

MAKE A MAGIC SQUARE

Show off your math skills with this impressive trick





What you'll need:

- Paper
- A pencil

Activity setup:

1. Practice makes perfect! Before performing this trick for someone else, be sure to review the steps and the example on the next page very carefully. Try the trick out on your own until you get the hang of it, then show off your skills!
2. To create a new magic square, start by drawing a 4x4 blank grid.
3. Choose a two-digit number higher than 20, or ask your volunteer to select it. This is the **magic number**.
4. Subtract 20 from the magic number. This new number is represented in the template by 🐰. Tip: If you're performing this trick for a volunteer, it's best to do this subtraction in your head.

Magic number - 20 = 🐰
5. Fill your grid with the numbers used in the template on this page, replacing the 🐰 with your number and doing small calculations in your head as needed. Tip: Memorize the number placements before performing this trick.
6. Observe and point out the many different combinations of numbers that equal the magic number. Tip: Review the example below carefully before performing this trick. There are 16 possible combos highlighted in the example, but there are more to find!

	1	8	11
7	12	 -1	2
9	6	3	 +2
4	 +1	10	5

How does it work?

Despite the name, there's no "magic" involved in creating these special squares. The secret to this trick is something much more familiar: math, of course!

In a magic square, there are several **summation patterns** that all add up to the same number. The sum of the numbers in any horizontal, vertical or main diagonal line is always equal. Magic squares come in different sizes, meaning some have more rows and columns than others. The number of rows and columns in a magic square is known as the **order**. A magic square of the third order has a 3x3 grid, while a square of the fourth order has a 4x4 grid, and so on.

Did you know?

The Jaina Square

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

Throughout history, many cultures believed that magic squares had magical powers that could provide protection and healing, ward off evil spirits or bring good luck. In some cultures, it was common to decorate amulets, clothing and even buildings with magic squares. An inscription in the doorway of the Parshvanath Temple at Khajuraho in Madhya Pradesh, India, contains a special 4x4 magic square dating back to the 10th century called the **Jaina Square** (also called the Diabolical Square or Panmagic Square). This cleverly constructed square, which has 52 summation patterns, uses numbers 1 to 16 to achieve a magic number of 34.



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Magic square example:

In this example, the magic number is 36.

Magic number - 20 = 

$$36 - 20 = 16$$

 = 16

	1	8	11
7	12	 -1	2
9	6	3	 +2
4	 +1	10	5



16	1	8	11
7	12	16-1	2
9	6	3	16+2
4	16+1	10	5



16	1	8	11
7	12	15	2
9	6	3	18
4	17	10	5

Here are 16 different summation patterns that add up to 36 (the magic number).
What other patterns can you find?

16	1	8	11
7	12	15	2
9	6	3	18
4	17	10	5

Each of the four rows and columns

16	1	8	11
7	12	15	2
9	6	3	18
4	17	10	5

The two diagonals and four corners

16	1	8	11
7	12	15	2
9	6	3	18
4	17	10	5

The four corners and centre