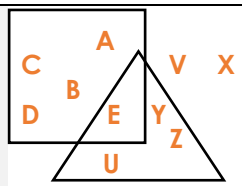
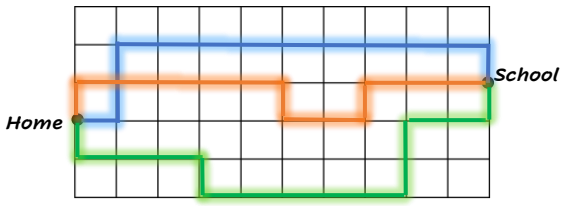
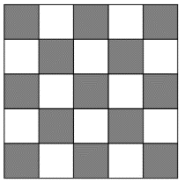
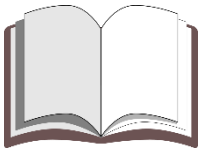
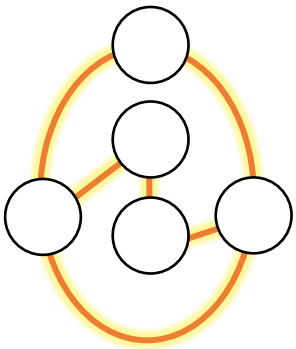
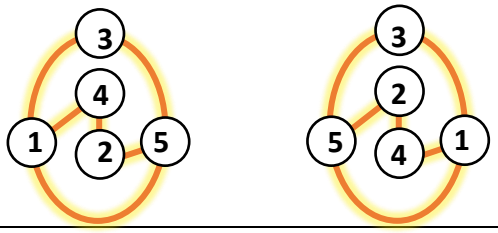
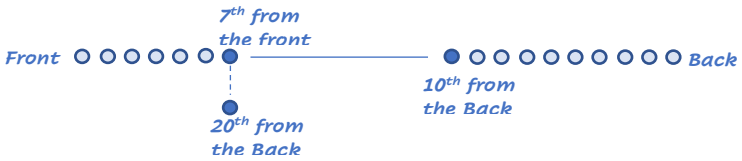
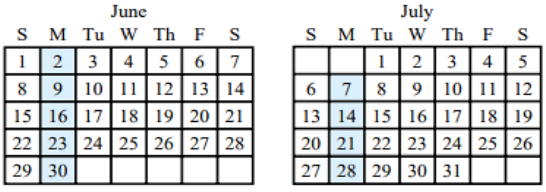
First Name: _____ **Last Name:** _____ **Grade:** _____

Teacher: _____ **Parent's email:** _____

Reasoning and Logic

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

		Answer
1.		*8*
2.		*Dad's: cat* *Lucy's: fish* *Dalton's: dog*
3.		*U, Y and Z*
4.	Blue = 13 units Green = 15 units Orange = 13 units 	*Green*
5.		*Colton*
6.	Missing pages are: 13 and 14, 15 and 16, 17 and 18, 19 and 20, 21 and 22, 23 and 24. There are 6 double-sided sheets missing.	*6 [double-sided sheets]*
7.	We can list the days of the week and eliminate one by one. It was not Monday or Tuesday, since it happened a few days after Monday. It was the day before Friday when her teacher shared the math test result. Then it must have been Thursday.	*Thursday*
8.	We can draw or list them in an organized way. Let's name the three friends: A, B, and C. AB, AC, BA, CA, BC, CB. Since the order matters (sitting in front or back), the number of ways 3 friends can bike 2 at a time is 3*2= 6. The front seat can be chosen three ways, and after that occurs, the person in the back seat can be chosen two ways. 	*6 [seating arrangements]*

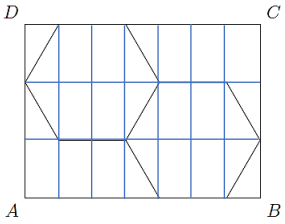
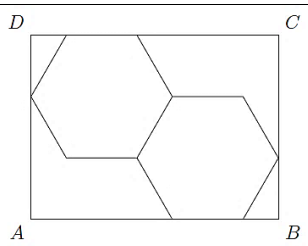
9.	Since there are 10 wings, there must be 5 parrots. The number of feet on dogs and cats must be 28 – 10 – 2 = 16 feet, which means there are 4 four-legged animals. Since the number of cats is the same as the number of dogs, there must be 4 ÷ 2 = **2 dogs and 2 cats.**	*2 [cats]*
10.	Each small square measures 10 cm by 10 cm. Thus, its area is 100 cm^2. There are 13 shaded small squares, therefore, the total area of the shaded part is 13 × 100 cm^2 = **1300 cm^2** 	*1300 cm^2*
11.	 Since the product is ending with 0, we can narrow down that one of the page number must be a multiple of 10. The closes number we can consider is 30. The other number can be 930 ÷ 30 = 31. Let's check 30 × 31 = 930. The sum of the pages: 30 + 31 = 61 Another way to do it is do prime factorization of 930 = 2×3×5×31. 930 is the product of two consecutive numbers, one of which is 31, so the other one is 30. The sum of 30+31 = 61	*61*
12.	 Hint: Think about the number of yellow lines connected to each of the circle. Also, think about the number of consecutives each of the numbers 1 to 5 have. 2 ways 	*2 [ways]*
13.	If Monica's position becomes the 20th from the back, then the number of people in the row is 20 + 6 = 26 	*26 [people]*
14.	T A K E A + C A K E K A T E Let's take a look at the column A AA. This suggests A = 0 or A =9. When we look at column EAEE, this suggest A + E = 10, so the only acceptable value for **A is 9, and E must be 1.** We now have: T 9 K 1 9 + C 9 K 1 K 9 T 1 Next column to tackle is K KT and T CK. 1+K+K = T+10 1+T+C = K We narrow down that K can't be less than 6. With a little bit of guess and check, we find **K = 6, T =3, and C =2. KATE = 6931**	*6931*
15.	At the beginning, it does seem like the pattern would go like this: 2, 9, 16, 23, 30, 37, and so on. But this is not the case. With thinking outside the box, we notice that this could be a pattern in a calendar. The next number is 4. 	*4*

June

S	M	Tu	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July

S	M	Tu	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

16.	If we divide the rectangle equally as such in the picture, we will have 21 equal size rectangles. The area of each hexagon equals 6 rectangles. If 6 rectangles have an area of 6 cm^2, then one rectangle is 1 cm^2. Therefore, the area of ABCD is 21 cm^2.  	*21 [cm^2]*
17.	The amount of water that is poured out weighs 6 pounds – 4 pounds = 2 pounds. This means $^1/_7$ of the water weighs 2 ÷ 3 or $^2/_3$ pounds. The empty jar must weigh 4 – (4 × $^2/_3$) = 4 – $^8/_3$ = $^4/_3$ pounds or 1 $^1/_3$ pounds. 	*$^4/_3$ [pounds] or 1 $^1/_3$ [pounds]*
18.	What we know: • From the information given, we know that there are 75÷15 = 5 colors of beads. • The number of sea-green beads = 20 • There are 3 other unknown colors, then there is a pile of golden beads with the total number of 75 – 20 = 55 beads In order to achieve the greatest number of golden beads, the 3 other colors would have 1, 2, and 3 beads. Thus, the greatest number of golden beads = 55 – 3 – 2 – 1 = 49.	*49 [golden beads]*

Solution is available on February 4, 2022, at www.mathinaction.org