



First Name: _____ Last Name: _____ Grade: _____

Teacher: _____ Parent's email: _____

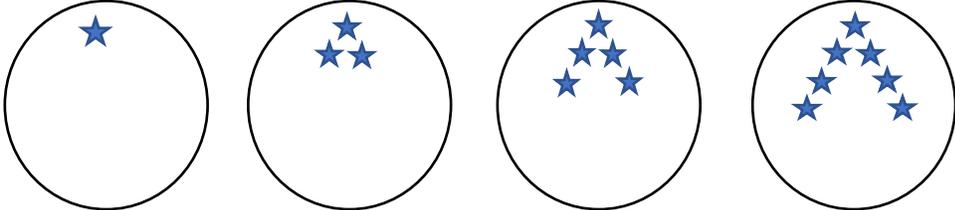
Pattern

In this challenge, we look at problems involving patterns. Patterns are all around us (classroom wall, ceiling, patio floor, etc.). You can also find patterns in quilts and kitchen tiles. Some are easy to notice, but some are hard.

You may need to predict “what’s next?” by figuring out the pattern in the problems. A pattern can be a sequence of objects, letters, numbers, or even a combination of all three. Grab your parents, siblings, or friends to help you solve these patterns problems with you. Good luck!

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.

Answer

1.	Josiah arranged the pool balls as shown below. Assuming there are no hidden balls, how many pool balls are there in total? 	
2.	Jerry bought 12 apples on Sunday and put them in the fridge at home. He brings 1 apple to school on Monday, 2 apples on Tuesday, 3 apples on Wednesday, 4 apples on Thursday, and none on Friday. How many apples will he have left at home by end of the day on Friday?	
3.	If the pattern continues, how many stars will be in Circle 6? 	
4.	Tyrone skip-counts by 4 starting with 10. What is the largest number he will say that is less than 50?	
5.	Camilla is learning French. She learned 30 words in January, 40 words in February, 50 words in March, 60 words in April, 70 words in May and 80 words in June. How many French words in all did Camilla learn in the first six months of the year?	

6. Donna makes a sequence of figures with tiles. The first four figures have 1, 4, 7 and 10 tiles, respectively. How many tiles will there be on figure 10?

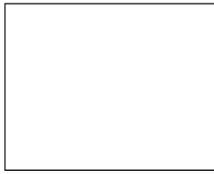


Fig. 1

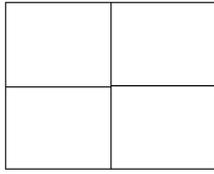


Fig. 2

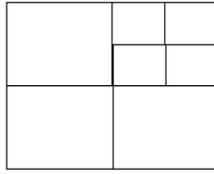


Fig. 3

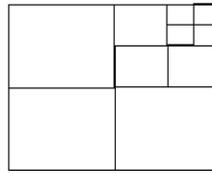
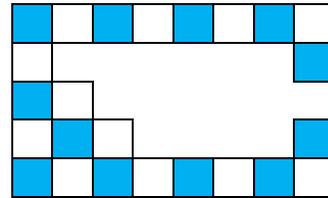


Fig. 4

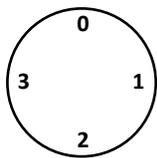
7. A rectangular wall has a pattern that was created with two kinds of tiles: blue and white. Some tiles have fallen off the wall (see the picture). If this pattern was continued throughout the entire wall, how many blue tiles have fallen off?



8. If you add up the digits of the year 2023, you will get $2+0+2+3=7$. What is the next year after 2023, for which the sum of the digits is 7 again?

9. Sonja the Slug climbs 5 feet in 3 minutes. Sawyer the Slug climbs 4 feet in 5 minutes. Assuming both slugs kept their same pace as before, how many more feet would Sonja climb than Sawyer in 15 minutes?

10. The figure below is a picture of a 4-hour clock. Clock addition (\oplus) works as follow:
 $A \oplus B =$ you start at A and move B number of steps around the clock.



$1 \oplus 1 = 2$ $1 \oplus 2 = 3$ $1 \oplus 3 = 0$ $1 \oplus 4 = 1$ $1 \oplus 5 = 2$
 In this 4-hour clock, $2 \oplus 50 = ?$

11. A bat ate a total of 890 mosquitoes over the course of four consecutive nights. Each night it ate 15 more than on the night before. How many did it eat the third night?

12. If the pattern below continues, what will be the 1002nd letter?
MATHISFUNMATHISFUNMATHISFUN...

13. The following three diagrams represent a pattern in the arrangement of the black and white cells. If the pattern continues, how many white cells will the next diagram have?

14. The following three figures represent a pattern in the arrangement of hexagons. If the pattern continues, how many hexagons will there be in the fifth figure?

Fig. 1 Fig. 2 Fig. 3

15. What is the ones digit for the product $9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9$?

16. The first figure shows that there are 7 tiles. If the pattern continues, how many tiles will there be in the 150th figure?

Fig. 1 Fig. 2 Fig. 3 Fig. 4

17. The following three images show a sequence of growing letter 'h's made of identical square tiles. The first letter 'h' is made of 6 square tiles. If the pattern continues, how many square tiles are in the 100th letter 'h'?

18. As illustrated below, there are 11 tiles in figure 1. How many tiles will there be in figure 100?

Fig. 1 Fig. 2 Fig. 3

Solution is available on March 17, 2023
www.mathinaction.org