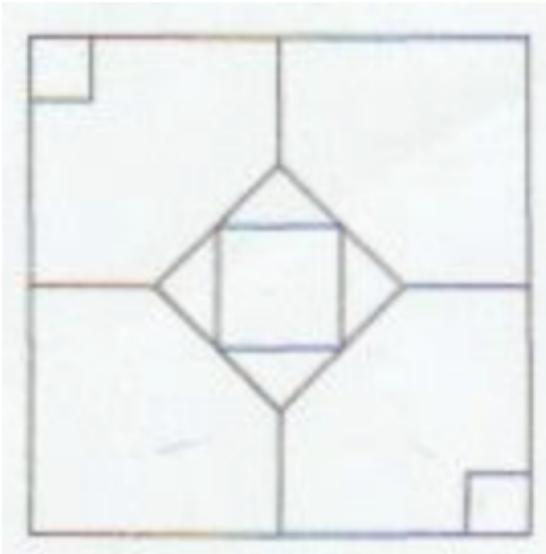


**Los Angeles Math Circle**  
**Early Elementary II**  
**March 17<sup>th</sup>, 2019**  
**Student Made Worksheet**

**Grayden:** Grayden built a large 10 foot by 10 foot cube. He built it out of smaller blocks that are each 1 foot by 1 foot. He then purchased some red paint and painted all the edges of his cube. How many of the little cubes have at least one side painted?

**Sammy:** Sammy spent 2 hours doing his homework. For 20 minutes he picked his nose. Another 20 minutes he spent thinking about getting ice cream for desert later. For 10 more minutes he was looking for an eraser to take out an ugly picture from the text book, which he drew for 40 minutes. The rest of the time Sammy was actually doing his math problems. How many problems was Sammy able to complete if each problem took him 15 minutes?

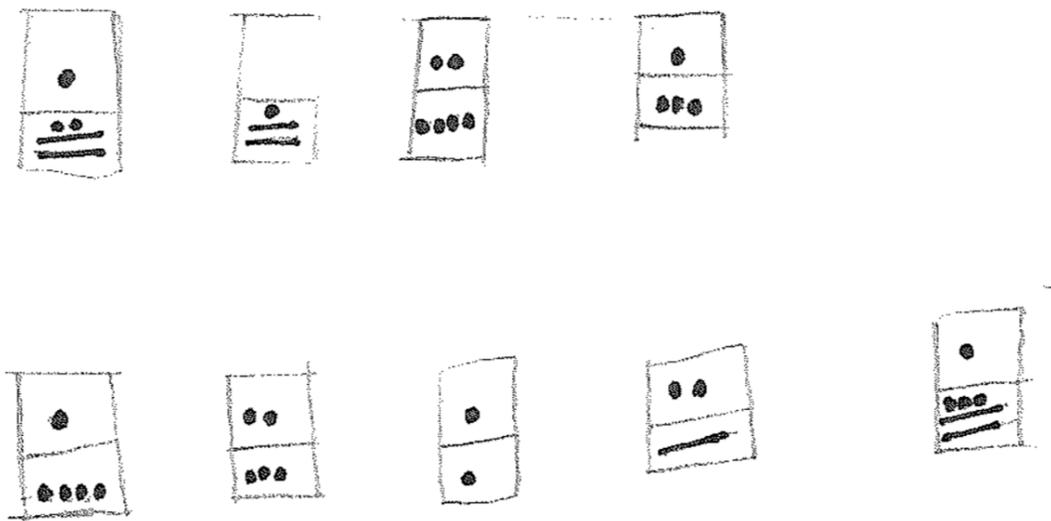
**Cyrus:** Below is a figure built by using different sized square sheets of paper. What is the minimum number of square sheets needed to construct it?



**Deen** - Zep added 3 numbers and got 487. Then he realized he used 152 instead of 125. What sum should he have gotten instead of 487?

**Remi L-** “Once there was a Mayan girl named Mia who was interested in codes. Archaeologists found a message she left that they think was using a square cipher. The archaeologists need your help to decode the message.”

	1	2	3	4	5
1	a	b	c	d	e
2	f	g	h	i/j	k
3	l	m	n	o	p
4	q	r	s	t	u
5	v	w	x	y	z



**Ethan:** Odd + Odd + Even = ?

Is it EVEN or ODD? Please explain your reasoning.

**Fatima:** You have two Hamsters. Each hamster eats  $\frac{3}{4}$  of a cup of hamster food a day. You have 21 cups of hamster food. How many days can you feed your hamster before running out of food?

**Audrey:** A, B, and C represent different digits. AB represents a 2-digit number.

$$AB + C = 50; BC + A = 41$$

What are the values for:

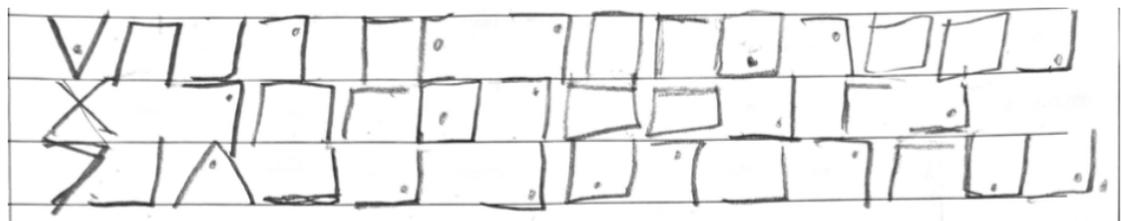
A \_\_\_\_\_

B \_\_\_\_\_

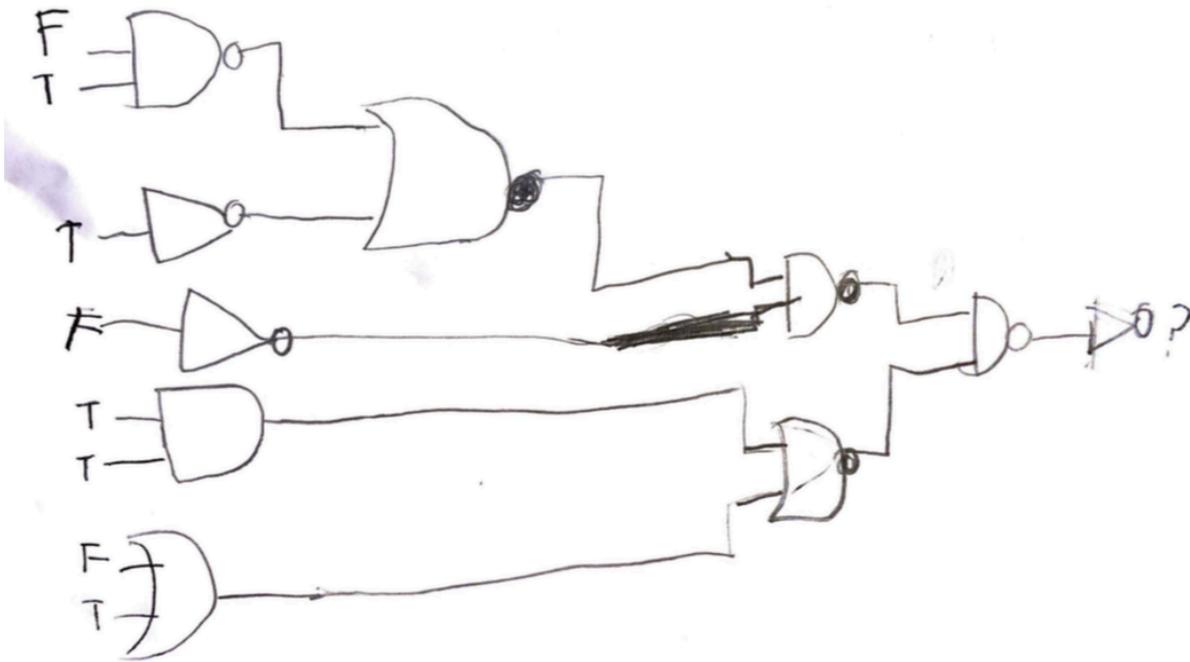
**Boyan:** There is a pile of coins. Each coin has two sides. 1 silver and 1 gold. You have to arrange them into 2 piles with the same amount of silver-side up coins. Suddenly, the power goes out and you can't tell if a coin is gold or silver-side up. You remember that exactly ten coins were silver-side up. How can you make the two piles?

**Remi O:** Decode this question using pigpen cipher. Write your answer as a Mayan Number.

A	B	C	
D	E	F	
G	H	I	
N	O	P	
Q	R	S	
T	U	V	

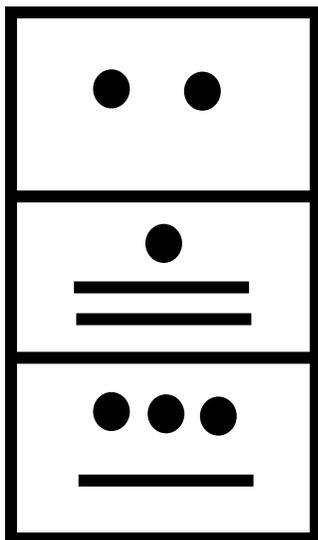


**Reyaan:** Solve is Logic Gate



**Jude:** What number is this?

- First translate into a regular number
- Then translate into a Roman Numeral



**Chandler:**

When you divide 1 by 81 (which is  $9 \times 9$ ), you get 0.012345679012345679 repeating to infinity.

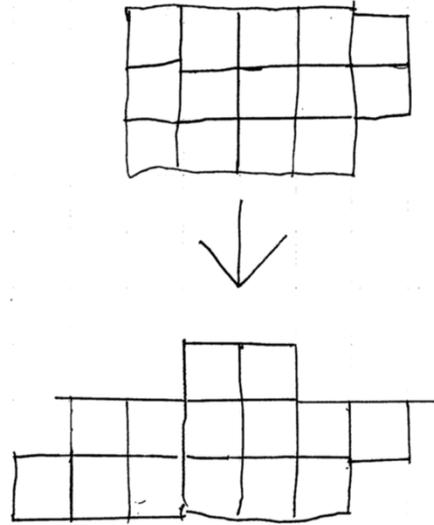
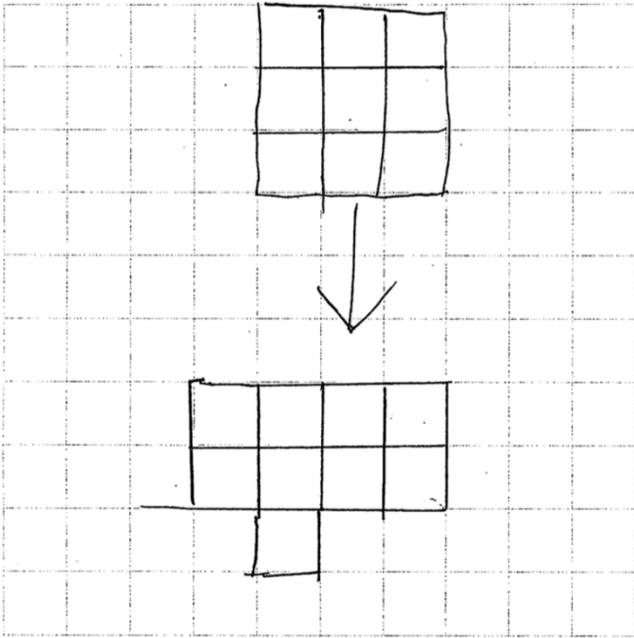
When you divide 1 by 9,801 (which is  $99 \times 99$ ), you get 0.0001020304050607 all the way up to 97, then skip 98 then 9900010203 repeating to infinity (always skipping 98).

(a) If  $9 \times 9 = 81$ , and  $99 \times 99 = 9,801$  and  $999 \times 999 = 998,001$  can you guess what  $9,999 \times 9,999$  is?

(b) Can you guess what  $99,999 \times 99,999$  is?

(c) Can you explain what happens when you divide 1 by 998,001?

## Zoran: Quilt Mending



How many cuts does it take to make the shape on the bottom when you start with the shape on the top?

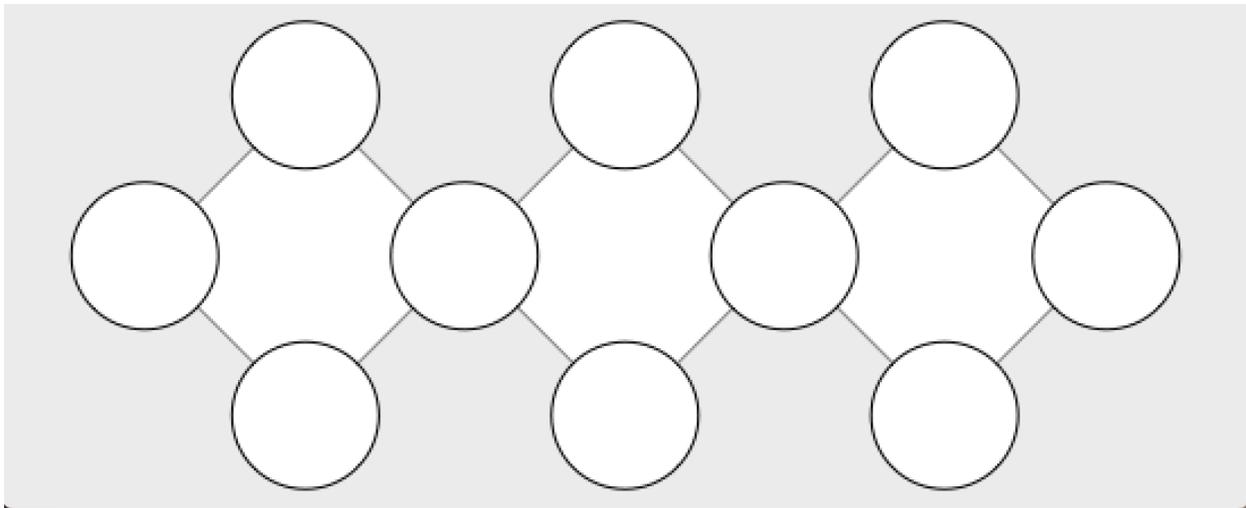
**Alejandro:** Alejandro and Jeff are sharing a bag of bagels. There are six bagels, each one cut in half. Alejandro and Jeff eat five halves each. Jeff eats whatever is left over.

How many more bagels did Jeff eat?

**Jordan:** Three Little Pigs, the Big Bad Wolf, and the Little Red Riding-hood are playing a game. The Big Bad Wolf writes number 8 on a piece of paper. He hands it to the Little Red Riding-hood. She either adds 2 or subtracts 2 and passes on the paper to the pigs. They have to follow up the same rule (add 2 or subtract 2). Can you list all the possible final numbers?

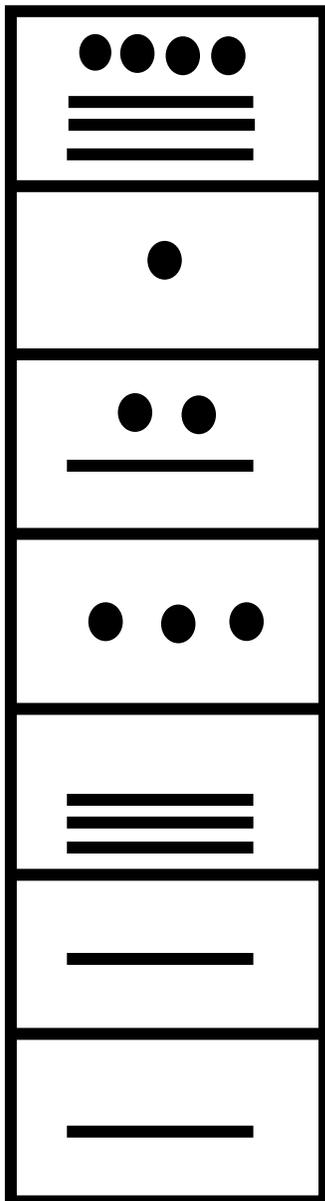
**Evan:** Can there be any consecutive numbers that are both even numbers? Why or why not? Explain.

**Gavin:** Fill the circles below with the numbers 1 through 10, without repeating any numbers, so that the sum of the vertices of each square is the same, and is the largest sum possible. What is this sum?



**Thea:** Thea has 5 numbers 2 are odd and the 3 are even. And you can't use the same number. She said that she got 28 when she added them together. What numbers did she use?

**Peter:** Convert this Mayan Number into Regular Number Form.  
Hint (there are 7 levels!)



**Nikolai: Ken Ken 6x6**

<b>12x</b>		<b>7+</b>		<b>16+</b>	
		<b>5+</b>		<b>46x</b>	
<b>120x</b>		<b>4+</b>			
	<b>11+</b>			<b>8+</b>	
<b>24x</b>		<b>11+</b>			
	<b>12+</b>			<b>7+</b>	

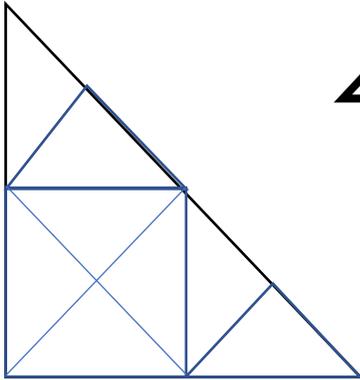


**Minghao:** There are 15 coins, one of which is fake. You don't know whether it is lighter or heavier than the others. How many times at the most do you need to weigh in order to find the fake coin? How many times to weigh to find out whether it is lighter or heavier than the others?

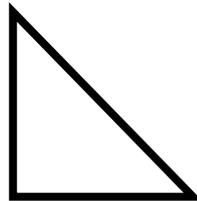
**Ojas:** Ojas is taller than Nimay, but shorter than Pranay. John is taller than James, but shorter than Ojas. Which of the boys is the tallest?

**Dawson:** How many triangles of any size are there in this shape?

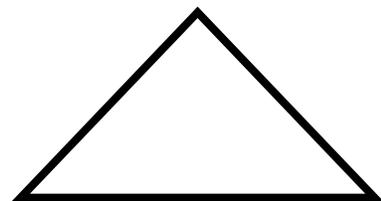
**\*\*Hint:** try to separate the triangles into tiny, small, medium, and large.



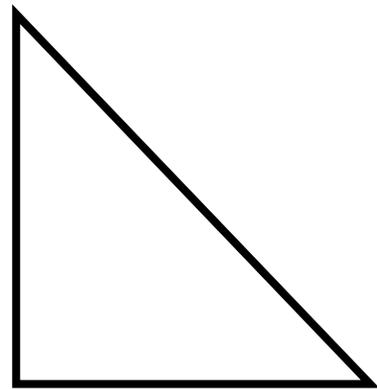
Tiny



Small

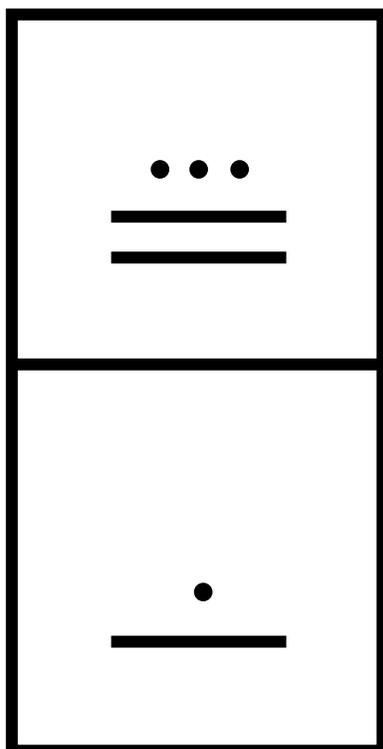


Medium



Large

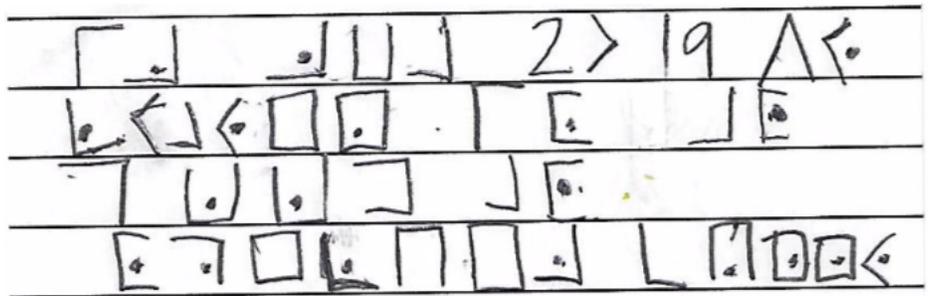
**Benny:** Convert the Mayan Number to Regular Number form:



**Eli:** 100110110101 is a binary number. Find what this number is in regular form, multiply it by 2 and express your answer in Roman Numerals.

**Nevin:** Use the Pigpen cipher to solve this problem.

A	B	C	<del>J</del>		
D	E	F		K	L
G	H	I		M	
N	O	P	<del>W</del>		
Q	R	S		X	Y
T	U	V		Z	



**Patrick:** Rail Fence Cipher: Decode the message.  
Remember that Rail Fence Cipher looks like this:

—				—				—				—	
	—		—		—		—		—		—		—
		—				—				—			

WIIHINIR

RTNWTTEALECCPE

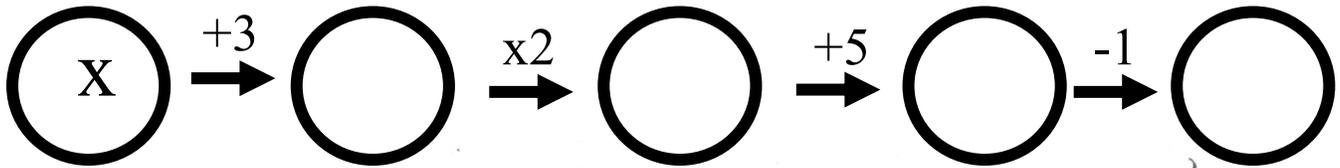
IGHRFEH

**Hannah:** Rabbits and parrots are locked in a cage. Count from top, there are 35 heads. Count from bottom, there are 94 feet. How many rabbits were locked in this cage?

**Tamar:** I have created a code that looks like this: A=1, B=2, C=3, D=4, E=5, F=6 etc etc.

You must work backwards to find "x" which will be a number that will equal a letter of the alphabet.

(For example, the first number is 26. So, follow the backwards reasoning puzzle below. Putting 26 (the first number in the code, in the last circle) Then, you work backwards to find what x equals to:  $26+1 = 27$ ;  $27-5 = 22$ ;  $22$  divided by  $2 = 11$ ;  $11-3 = 8$ . So,  $x=8$  and 8 corresponds to the 8<sup>th</sup> letter of the alphabet which is H. So, the first letter of the code is H.

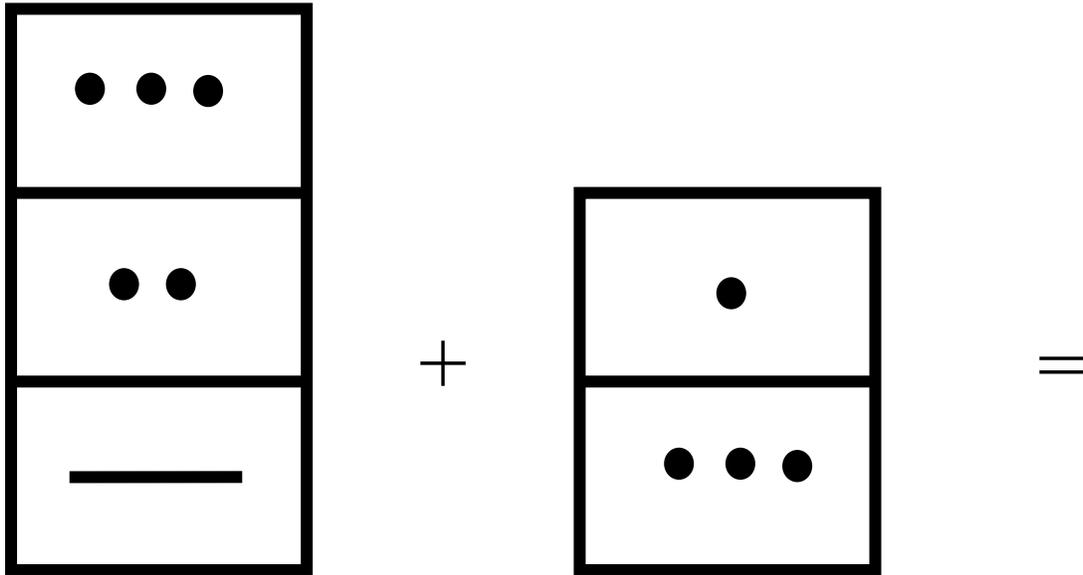


26 40 56 28 60 | 36 12 51 40 |

SOLVE IT!

It's going to be hard...

**Sadie:** Solve! Write Final answer in Mayan Numbers.



**Pablo:**

$$90,936 \div 18 =$$

$$9,404,618 \div 9 =$$

**Natalia:** Sophia had invited 3 of her friends (Diana, Natalia, Jillian) to celebrate her birthday with her. They ate tacos for dinner.

Sophia has the same amount as Diana. Diana has  $\frac{1}{3}$  of how many tacos Jillian has, and Natalia has half of what Jillian and Diana have together.

How many tacos do all the friends have if Sophia has 3 tacos? Who ate the most tacos?