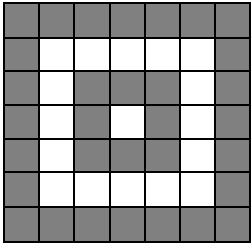| First Name: _____ | Last Name: _____ | Grade: _____ |
| Teacher: _____ | Parent's email: _____ | |

Interesting Patterns

Welcome to Math Challenge #11. Once again, we circle back to patterns. This time we will look into math problems involving interesting and unique patterns. In some problems, you can try to look for a pattern, in others you may need to draw it out or act it out to solve them. Try to solve as many problems as you can.

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

| #	Problem	Answer
1.	Maria counts up by one starting with 11 and ending with 20. She claps everytime she says an even number. How many times does she clap?	
2.	Micah built 4 towers using gray and white cubes as shown on the right. He made each tower using five cubes. How may white cubes does he use to build the 4 towers?	
3.	When written as 4/4/2024, the date April 4, 2024, has three 4's. What is the next earliest date that will have three 4's?	
4.	Tairah is making a necklace. She places charms in a certain order. What shape of charm should she place next?	
5.	How many more small gray squares are there than small white squares?	
6.	For 3 days, Isak is fishing. Each day, he caught 2 more fish than the previous day. On the third day, the amount of fish Isak caught was twice as many as on the first day. In total , how many fish did Isak catch during the three days?	

7.	There were some pieces of candy in a jar. Santos took half of the pieces of candy. Then Tiara took half of the pieces left in the jar. After that, Chelsea took half of the remaining pieces. In the end, there were 3 pieces in the jar. How many pieces of candy were in the jar at the beginning?	

8.	Sonya wants to complete the grid with a special pattern. Each row and each column have to contain the digits 1, 2, and 3 exactly once. What is the sum of the digits she will write in the shaded cells?	

| 9.	Sam can put 4 circles in a square using 4 crayons. At least how many crayons will she need in order to make a square containing 16 circles that do not overlap?	
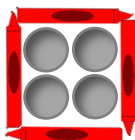
10.	A special die has a number on each face. The sums of the numbers on opposite faces are all equal. If five of the numbers are 5, 6, 9, 11 and 14, what is the sixth number?	

11.	20 boys and 12 girls stand in a circle, hand in hand, all facing inwards. Exactly 8 boys give their right hand to a girl. What is the smallest number of boys that give their left hand to a girl?	

12.	Twelve people, and no more, can sit evenly spaced around a large square table. Rohan arranges eight of these square tables in a row to make one long rectangular table. What is the maximum number of people that can sit evenly spaced around this long table?	

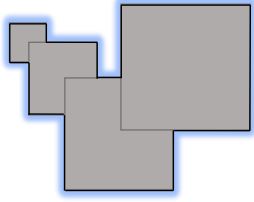| 13.	The Vox Furniture store sells chairs, loveseats, and sofas made from identical modular pieces as shown in the picture. Including the armrests, the width of the sofa is 76 inches, and the width of the loveseat is 62 inches. What is the width of the chair?	
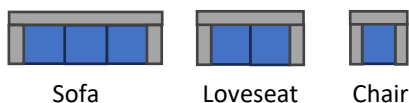
Sofa   Loveseat   Chair

14.	Anu stacks four heart shapes in an alternating pattern red-white-red-white. The diagram shows the result of four overlapping hearts. The areas of the hearts are 1 cm^2, 4 cm^2, 9 cm^2 and 16 cm^2. What is the total shaded area (red) as shown in the diagram?	

15.	Quentin has four squares, and he places each square as shown in the picture. The first one has a side length of 2 inches. The second one has a side length of 4 inches and a vertex placed in the center of the first square. The third one has a side length of 6 inches and a vertex placed in the center of the second square. The last one has a side length of 8 inches as shown in the picture. What is the area of the figure?	

16.	The number 27 is written on the blackboard. After each minute, the following procedure is performed: the written number is erased and the product of its digits plus 12 is written on its place (for instance, after the first minute, the number 2×7+12 = 26 will be written). What number will be on the blackboard after one hour?	

17.	Find the 2024th letter of the infinite sequence: REDMONDREDMONDREDMOND…	

18.	The numbers from 1 to 100 are written on a 10 by 10 board in a consecutive order. That is, the first row is 1, 2, 3 , …, 10, the second row is 11, 12, 13, …, 20, and so on. Amina places 10 rooks on the board so that no two of them are in the same column or row, and then she adds up the numbers under the rooks. What is the largest sum Amina can get?	

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	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Solution is available on March 15, 2024
www.mathinaction.org