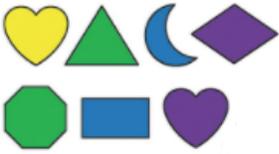
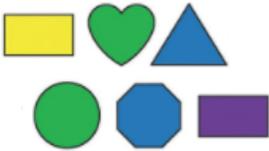
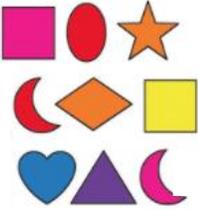


Math Challenge #1

First Name: _____	Last Name: _____	Grade: _____
Teacher: _____	Parent's email: _____	

Playing with Numbers

Kinder & First Grade: solve at least 3 problems.
Second & Third Grade: solve at least 7 problems.
Fourth Grade and above: solve at least 12 problems.

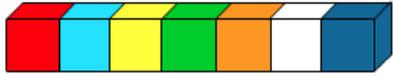
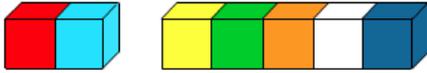
	<i>Answer</i>
<p>1. Which group(s) has an odd number of shapes?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Group A</p> </div> <div style="text-align: center;">  <p>Group B</p> </div> <div style="text-align: center;">  <p>Group C</p> </div> </div>	<p><i>A and C</i></p>
<p>2. Which 2 numbers below when you add them together result in an even number?</p> <p style="text-align: center; font-size: 1.2em; font-weight: bold;">4 5 6</p>	<p><i>4 and 6</i></p>
<p>3. Which 2 groups of shells when you put them together would result in an even number of shells?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Group X</p> </div> <div style="text-align: center;">  <p>Group Y</p> </div> <div style="text-align: center;">  <p>Group Z</p> </div> </div>	<p><i>Y and Z</i></p>
<p>4. Think of all numbers that are less than 15.</p> <p style="margin-left: 20px;">a. How many odd numbers are there between 2 and 10?</p> <p style="margin-left: 20px;">b. Find all other pairs of even numbers which have the same number of odds as in between 2 and 10? Remember you are only using counting numbers less than 15.</p>	<p><i>a. 4 [odd numbers]</i></p> <p><i>b. 4 and 12, 6 and 14.</i></p>

5. Harry has a stick of 7 interlocking cubes like the one below. He wants to split them between him and his sister, Maya.

a. Can he split them equally?

b. One way he can share is as follow: Harry gets 2, and Maya gets 5. If he cannot change the order of the cubes, in how many different ways can he share with his sister?

6 ways (1+6, 2+5, 3+4, 4+3, 5+2, 6+1)

a. No
b. 6 ways

6. Think of two-digit numbers and find the following numbers:

a. Write the largest two-digit even number that you can think of, that uses the digit 9.

b. Write the largest two-digit even number that you can think of, that uses the digit 3.

c. Write the largest two-digit number that you can split in to two parts equally.

a. 98
b. 38
c. 98

7. Francine and Kevin were given a bag of candies. The number of candies is less than 55 but more than 40. They shared them evenly and had one leftover. Just as they finished sharing, their friends Sasha, Sid and Liza came along. Francine and Kevin then put their candies back together and shared them out again between all of them. This time, they had 2 candies left. How many candies could there have been in the bag?

If the number of candies has remainder of 1, when split into two groups, it means there is odd number of candies. When there are 5 kids there will be 2 candies remaining, after splitting equally. Which means the number of candies must be divisible by 5 with remainder of 2. The only number between 40 and 55 works is 47.




47

8. Tim writes the number 4 four times. He puts operation symbols (+, -, ×, ÷) between them so that he gets 60.

$4 \times 4 \times 4 - 4 = 60$

He was wondering if he can erase the operation symbols and redo to get 9.

$4 \quad 4 \quad 4 \quad 4 = 9$

Find the operation symbols that he uses to get 9 and write the new equation.

$4 \div 4 + 4 + 4 = 9$
or
 $4 + 4 + 4 \div 4 = 9$
or
 $4 + 4 \div 4 + 4 = 9$

9. 5000 years ago, Egyptians carved number symbols on their tombs:

| = 1
∩ = 10
@ = 100

What is the value of these Egyptian numbers?

a.  + 

$123 + 124 = 247$

b.  + 

$324 + 249 = 573$

a. 247
b. 573

10. Use your reasoning skills to find the mystery number from the list below:

- The number has two digits.
- Both of the digits are even.
- The digit in the tens place is greater than the digit in the ones place.
- The sum of the two digits is a multiple of 5.
- The tens digit is 2 more than the ones digit.

64

11. Anna, Ben and Charlie are playing a game. Each of them writes down a statement in a card that describes a set of numbers.

Multiples of five

-Anna

Even, but not multiples of four

-Ben

Multiples of 3 but not multiples of 9

-Charlie

a. Find the smallest number that satisfies Anna’s and Ben’s statements.
 b. Find the smallest number that satisfies Anna’s and Charlie’s statements.
 c. Find the smallest number that satisfies all the three statements.

a. 10
b. 15
c. 30

12. In the multiplication table on the left, the row and column headings are all missing, and only some of the products in the table are filled in. All the numbers in the table are positive integers and they are not in order.

×					
	A	10		20	
	15	B	40		
	18		C	60	
		20		D	24
			56		E

What is the value of $A+B+C+D+E$?

$6+25+48+40+42 = 161$

×	3	5	8	10	6
2	6	10	16	20	12
5	15	25	40	50	30
6	18	30	48	60	36
4	12	20	32	40	24
7	21	35	56	70	42

161

13. Using the cards below,

a. Make a number between 6.1 and 6.81.
 b. Make the largest number possible that is less than 7.
 c. Make the largest number possible.

1

6

8

.

a. 6.18
b. 6.81
c. 86.1

14. The number **A346A** is divisible by 9. What number does the letter "A" stand for?

$2A + 3 + 4 + 6 = 2A + 13$
 $2A + 13$ should be divisible by 9.
 Let's look at multiples of 9, which are 18, 27, ... $A = 7 \rightarrow 2 \times 7 + 13 = 27$
 This problem can also be solved by 'guess and check' strategy.

7

15. Both 4 and 8 can be written as the sum of two prime numbers ($4 = 2 + 2$, $8 = 5 + 3$). How many positive numbers less than 20 **cannot** be written as the sum of two prime numbers?

The numbers are 1, 2, 3, 11 and 17.
 Note that, because 2 is the only even prime, the only way we can sum two primes to give an odd number is to sum the odd number before it (if it is a prime) and 2.

5 [numbers]

<p>16. Put the operations signs (+, -, ×, or ÷) and parenthesis (if needed) between the numbers 3, 4, 5, 6 to make the highest possible number and lowest possible numbers. You may re-arrange the numbers, but you may only use a sign just once.</p> <p style="text-align: center;">3 4 5 6</p> <p>a. Highest possible number is _____.</p> <p><i>Student may come up with: $(4 - 3 + 5) \times 6 = 36$ or $(5+4-3) \times 6 = 36$ or $(5 + 4 / 3) * 6 = 38$</i> <i>But the highest possible is $6 \times (5 + 4) - 3 = 51$</i></p> <p>b. Lowest possible counting number is _____.</p> <p><i>$6 \div 3 + 4 - 5 = 1$</i> <i>Another possible answer is $(4+6)/5-3 = -1$, however, it is not a counting number.</i></p>	<p>a. 51</p> <p>b. 1</p>
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<p>17. Find at least one way to place operation signs (+, -, ×, ÷) and parenthesis if needed to make the following digits become 100.</p> <p style="text-align: center;">1 2 3 4 5 6 7 8 9 = 100</p> <p><i>Possible answers:</i></p> <p><i>$1+2+3+4+5+6+7+(8 \times 9)=100$</i> <i>$(1+(2 \times 3)+(4 \times 5)-6)+7+(8 \times 9)=100$</i> <i>$(1+2 + 3+4) \times 5+67-(8+9)=100$</i> <i>$((1+2+3+4) \times (5+6))+7-8-9=100$</i></p>	<p><i>Answer varies</i></p>
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<p>18. The number 311 is prime, and its reverse, 113, is also prime. How many two-digit primes are there between 10 and 99 which have the same property?</p> <p><i>First, we can list possibilities that we can eliminate:</i> 2__, 4__, 6__, 8__ → when you reverse these numbers, they are even numbers. 5__ → when you reverse these numbers, they are multiples of 5. Then, we can list the rest of possibilities:</p> <p>11: reverse 11 ✓ 13: reverse 31 ✓ 15 not prime 17: reverse 71 ✓ 19: reverse 91 = 7×13 ✗</p> <p style="margin-left: 150px;">} 9 numbers (4 pairs + the number 11)</p> <p>31: already counted as 13 33, 35 not prime 37: reverse 73 ✓ 39 not prime 79: reverse 97 ✓ All other 9__ → already counted above except for 99, which is not a prime number.</p>	<p>9</p>
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Solution is available on October 9, 2020 at www.mathinaction.org