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Intellectual output 2

Mathematical creativity

4 Creativities Project
№2019-1-BG01-KA201-062354





INTRODUCTION

The aim of FCREATIVITIES project is to improve the teachers' abilities to generate a creative education, leading to the creation of students who are able to think, analyze and solve daily problems. With the following six activities we aim to equip the teachers with some easy to implement, fun to organize exercises to be used with **10 to 12 year old students**, focusing on enhancing their motivation, logical thinking and **mathematical creativity**. The very nature of mathematics provides a suitable platform for developing creativity. Mathematical creativity could be defined as the process that results in unusual and insightful solutions to a given problem, irrespective of its level of complexity. Mathematical creativity is observed when one generates a non-standard solution for a problem which may not be solved so easily using the conventional methods.



Title of the activity

Mathematics Gymkhana



Description

A mathematical Gymkhana is a game of mathematical problems and tests in which groups of students carry out a series of activities to reach the final point. The aim is to solve all the tests correctly and in the shortest possible time.



Aims

- *To develop mathematical creativity.*
- *Motivate children and introduce them to the basic concepts of logical-mathematics.*
- *To reinforce knowledge acquired in the classroom during the school year.*

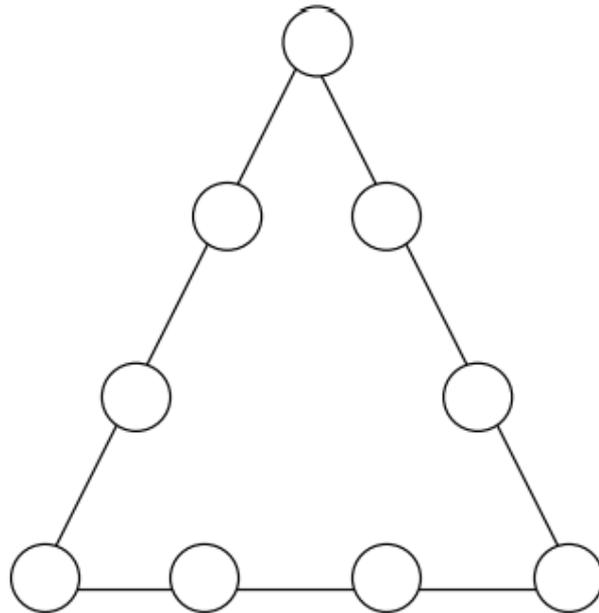


Steps we must follow

1. First of all, you have to prepare the different mathematical tests of the Gymkhana. There will be 4 tests in total and each of them will be placed on a table in the classroom at a distance from each other, each test will be numbered (1, 2, 3, 4). The number of tests will depend on the number of students participating, there has to be at least one test for each group of people so that they can start in one test each and move from one activity to another. For each test, there will be three models in case several groups get together on the same test at the same time. When a group of students gets a test right (the teacher has to check that it is correct) they have to move on to the next test. Each group will have a card with the order they will follow to do the activities. For example:
 - First group: 1st test no. 1; 2nd test no. 2; 3rd test no. 3; 4th test no. 4.
 - Second group: 1st test no. 2; 2nd test no. 3; 3rd test no. 4; 4th test no. 1.
 - Third group: 1st test no. 3; 2nd test no. 4; 3rd test no. 1; 4th test no. 2
 - Fourth group: 1st test no. 4, 2nd test no. 1, 3rd test no. 2; 4th test no. 3.

Each group of students with their order card will start with the first test that corresponds to them. The teacher will say: ready, set, go! And each group will start with their activity. The fun of this gymkhana is that the groups compete with each other to try to solve it in the shortest time possible and that everyone participates in the activity. Even if one group has completed all the tests, you have to leave time for the others to solve them all. The first group to finish the tests can be rewarded with something educational or pedagogical, for example, they can be in charge of correcting the homework exercises on the blackboard in the next class.

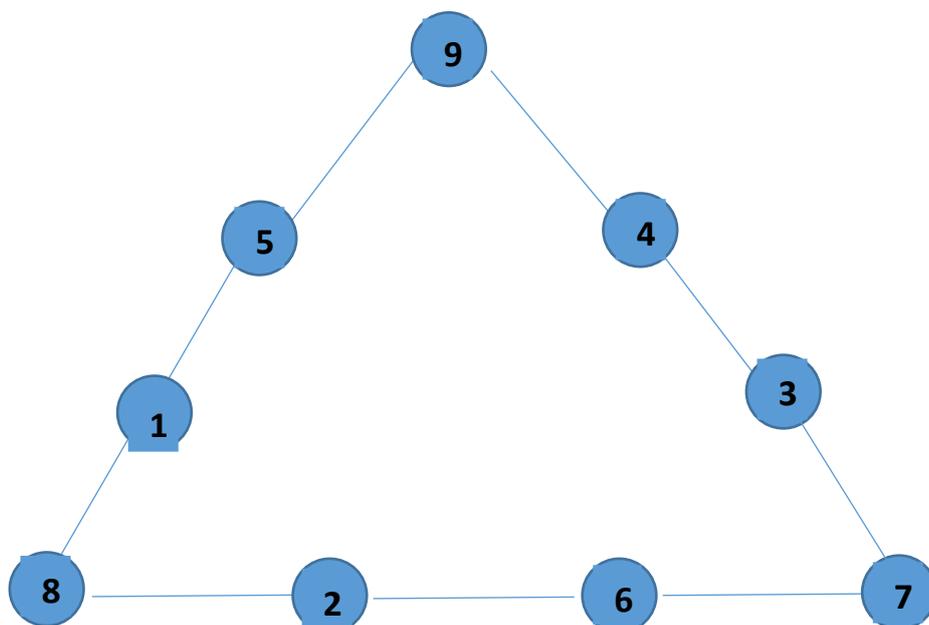
2. The first test is the magic triangle. Students are given a sheet of paper with a triangle printed on it; the triangle has 4 white circles on each side. It looks like this:



What you have to do with that triangle is the following:

Place all the numbers from 1 to 9 in such a way that the sum of the four numbers on each side of the triangle adds up to 23.

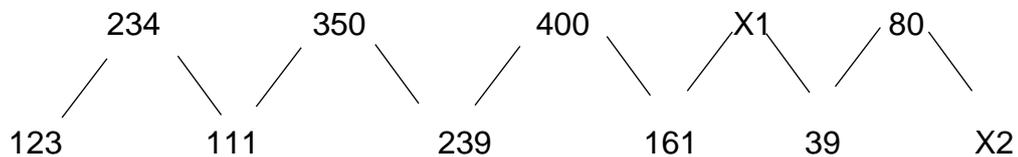
*There are several possible solutions to this problem depending on how the numbers are placed, one of which is:





In this test, students should be given a printed worksheet with the triangle and instructions on what to do.

- The second activity is to continue a series of numbers that are related to each other. Students have to find out how these numbers are related to each other and write the missing numbers. The numerical series is:



Solution:

X1: 200

X2: 41

The relationship between the numbers is that subtraction between 234 and 123 is 111. Subtraction between 350 and 111 is 239, and so on.

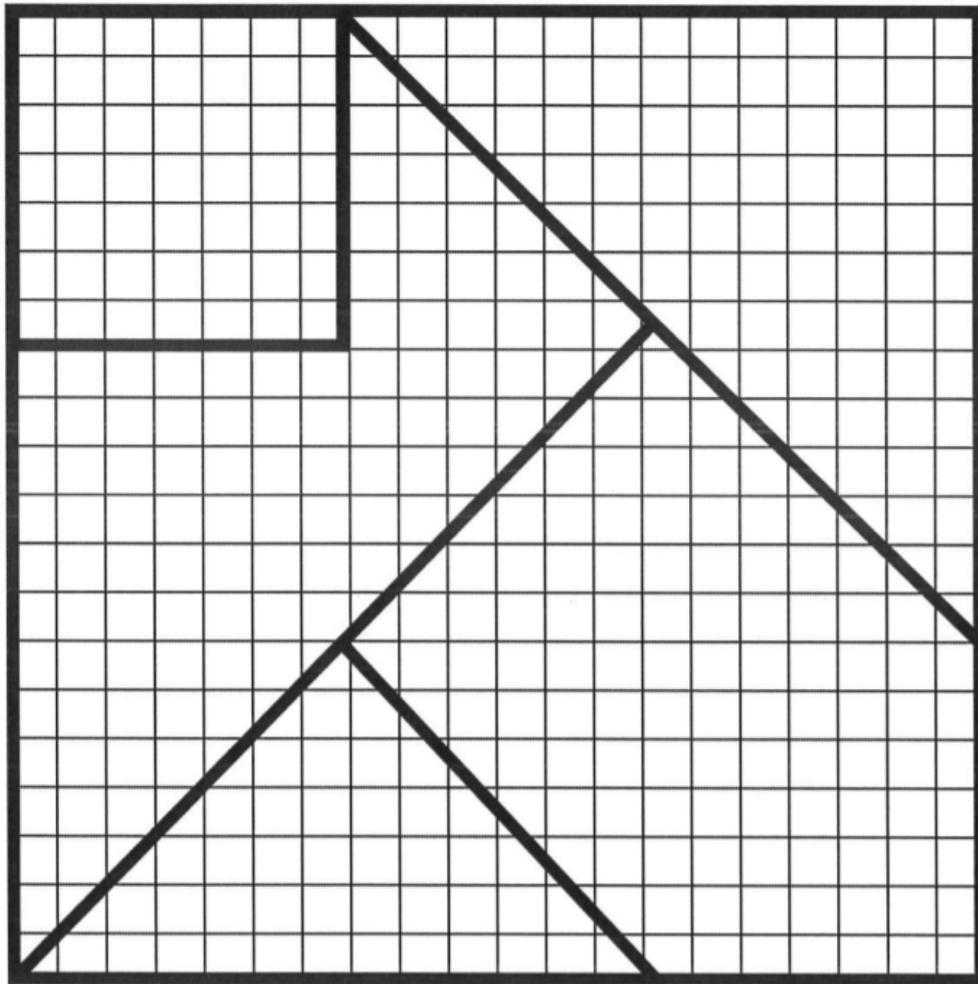
In this activity, students should be given the series of numbers, pencils and erasers.

- The third test is that the participants have to form two figures with 5 pieces that are given to them in an envelope. First, they have to form a square with 4 pieces. Secondly, they have to form a square with the five pieces.

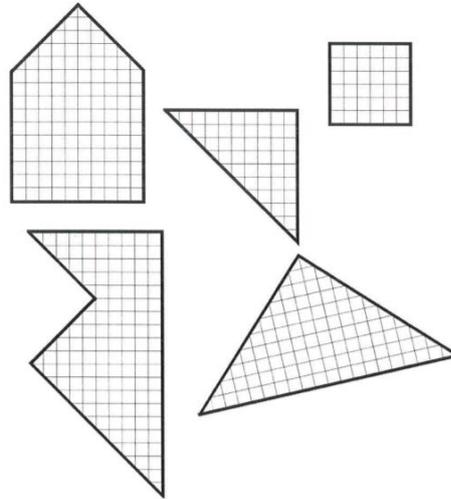
The pieces to be printed are:



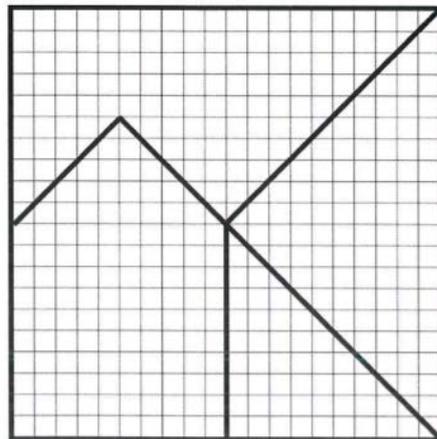
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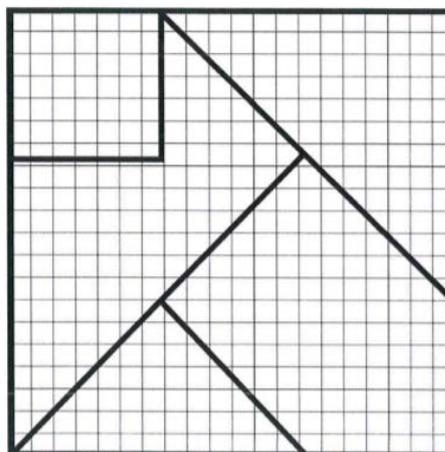
Those cut-out pieces look as follows:



The solution of the first square to be made with 4 pieces is:



The solution of the second square to be made with the 5 pieces is:





For this activity, students should be given instructions on the number of pieces they need to use to make each square and the cut-out pieces placed in an envelope.

5. The fourth and last test consists of finding out which number corresponds to the compass, which to the eraser, which to the ruler and calculating the number of the question mark. The worksheet for this activity is:

$$\begin{array}{r} \text{Compass} + \text{Compass} + \text{Compass} = 60 \\ \text{Compass} + \text{Eraser} + \text{Eraser} = 30 \\ \text{Eraser} - \text{Ruler} = 3 \\ \text{Ruler} + \text{Compass} \times \text{Eraser} = ? \end{array}$$

Solutions:

Compass: 20

Ruler: 5

Eraser: 2

Interrogation: 102 (to be calculated according to the order of priority of the operations, first multiplication and then addition).



Materials (if needed)

- One card per group with the order of the tests to follow.
- Test 1: pencils, eraser and worksheet of the triangle with the blank circles.
- Test 2: pencils, eraser and a worksheet of the series of numbers.
- Test 3: Instructions, envelopes, worksheet of pieces, and scissors.
- Test 4: worksheet of compasses, erasers and rulers; pencils and eraser.



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Tips

If it is necessary to do more tests because there are more than 4 groups of students, you can take as an example the ones that have already been done to see what other activities can be added. In any case, by searching on the internet we can find many more activities, depending on what is being taught in mathematics at that moment, we can add tests in which we have to multiply, divide, etc. The degree of difficulty of the tests will depend on the age group at which the activities are aimed. If we see that a group is stuck in one of the tests and the rest of the students are making progress, we can give them one or more clues so that they can find out what they have to do.