

Some Numbers

The number of ways that the numbers $1, 2, 3, \dots, m^n$ can be placed into a partitioned hypercube of order m and dimension n is shown below. It shows how little is known on the numbers of magic ones and how rare they are.

Magic Square

For Order 3 there are 8 ways out of $9! = 362880$ ways of arranging numbers in a square.
For Order 4 there are 7040 ways out of $16! = 20922789888000$ ways of arranging them.
For Order 5 there are 195305224 ways out of $25! = 15511210043330985984000000$
For Order 6 and above. there are $36! = 3.7199332678990121746799944815084e+41$ ways of placing numbers, but the count the last I heard was unknown.

Magic Cubes

For Order 3 there are 192 ways out of $27! = 10888869450418352160768000000$
For Order 4 it is unknown how many out of $64! = 1.2688693218588416410343338933516e+89$
For Order 5 it is unknown too. $125! = 1.882677176888926099743767702492e+209$

Magic Tesseracts

For Order 3 there are 22272 ways out of $81! = 5.797126020747367985879734231578e+120$
For Order 4 it is unknown. $256! = 8177753428426541190822716812e+506$

In spite of these odds against making one, Magic Hypercubes have been constructed to the eighth dimension

John R. Hendricks,

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