

Lower Primary Final Paper

Exam Time: 26/02/2023 10:00-11:30

Your Full Name: _____

2023 School Year: _____

School Name: _____

Country: _____



Level 1: Puzzle's password

As shown in the figure below, the four Chinese characters 數, 學, 花, and 園 each represents one of the four numbers 0, 1, 2, and 3. Please carefully observe the puzzle below and determine which number is represented by the puzzle piece with the character "數" written on it.

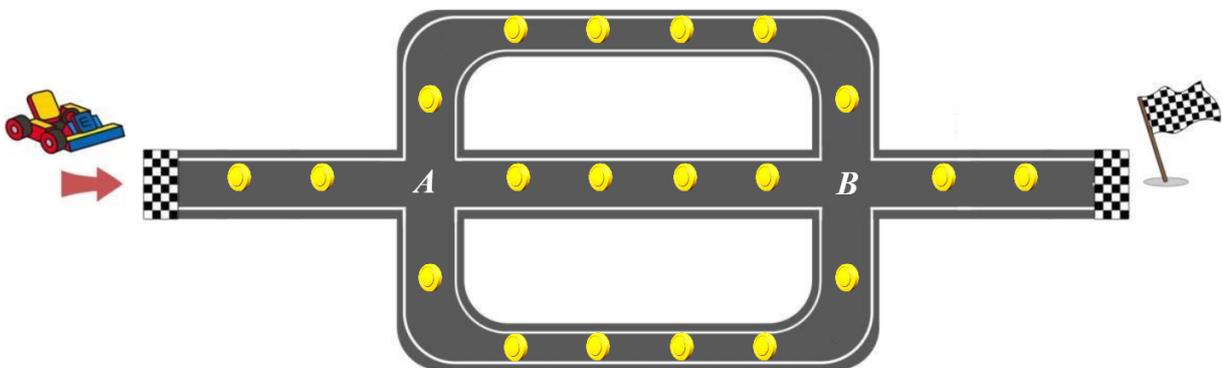
$$\text{數} + \text{學} + \text{花} + \text{園} = \text{數} + \text{數} + \text{數}$$

$$\text{數} = ?$$



Level 2: I am a race car driver

Mary decided to go karting. The track of the go-kart is shown in the figure below. Mary needs to drive from the starting point on the left to the end point on the right. If each runway can only be driven through once, how many gold coins can Mary get at most? (Intersections A and B can be passed repeatedly)





Level 3: Happy New Year

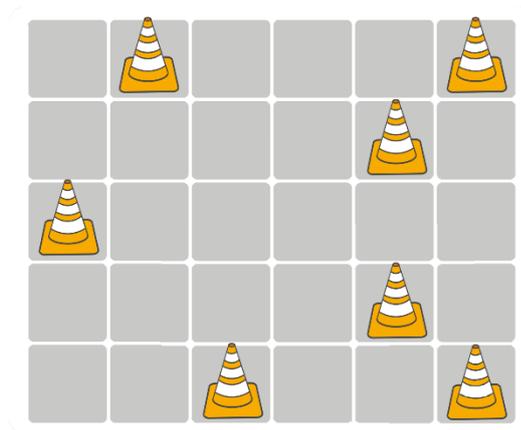
It's about to be Chinese New Year. This year's Spring Festival is February 12, 2021. If you fill in 3 "+" and 3 "-" in the ○ of the formula below, what is the greatest number you can get?

$$2 \bigcirc 0 \bigcirc 2 \bigcirc 1 \bigcirc 2 \bigcirc 1 \bigcirc 2$$



Level 4: Parking lot

The picture below is a model of a parking lot with five rows and six columns. John wants to park his own car in it. If each car occupies 2 adjacent grids (cannot be placed diagonally), and the grid with traffic cones cannot accommodate cars, then how many cars can be placed in the parking lot at most?





Level 5: The race of the 7 dwarfs

The 7 dwarfs participated in a running competition, and after the competition they saw that their rankings were as following:

- ① The 5th dwarf is in second place, and is behind the 3rd dwarf;
- ② The 4th dwarf is behind the 1st dwarf;
- ③ The 4th dwarf is in front of the 6th dwarf;
- ④ The 4th dwarf is ranked between the 2nd and 7th dwarf

Question: What is the ranking of the 4th dwarf?



Level 6: A magical year

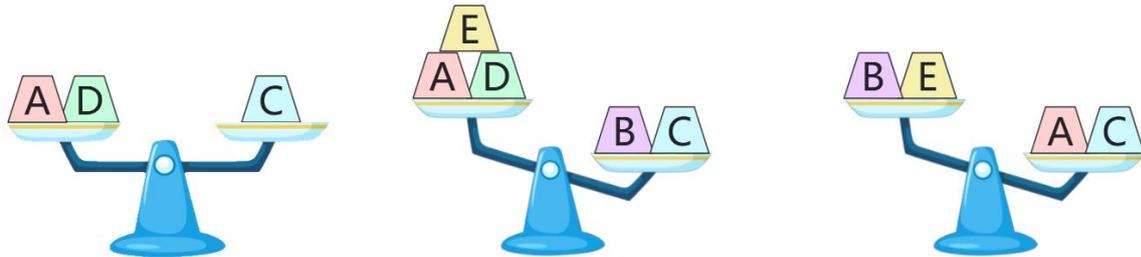
We can get a sum by adding the number represented by a year to the numbers in all its digits. For example, this year is 2021, $2021+2+0+2+1=2026$; we can get 2026. In some years, the number represented by adding the sum of the numbers on each digit can only reach 2021.

Consider the following: among the years that meet this requirement, which year is the closest to 2021 and gives the result of 2021?



Level 7: Who's the heaviest?

There are 5 building blocks. Two of which are 10 grams, two of which are 20 grams, and one of which is 30 grams.



Please analyze according to the picture above: which letter is on the 30g building blocks?



Level 8: Even bridge Sudoku

Fill in the numbers 1-6 in the blanks so that the numbers in each row, each column, and each thick line box are not repeated. If the \bigcirc in the upper left corner of the question is the starting point, and the \bigcirc in the lower right corner is the end point, you can find a route by moving up, down, left, and right (not diagonally, only one space at a time), and the numbers on the route are all 2, 4, and 6. What is the six-digit number composed of the six numbers from left to right in the third row?

\bigcirc 2	4	1	5	3	6
5	6	3	4	1	2
1	2	4	6	5	3
6	3	5	2	4	1
4	1	2	3	6	5
3	5	6	1	2	\bigcirc 4

Example

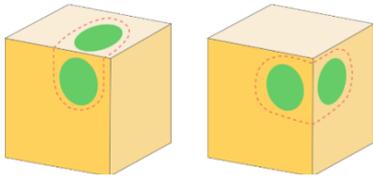
\bigcirc	3		4		1
5					4
3					5
2		3		1	\bigcirc

Question

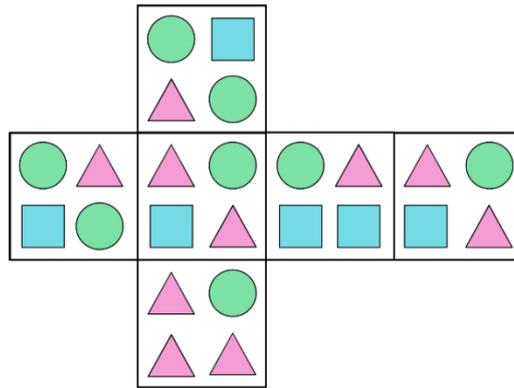


Level 9: The adjacent ○ in a cube

The cube shown in the figure on the left, if there is an edge in the middle of two adjacent ○, the two are said to be a group of "adjacent ○". Then, if the unfolded diagram on the right is folded into a cube, how many groups of "adjacent ○" will be produced in total?



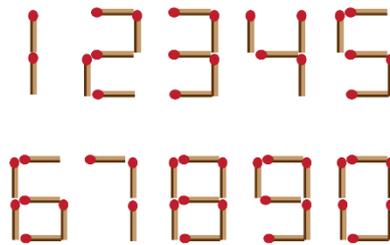
The red frame is a group of adjacent ○





Level 10: Matchsticks' transformation

As shown in the picture on the left, the numbers Mary made with matchsticks are “16”, and what John saw on the opposite side happened to be a two-digit number, but this two-digit number would become “91”. If Mary puts another three-digit number on the table, and what John sees on the opposite side happens to be a three-digit number, and if the sum of the three-digit number with Mary's original three-digit number is 810, then what would be the smallest number placed by Mary? (The picture on the right is the method of placing numbers 0-9 with matchsticks)



Arrangement of numbers 0 - 9



Level 11: Stop on red, go on green

As shown in the figure, Mary's journey from school to home is divided into 5 sections of equal lengths by 4 traffic lights, and she needs to walk each section for 2 minutes. It is known that each traffic light operates in the following way: stop for red light, and go for green light. The red light is on for 1 minute, and the green light is alternately on for 1 minute .

One day when Mary was walking home from school after classes, all four traffic lights had just turned red, and when she had just reached the second traffic light, Mary realized that she had forgotten to bring her homework, so she went back to school immediately to pick it up. After getting the homework, she went home the same way.

If we ignore the time she used to pick up her homework, how many minutes did it take Mary to go home from school?

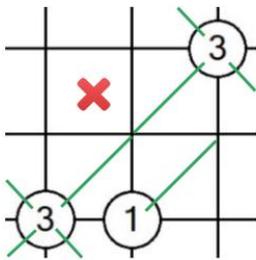




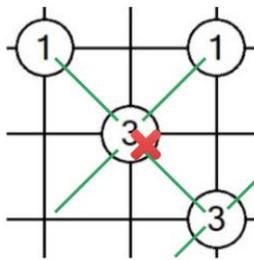
Level 12: The slide kingdom

John wanted to create a slide kingdom, so he drew the design of the kingdom and made some rules:

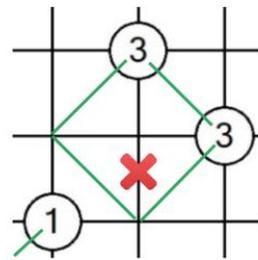
- ① Each small square in the picture represents a room.
- ② Draw a diagonal line in each room to represent the slide in this room, and each room has exactly one slide.
- ③ The number in the circle indicates how many slides there are at this intersection.
- ④ All slides cannot form a square or a rectangle.



Each grid must have
a diagonal line



The number indicates the number
of diagonal lines connected



Cannot form a square
or a rectangle

John has now designed the room of the slide kingdom and marked some numbers as shown in the picture below. Please help John design the placement of the slides in each room. How many grids  are there in all the rooms?

