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

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

More Patterns

Welcome to the Math Challenge #9. In this challenge, you will continue to work on more complex patterns. Enjoy.

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.

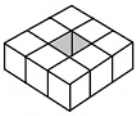
		Answer
1.	How many buttons will be in the next two figures in the pattern?  Figure 1 Figure 2 Figure 3 Figure 4 Figure 5 Figure 6	*Figure 5:* *Figure 6:*
2.	Below are two sequences of letters. What letters will be in the next two spaces of each pattern? a. A A B C A A B C A ___ ___ b. X Y X Y Y X Y X Y ___ ___	*a.* *b.*
3.	Brenda joined a basketball team. The first game they played, she scored 1 point. The next game she scored 3 points and the following game she scored 5 points. If this pattern continues, how many total points would she have scored **by the end of the fourth game?**	
4.	Look at the number sequences below and find the missing numbers. a. 4 7 10 ___ 16 ___ 22 b. 15 13 11 ___ 7 5 ___ c. 5 10 ___ ___ 25 30 ___	*a.* *b.* *c.*
5.	Felicity collects 4 more cans for the recycling center than the day before. She made a chart to record the number of cans she collects. Complete her chart and find out how many cans will she collect on Friday?	

Monday	6
Tuesday	10
Wednesday	14
Thursday	
Friday	

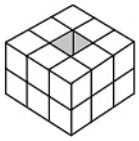
6. Look at the pattern on the right. If the pattern continues, what is the letter under which the number 24 would go?

A	B	C	D	E
1	2	3	4	5
6	7	8	9	10
11	12	13	…	…
…	…	…	…	…

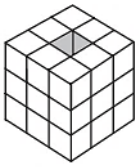
7. Study the figures on the right. How many layers will there be if the well is built using 64 cubes?



This well uses 8 cubes



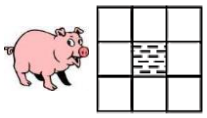
This well uses 16 cubes



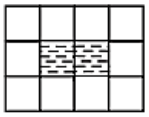
This well uses 24 cubes

8. Alex loves cookies. He ate 10 cookies on Monday, 9 on Tuesday, 8 on Wednesday, and so on through Sunday. How many cookies did he eat in all from Monday through Sunday?

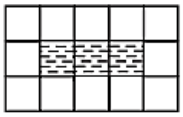
9. A farmer uses bales of hay to fence his pigs. Bales are shown as white squares. Pigs live in the dashed squares. Top views of his pens are shown below. How many bales of hay will the farmer need for 10 pigs?



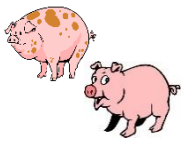
This pen holds 1 pig.



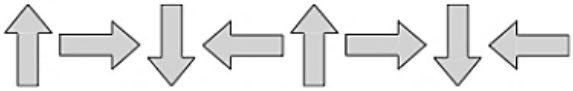
This pen holds 2 pigs.



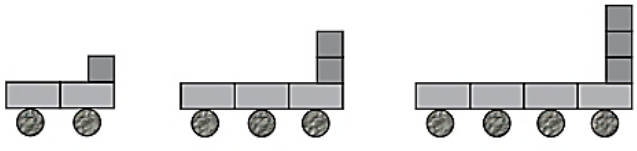
This pen holds 3



10. A repeating pattern is shown below. What is the 50th figure in the pattern?



11. Tina started building trains with shapes. Look for a pattern to help you complete the table. Using the table, how many squares, rectangles and circles does Tina need to make train #100?



Train #1 Train #2 Train #3

Train	1	2	3	4	5	10	100	
Number of squares	1	2						
Number of rectangles	2	3						
Number of circles	2							

Number of squares:

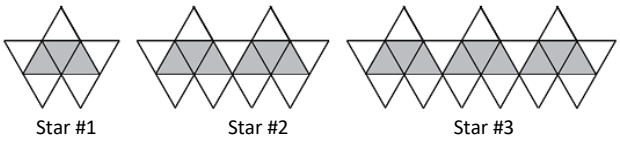
Number of rectangles:

Number of circles:

12. The stars below are made up of white triangles and shaded triangles. Look for a pattern to help you complete the table. How many white triangles and shaded triangles needed to make star #100?

White triangles:

Shaded triangles:



Star #1 Star #2 Star #3

Star	1	2	3	4	5	10	100
Shaded Triangles	3	6					
White Triangles	5	9					

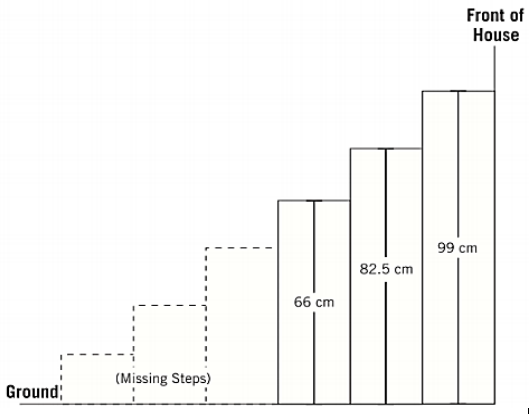
13. The table below shows the number of pennies Angela places in a jar each day. If the pattern continues, on what day will Angela place 1024 pennies in her jar.

Day	1	2	3	4	5	6	7	8	9	10	11
Number of pennies placed in the jar	1	2	4	8							

14. Diana hired a carpenter to replace some missing steps at the front of her house. The bottom three steps are missing. The carpenter wants to use the same heights for the new steps as the old steps. The carpenter measures the height from the ground to the top for each remaining step.

- The fourth step is 66 cm from the ground.
- The fifth step is 82.5 cm from the ground.
- The sixth step is 99 cm from the ground.

The carpenter plans to make each step increase by the same amount. What is the height of the first, second, and third steps?



First Step:

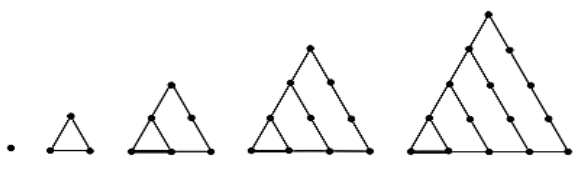
Second Step:

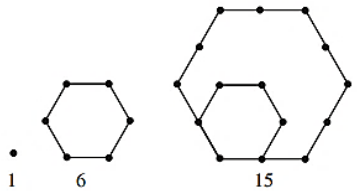
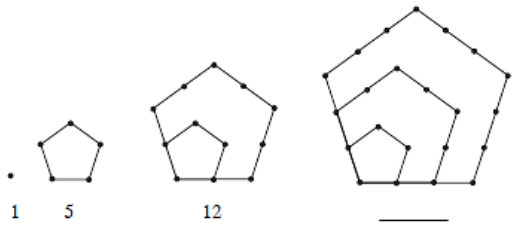
Third Step:

For problems 15 to 17, record the corresponding numbers in the following chart.

Term	1	2	3	4	5	6	10
Triangular Numbers	1	3					
Square Numbers	1	4	9	16	25		
Pentagonal Numbers	1						
Hexagonal Numbers	1						

15. The first few **triangular numbers** are given below. Determine the next two triangular numbers and add these numbers to the chart. What is the 10th triangular number?



16.	The first few **hexagonal numbers** are illustrated below (1, 6, 15, 28). Determine the next two hexagonal numbers and add them to the chart. What will be the 10th hexagonal number?  	
17.	The first few **pentagonal numbers** are illustrated below. Add them to the chart. Determine the next two hexagonal numbers and add them to the chart. What will be the 10th pentagonal number?  	
18.	Look at the number sequences below and find the missing numbers. a. 2 8 18 32 50 ___ ___ b. 1 8 27 64 125 ___ ___ c. 0 3 ___ 15 24 35 ___	*a.* *b.* *c.*

Solution is available on February 21, 2020 at www.mathinaction.org