Maximum time: 25 *minutes*

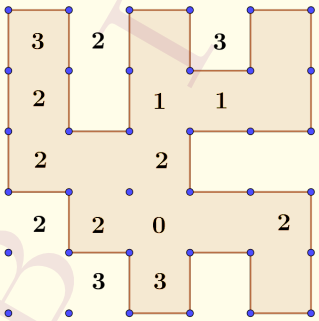
KEM1 - Maths Olympiad for Std 5^{th} & 6^{th} together @ *ABIMS*

Try on your own ! Don't use calculators ! Think and Answer !

Name:_____ Standard:_____

I Answer the following questions accordingly !

1. Here is a loop the loop puzzle solved wrongly.



This is because not all numbers are satisfied by the surrounding line segments.

How many such numbers are <u>not satisfied</u> with this wrong solution?

A. 0 B. 1 C. 2 D. 3

2. Which of the following statements is TRUE?

A. The number of days got over in the year 2024 so far (till 12^{th} July, 2024 - Friday) is 195.

B. The remaining number of days in the year 2024 (from 14^{th} July, 2024 - Sunday) will be 171.

C. The number of *Saturdays* in August, 2024 will be 4.

D. The number of *Fridays* in the whole year of 2024 is 50.

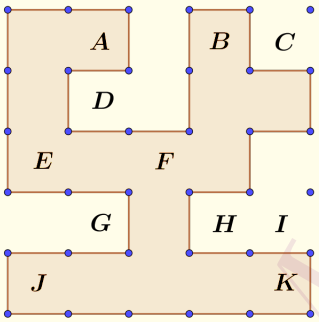
3. The sum of all the dates across Fridays of a month of a calendar year is 66.

Then, what is the date on 23^{rd} of that month?

A. *Saturday* B. *Sunday* C. *Tuesday* D. *Monday*

4. Here is a loop the loop puzzle solved correctly.

   Instead of numbers, letters are marked whose values are the numbers.



   What is the value of $A + B + C + D + E + F + G + H + I + J + K$? _____.

Maximum time: 60 *minutes*

Calendar Maths, Puzzle Maths, Configuration. Odd & Even

KEM1 - Maths Olympiad for Std 5,6 together @ *ABIMS*

Try on your own ! Don't use calculators ! Think and Answer !

Name:_____ Standard:_____

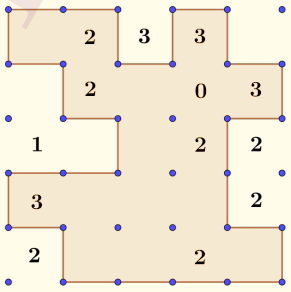
I Answer the following questions accordingly !

1. It is found that in a calendar year that
   - the number of Mondays in August is lesser than that of number of Mondays in July;
   - the number of Tuesdays in August is more than the number of Tuesdays in July.

   Then, the August 15th of that year will fall on

   A. *Sunday* B. *Tuesday* C. *Thursday* D. *Saturday*

2. Here is a loop the loop puzzle solved wrongly.



   This is because not all numbers are satisfied by the surrounding line segments.

   How many such numbers are not satisfied with this wrong solution?

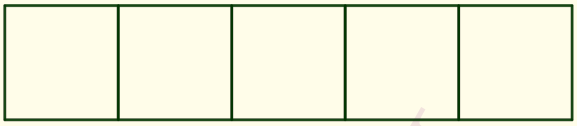
   A. 0 B. 1 C. 2 D. 3

3. The product of three natural numbers is 1155. Their sum

   A. must be odd. B. must be even.
   C. sometimes odd, sometimes even depending upon the three numbers.
   D. none of these.

4. A Row of five square cells is formed, as shown.

   - Each square cell should be filled with one of the natural numbers among $2, 3, 4, 5$ and 6.
   - No two square cells should be filled with the same value.
   - The product of every two adjacent cell entries should be less than 16.



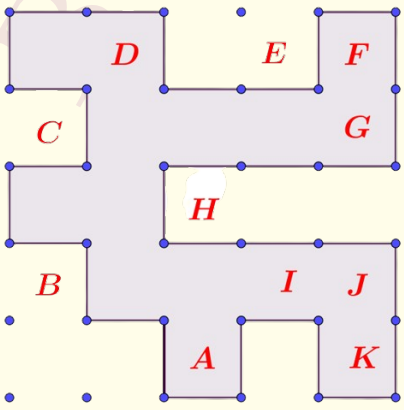
   The number of such possible configurations, is _____.

5. Which of the following statements is not correct?

   A. The calendar months of May 1999 and January 2000 are identical.
   B. The calendar months of March 1998 and August 1999 are identical.
   C. The calendar months of October 1997 and July 1998 are identical.
   D. The calendar months of August 1996 and January 1997 are identical.

6. Here is a loop the loop puzzle solved correctly.

   Instead of numbers, letters are marked whose values are the numbers.



   What is the value of $A + B + C + D + E + F + G + H + I + J + K$? _____.

7. The sum of the first 2024 odd numbers, that is

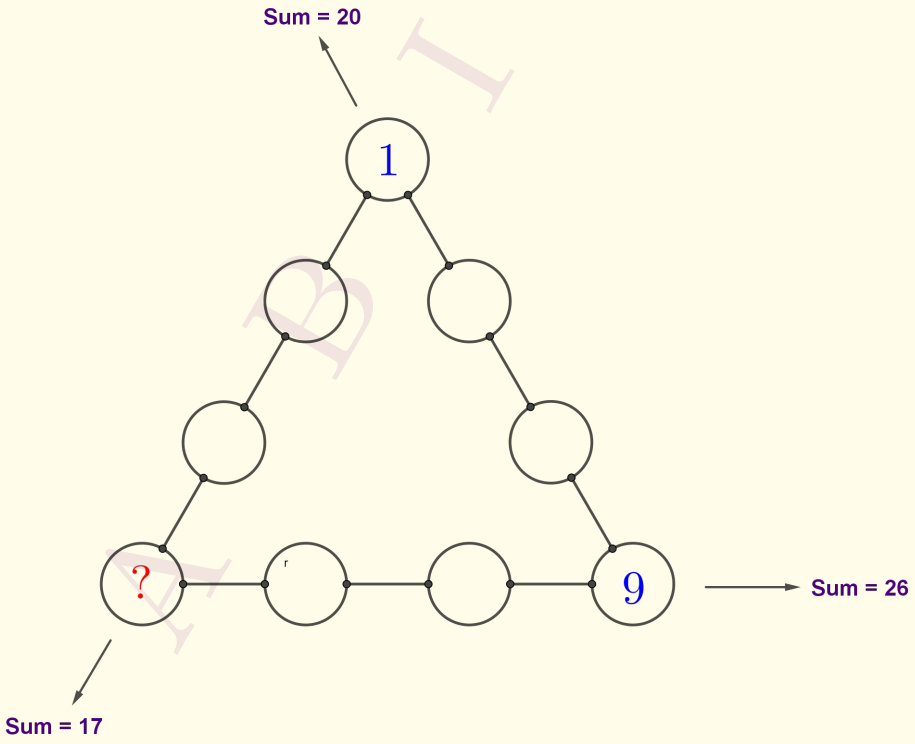
$$1 + 3 + 5 + 7 + \cdots + 4045 + 4047,$$

is

A. an odd number and a multiple of 3.
B. an odd number and not a multiple of 3.
C. an even number and not a multiple of 4.
D. an even number and a multiple of 4.

8. A Triangle of circles is formed, as shown. Each side has four circular cells.

- Each circular cell should be filled with one of the natural numbers from 1 to 9.
- No two circular cells should be filled with the same value.
- Two of the corners are filled with 1 and 9, as shown.
- The sum of the four cell entries along the sides of the triangle should be 17, 26 and 20, as shown.

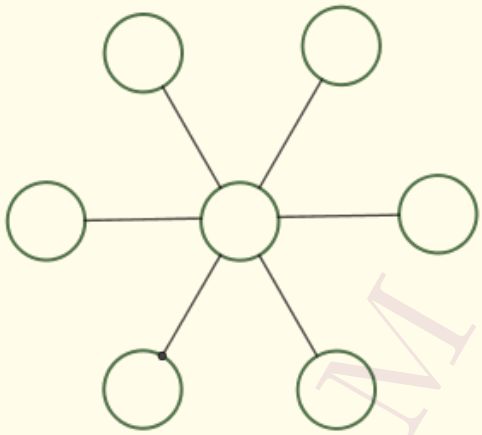


What should be the cell entry at the third corner (bottom left corner) of the triangle? ____.

9. How many Saturdays are there in the next four months (From 1st September to 31st December) of 2024?

_____.

10. Here is a *configuration* of 7 *circular cells with three straight connectors and a central circular cell*!



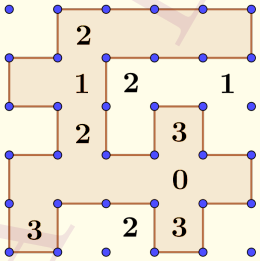
- Each cell should be filled with a whole number from $2, 5, 8, 11, 14, 17$ and 20.
- No two cell entries should be of same value.
- *The sum of the cell entries of* 3 *circular cells in each straight connector should be the same.*

To satisfy the configuration, the central circular cell cannot be

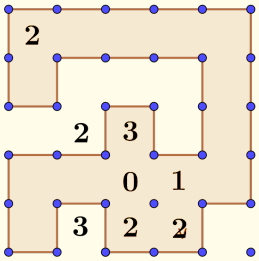
A. 2 B. 20 C. 11 D. 8

11. Which of the following loop the loop puzzle is solved wrongly?

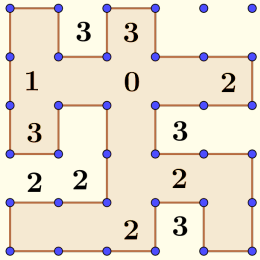
A)



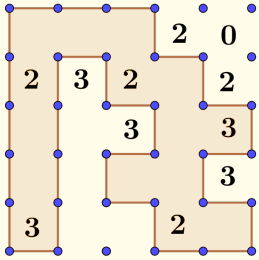
B)



C)



D)



12. There were 100 dolls kept in a row of a long table numbered from 1 to 100 in usual order from left to right ↘

$$1, 2, 3, 4, 5, 6, 7, \cdots, 97, 98, 99, 100$$

Vedanth took away the even placed dolls and kept the remaining dolls as it is.

So, the dolls will now look like: $1, 3, 5, 7, \cdots, 97, 99$

Again Vedanth took away the even placed dolls and kept the remaining dolls as it is.

So, the dolls will now look like: $1, 5, 9, 13, \cdots, 93, 97$

Again Vedanth took away the even placed dolls and kept the remaining dolls as it is.

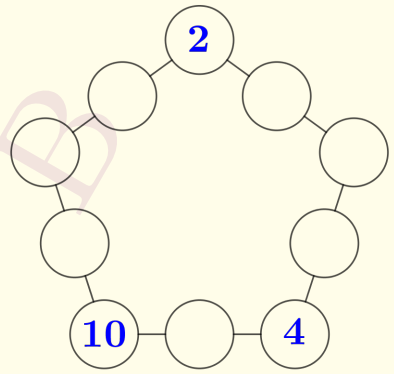
So, the dolls will now look like: $1, 9, 17, \cdots, 89, 97$

The number of dolls will kept reducing and finally there will be only one doll.

Which numbered doll will remain finally? _____.

13. A pentagon of ten circles is formed, as shown. Each side has three circular cells.

Required Configuration



- Each circular cell should be filled with one of the natural numbers from 1 to 10.
- No two circular cells should be filled with the same value.
- Three corners among the five corners are filled with 2, 4 and 10, as shown.
- The sum of the three cell entries along each side of the pentagon should be the same.

What is the sum of the cell entries at the other two corners of the pentagon? ____.

14. The sum of three different prime numbers is 40.

The largest among them, should be _____.

15. In a October month of a calendar year, the days are mentioned in order from left to right as follows:

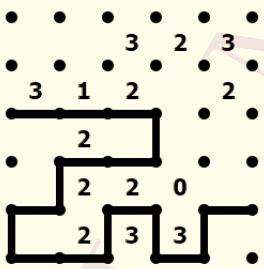
SUN MON TUE WED THU FRI SAT

The dates are mentioned from left to right and top to bottom in usual order.

Which of the following cannot be the sum of all the dates in the second row?

A. 42 B. 56 C. 70 D. 84

16. Here, you observe a *Loop the Loop Puzzle* solved partly with 17 line segments connected so far!



Note: Here a line segment means a segment ending with two adjacent (closer) horizontal or vertical dots.

How many more line segments are needed to complete solving the puzzle correctly? _____.

CONFIGURATION, ODD and EVEN & DOING and UNDOING

ASSIGNMENT - 2

KEM1 - Maths Olympiad for Std 5^{th} and 6^{th} together @ *ABIMS*

Shri Sadagopan Rajesh

Try on your own!

Post your detailed (not just numbers) and neat solution(s) to : kem2022.23@gmail.com (only!)

Mention your Name, Standard INSIDE ANSWER SHEET along with Course code: KEM1, Topic and Assignment number.

Use unruled note, submit a clearer view of answers preferably in a single pdf file using adobe scan app (only one answer file for one assignment)

You may go through the related lecture session(s) before trying this!

Dead Line for submission of this assignment: 13th October, 2024 (SUN)

ARYABHATTA INSTITUTE OF MATHEMATICAL SCIENCES

INDIA

September 2024

MATHS OLYMPIAD - STD 5, 6

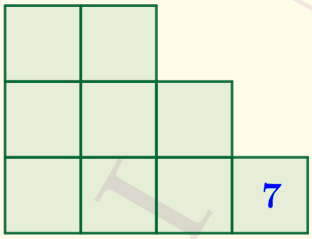
ASSIGNMENT - 2

Hope you have studied the live class video before trying this worksheet !

Name:_____ Standard:_____

1 Configuration

1. Nine square cells are arranged in three rows and four columns, as shown.



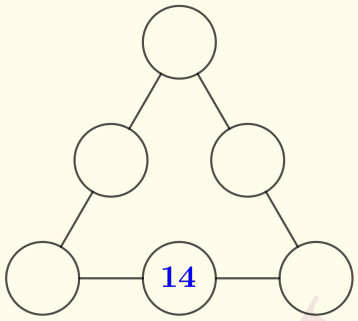
Required Configuration

- First row has two cells; Second row has three cells; Third row has four cells, as shown.
- Each cell should be filled with one among the first 9 natural numbers.
  That is, Each cell should be filled with one among $1, 2, 3, 4, 5, 6, 7, 8, 9$.
- No two square cells should be filled with the same value.
- The sum of two cell entries in the first row $>$ The sum of three cell entries in the second row.
- The sum of three cell entries in the second row $=$ The sum of four cell entries in the third row.
- The sum of 3 cell entries in the first column $=$ The sum of 3 cell entries in the second column.
- The sum of 2 cell entries in the third column $= 4$.
- The only cell in the first column is filled with 7, as shown.

How many possible configurations are there? Give reasons.

SEE NEXT PAGE!

2. Six circular cells are arranged to form a triangle with three cells in each side, as shown.



Required Configuration

- Each cell should be filled with one among $4, 6, 8, 10, 12, 14$.
- No two circular cells should be filled with the same value.
- The sum of the three cell entries in each side should be 24.
- The one middle cell in one of the sides, is filled with 14, as shown.

How many possible configurations are there? Give reasons.

2 Odd & Even

3. The sum of four different prime numbers is 25. What is their product? Give reasons.

4. Among the first 2024 natural numbers, all natural numbers containing digit 1 are removed.

Examples: Numbers such as $1, 10, 11, \cdots, 19, 21, 31, \cdots, 101, 102, \cdots, 1000, 1001, \cdots, 2021$ are removed.

Find out whether the number of remaining numbers is ODD or EVEN. Give reasons.

Hint: No need to count how many such numbers removed for this purpose!

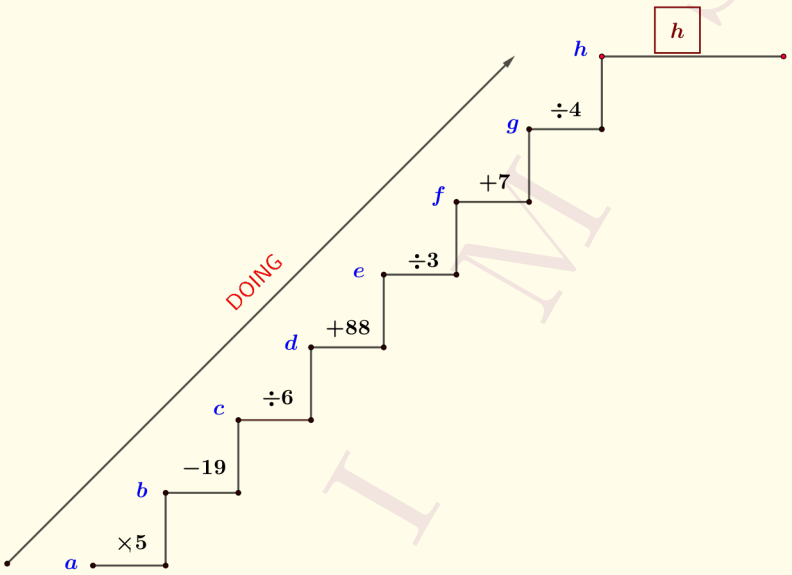
3 Doing & Undoing

5. Vyas thought of a number. He performed the operations in the following order:
   - Add the number to itself.
   - Multiply by 5.
   - Subtract 23.
   - Multiply by 11.
   - Add 18.
   - Divide by 25.

Finally, the result obtained by Vyas from these 6 operations in order was 17.

Find the initial number thought by Vyas. Give reasons.

6. The following order of operations are performed on unknown number a.



If all of a, b, c, d, e, f, g, h are two digit numbers, find their values. Give reasons.

Hint: Think about the link between the two digit numbers d, e and the possinilities!

KEEP ENJOYING MATHEMATICS!