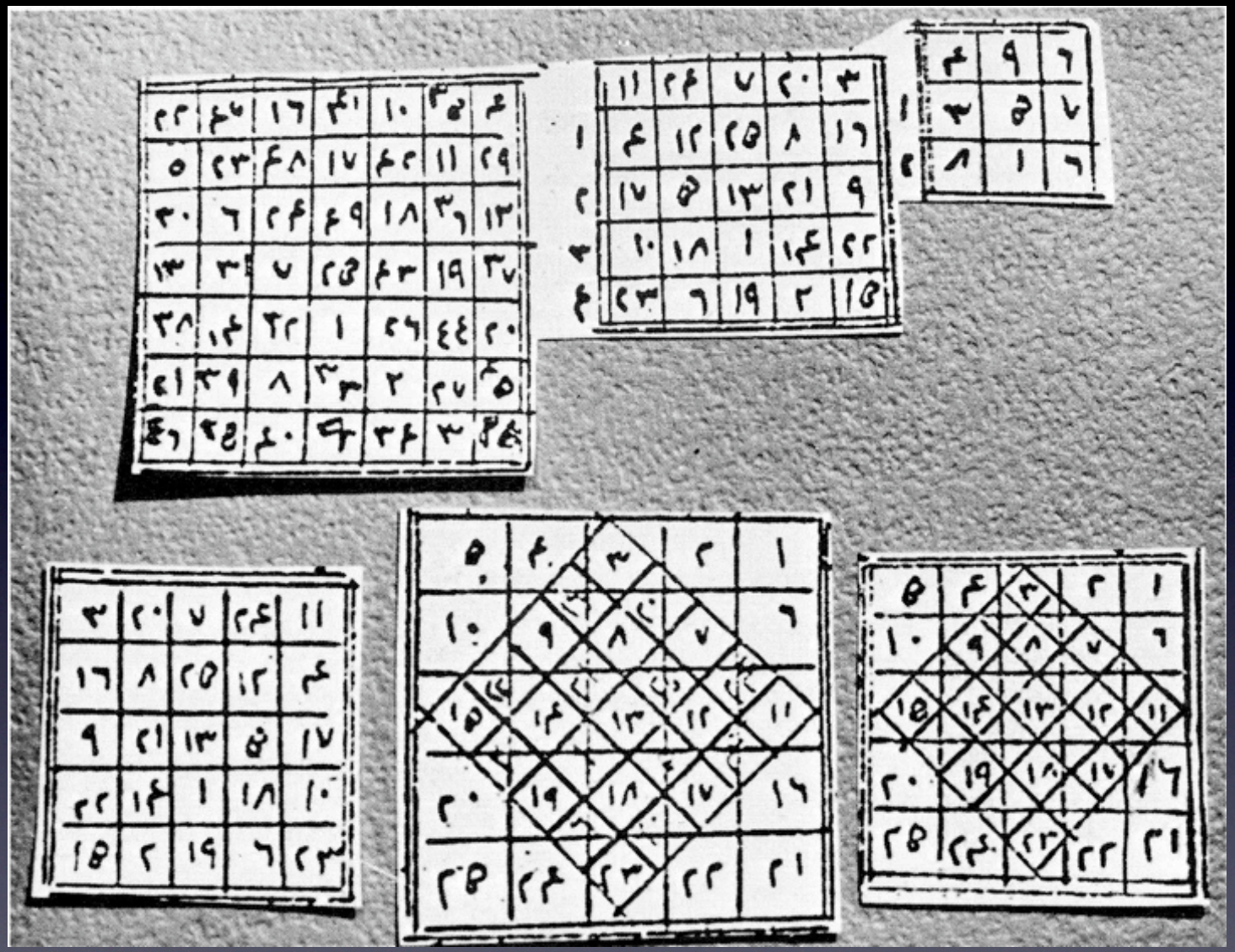
Astronomer, mathematician
Northern Nigeria, 1732

2		
		1
4	3	

Place 1,2,3,4,5,6,7,8,9 so that the rows, columns and diagonals all have the same sum.



Muhammad ibn Muhammad al-Fullani al-Kishnawi (1732)

5 by 5 Magic Square:
Use each of 1,2,3,4,5,6,7,8 once, so rows, columns and diagonals have the same sum.

		21	20	19
25	10	15	14	
22	17	13	9	
	12	11	16	18
	24			23

1 2 3 4 5 6 7 8

What should the sum of each row be?

1+2+3+4+5+6+7+8+9 = the sum of three rows

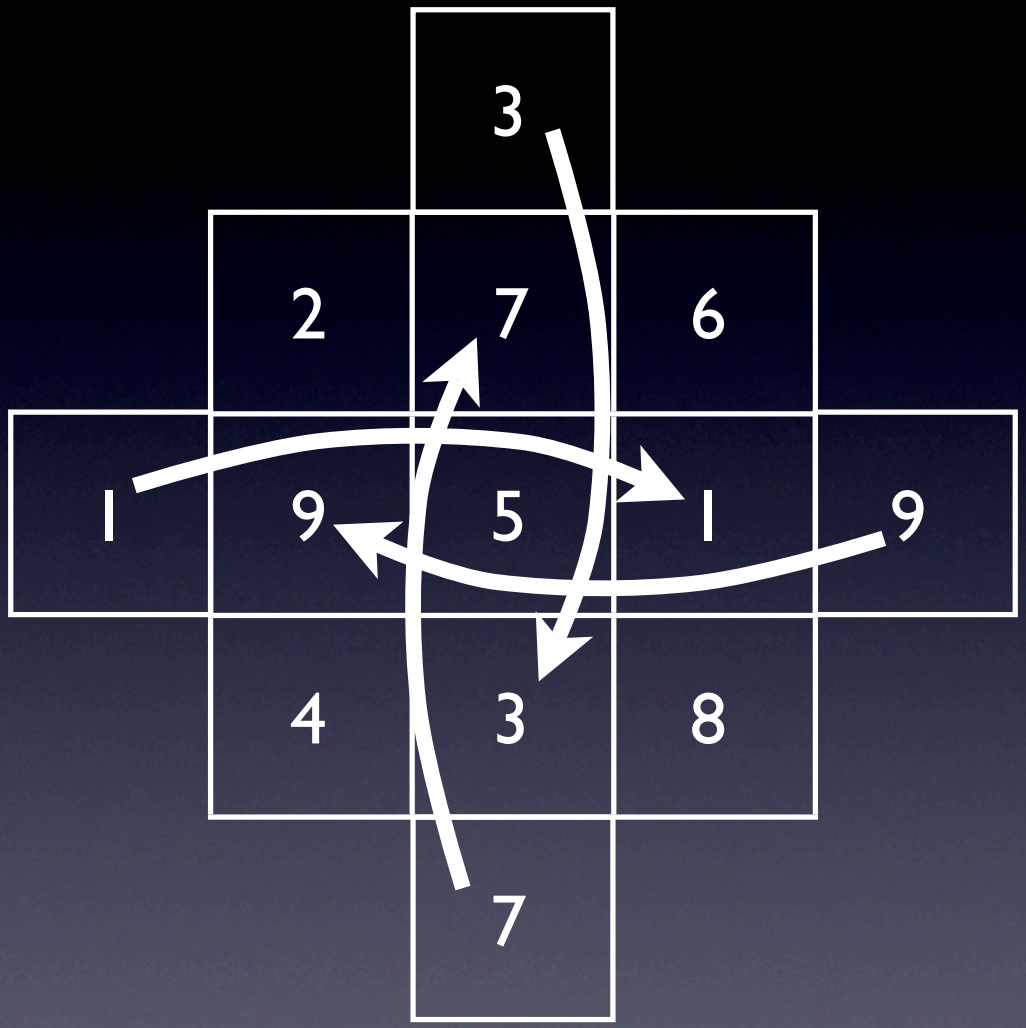
(1+2+3+4+5+6+7+8+9)/3 = sum of one row

What is 1+2+3+4+5+6+7+8+9?

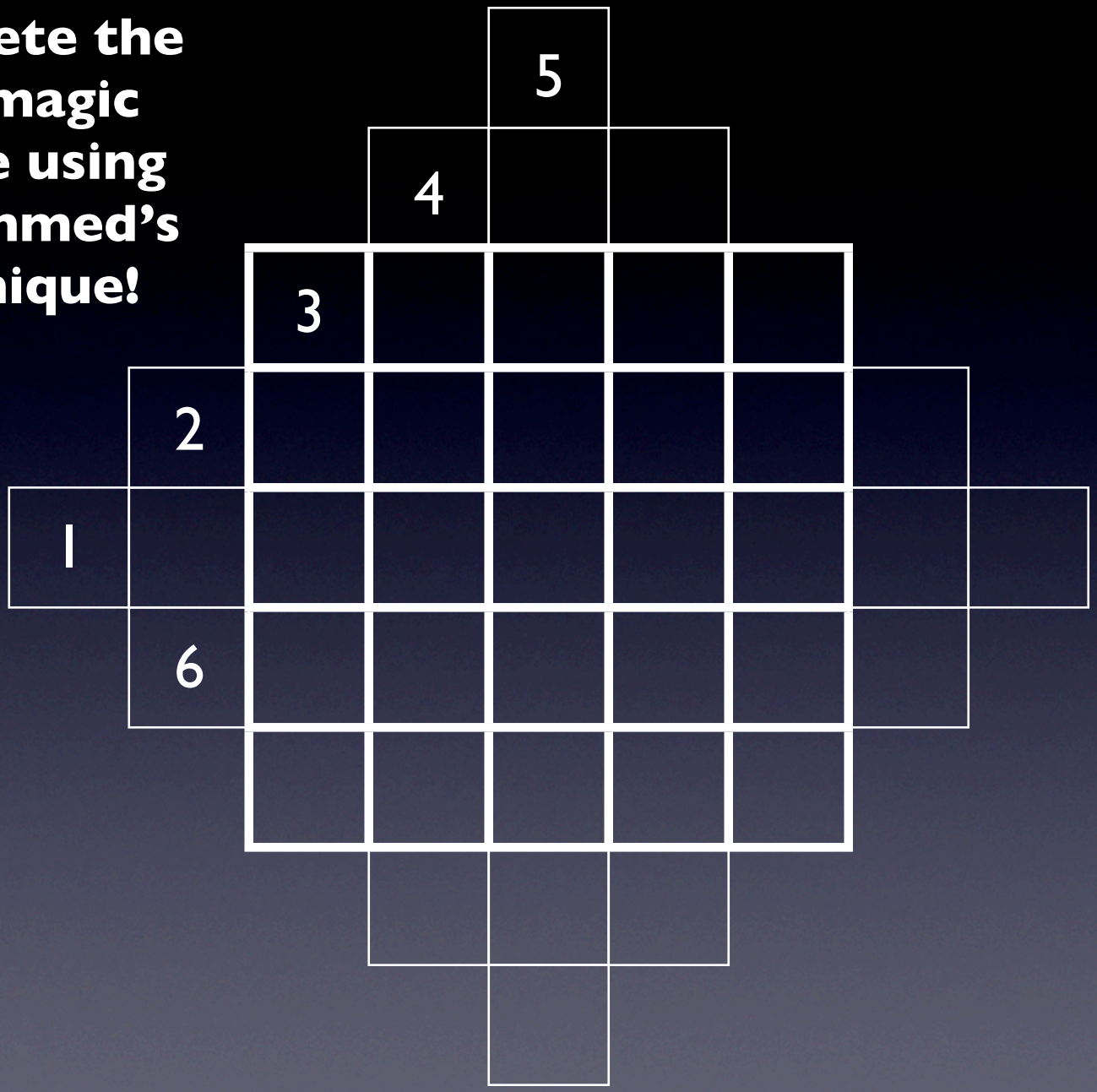
1+2+3+4+5+6+7+8+9 = Sum of all numbers
9+8+7+6+5+4+3+2+1 = Sum of all numbers
9(10) = 90 = 2(Sum of all numbers)

90/2 = 45 = Sum of all numbers

Row sum = 45/3 = 15


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

Complete the 5X5 magic square using Muhammed's technique!



5X5 row sum = ?

What is 1+2+3+...+25?

$$1 + 2 + 3 + \ldots + 25 = \text{Sum}$$
$$\underline{25 + \ldots + 3 + 2 + 1 = \text{Sum}}$$
$$25(26) = 650 = 2(\text{Sum})$$

650/2 = 325 = Sum of all numbers

1+2+3+... +25 = the sum of 5 rows

(1+2+3+...+25)/5 = 325/5 = 65 = row sum