



Math (Circles) Magic!

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Eastern Kentucky Math Teachers' Circle



ASBURY UNIVERSITY

Academic Excellence & Spiritual Vitality

Background of EKMTTC

History:

- Established in summer 2011 through a grant from AIM (Summer Immersion Workshop)
- Meets four to six times per year
- Average Attendance: 12 teachers

Goals of EKMTTC:

- Support and emphasize MS teacher mathematics content knowledge in light of the new standards
- Create a network for MS teachers throughout Eastern KY
- Continue collaboration with university math faculty and MS teachers, specifically focused on content & pedagogy

Exploring Math Magic!



1. **Pick a number, any number!**
2. **Multiply by 3.**
3. **Add 30.**
4. **Divide by 3**
5. **Subtract your original number.**

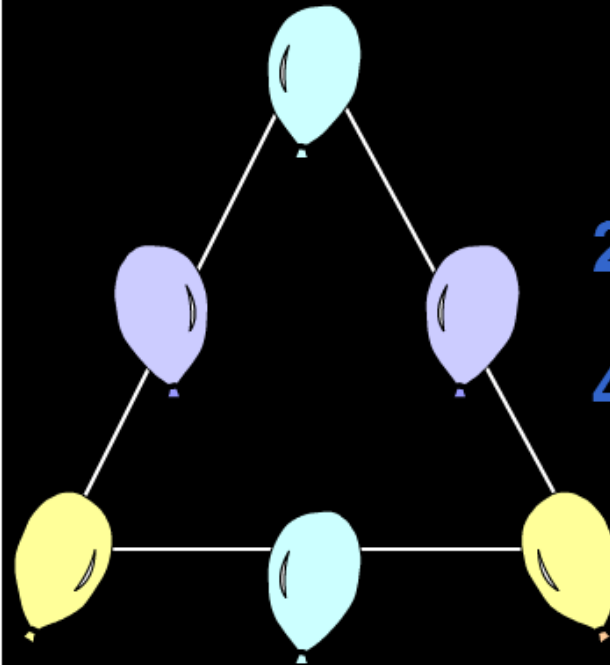
Let “n” be the original number.

Write an algebraic expression for each step in the magic trick.

Math Triangle



Move the numbers on the right onto the balloons such that the total of the numbers (on the sides) equals 9



1

2

3

4

5

6

Next Puzzle

Submit

Solve it

Quit



Guess My Answer



Mystery Math

Let's Play Mystery Math!

Mystery Math is a number game that allows you to guess another person's secret number.

If you want to play Mystery Math with the computer, you will need a pencil, a piece of paper and a JavaScript enabled web browser.

I'm ready! What do I do first?

Mystery Math

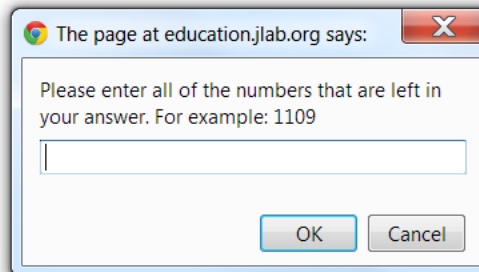
Step 1

Write a long number on a piece of paper.

For example:

30198

What's next?



Mystery Math

Your secret number is...

5

Lucky guess! Let's try that again!

No, it's not...

Show me how you did that!



The “Magic” Behind Magic Squares



In *magic squares*, in each row, column and diagonal, the sum of the numbers is always equal to the *magic number* for that square.

1. Here is an example which happens to use 9 consecutive numbers.

Check that the sum of the numbers in each row, column and diagonal is equal to the magic number, 12.

3	2	7
8	4	0
1	6	5

Solving Magic Squares

	11	7
9		
	5	10

x	11	7
9		
y	5	10

This magic square is more challenging! The answer may be found by trial and error but, ideally, a more systematic method is required.

Let x be the unknown number in *Column 1, Row 1*,

y be the unknown number in *Column 1, Row 3*,

n be the *magic number*.

$$\begin{aligned}\text{Then, from Row 1,} \quad n &= x + 11 + 7 \\ &= x + 18\end{aligned}$$

$$\text{and from Column 1,} \quad n = x + 9 + y$$

$$\text{So,} \quad x + 18 = x + 9 + y \quad (\text{Subtract } x \text{ from both sides.})$$

$$18 = 9 + y \quad (\text{Subtract 9 from both sides.})$$

$$y = 9$$

From *Row 3*, $n = y + 5 + 10$, so $n = 24$. From *Row 1*, $x + 18 = n = 24$, so $x = 6$.

The other two missing numbers can then be found to be 8 (*Column 2*) and 7 (*Column 3*).



2. Use an algebraic approach to solve the following magic squares:

(a)

9	2	
12	8	

(b)

10	3	
5		9
	11	4

(c)

14		12
10		8

Extension

a	b	
c	d	

For the general magic square opposite:

1. Find an expression for the missing entries in terms of a , b , c , d and n .
2. Form equations for the sums in the two diagonals.
3. Hence solve for the unknowns, c and d , in terms of a , b and n and find the form of a general magic square.
4. Use this general form to solve the magic squares in question 2.



Contact Information

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