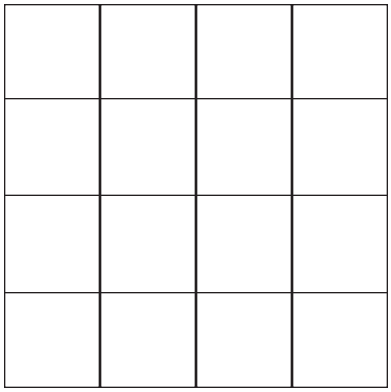
About Magic Squares

The young Ben Franklin liked to arrange numbers into patterns that had special properties, called magic squares. Years later, when he was clerk for the Pennsylvania Assembly, 30 year-old Ben returned to his old hobby and created magic squares to pass the time, much like a student doodling during class.

To create a magic square you need to start with a square grid of empty boxes. As an example we'll look at the grid formed by a square with 4 rows and 4 columns.



Then you have to fill in the square with numbers according to the three rules below:

1. The magic square has to include all of the numbers from 1 to the number of boxes in your grid.

   For example, if you have a square with 4 rows and 4 columns, then the square has to include all of the numbers from 1 to 16. ***A magic square with 3 rows and 3 columns (like the one you will make) has to include all the numbers from 1 to 9.***

2. You must put one number in each box and use each number only once.

3. The numbers along every column, row, and main diagonal have to add up to the same number.

Below is an example of a 4x4 magic square.

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

Row 1: 16+3+2+13=34
Row 2: 5+10+11+8=34
Row 3: 9+6+7+12=34
Row 4: 4+15+14+1=34

Column 1: 16+5+9+4=34
Column 2: 3+10+6+15=34
Column 3: 2+11+7+14=34
Column 4: 13+8+12+1=34

Diagonal 1 *(upper left to lower right)*: 16+10+7+1=34
Diagonal 2 *(lower left to upper right)*: 4+6+11+13=34

In order to decode Ben's secret message you will need to create a 3x3 magic square using the results of Activities 2-4. It is possible to make many different 3x3 magic squares, but only one will give you the right message, so do the experiments carefully!

Remember that each row, column, and diagonal in your square must add up to the same number. **For a 3x3 square, they should all add up to 15.**

One more hint: **The odd numbers never appear in the corners of a 3x3 magic square.** Good luck!

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