

INTERSEK ECUADOR

MAY 2016

MATHEMATIC FARM

I. OBJECTIVE

Encourage the study of mathematics in young people to strengthen their creativity, intellect and imagination, and promote positive experiences in the learning process of this subject.

II. PARTICIPANTS

A maximum of five students per delegation.

III. INSCRIPTIONS

Registration of participants will take place by email to ruth.viteri@sekquito.com. Until two hours before the event.

For further information contact Ruth Viteri email ruth.viteri@sekquito.com.

IV. THEMES OF THE COMPETITION

1. Mental calculation.
2. Algebraic identities.
3. Applications of Algebraic identities.
4. Operations with polynomials.
5. Equations of first grade and second grade.
6. Systems of linear equations
7. Problem solving with equations
8. Pythagorean Theorem. Implementation issues.
9. Tales theorem on similarity of triangles. Implementation issues.
10. Surface and volume of prism, cylinders, spheres
11. Statistical parameters. Mean, median, mode.
12. Questions of logical mathematical reasoning
13. Solve Rubik's cube
14. Solve a soma cube
15. Make figures with Tangram

V. DESCRIPTION OF THE MATHEMATIC FARM

The following activities are designed so that they are part of a mathematical circuit posing as a farm, all exercises and problems to be proposed will require strategy, skill, logic, wit and mathematical knowledge. You cannot use calculator.

The mechanics of the circuit is:

Each delegation will be located in a farm pen where they will place all the animals they collect (animals figures that have the results of the operations the need to solve) of a large panel. The place will be decorated with elements of a farm like: tractors, bushes, trees, straw, etc.

OF THE PARTICIPATION



The circuit begins at 09.30am and will finish the moment the jury determines which delegation wins. Students and teacher should be in Patio 4 at 09h00 wearing their personal identification card. The participating students should be uniformed properly and **with only one** article of clothing used by farmers (like a hat, scarf, shirt, or coveralls, etc). The school will provide sheets, pencils, pens, eraser, Rubik's cube, Soma cube, Tangram, I pads, adequate space for each delegation, chairs, a banner that identifies the delegation, and will provide an appropriate environment for the realization of the circuit .

ELIMINATION PHASE

In the elimination phase, each delegation will have a judge who will give a questionnaire of 8 questions, each delegation shall elect a representative to present the results to the judge. The representative will be the one to organize his team to solve the questionnaire, find and collect the correct answers on the panel of animals, so that the animals are gathered in the farm pin of each delegation, completed this 1st stage (maximum 30 minutes) each delegation shall elect one participant to receive a Rubik's cube and when directed by the animator, a representative of each delegation will solve the Rubik's Cube (the first five delegations to solve cube will receive an animal for their farm); The same procedure will be followed to form the figure using a soma cube and the tangram.

(Similar exercises are found on page 3-4-5)

At this stage delegations may obtain a maximum of 12 animals, distributed as follows:

- 1 animal for using a farmer article
- 8 animals for solving the questionnaire
- 1 animal for solving the Rubik's Cube
- 1 animal for forming the figure indicated with the soma cube.
- 1 animal for forming the figure indicated with the tangram.

In the elimination round, the five delegations with the most animals will qualify to the finals. They will compete in patio 4 by answering two questions of logical reasoning, the representative of each delegation will present the results. The delegation that answers in the shortest time wins.

If there is a tie in the qualifying and / or in the final, the jury will propose exercises and / or problems of mathematical reasoning, the delegation that answers first and correctly will be the finalist or winner.

Each delegation will have a judge who will verify the results of each team and deliver the results primer to the jury who will announce the finalists.

JURY

The jury will be composed of delegates from SEK INTERNATIONAL SCHOOL ECUADOR. The jury will award an animal to the delegations that wear the best farmer article.

The results of each delegation shall be given by each judge in a sealed envelope to the jury.

The president of the jury will announce the five delegations that will participate in the final and all the delegations will receive an Ipad with two questions of logical reasoning, each delegation will be informed that they only have three attempts to resolve the two questions. The delegation that meets both questions correctly in the fastest time will be declared the winner.



The jury's decision is final.

SIMILAR EXERCISES

Mental calculation

$$(\sqrt{144} - 3^2 + 4 - 10) \times 2$$

Algebraic identities

$$(x + 3)^2$$

$$(x - 5)(x + 5)$$

Operations with polynomials

Simplify:
$$\frac{x^2 - 9}{x^2 - 6x + 9}$$

Let $P = 4x^2 + 3x + 4$, $Q = 2 - x$, $R = x + 2x^2 + 5$ y $S = x^2 + 3$. Calculate: $P \cdot Q - S$

Equations

$$\frac{21}{49} = \frac{x}{35}$$

$$\frac{3x}{2} - 1 = \frac{3x + 2}{4}$$

$$3x(5x - 1) - 5x(2x - 1) - 3 = 0$$

$$x^2 - 10x + 25 = 0$$

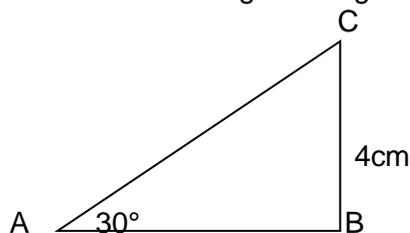
Systems of linear equations

Solve for x and y in the following system of equations:

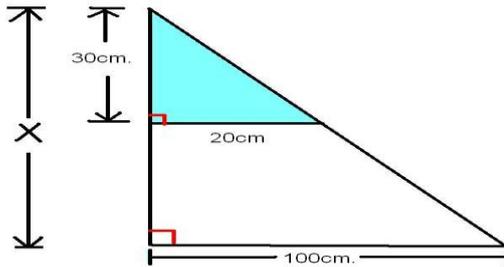
$$\begin{aligned} 3x + 2y &= -8 \\ 2x - 5y &= 1 \end{aligned}$$

Similarity of triangles

Solve the following of triangles with right angle. (Remember: $\sin 30^\circ = 1/2$)



Semejanza



Problems of logical mathematical reasoning

- If twice a number is multiplied by the same number decreased by five is 12.
- Six friends go on vacation to the beach and decide to travel in couples; each couple uses different ways of transportation. We know that Axel does not use the car and travels with Lucy that will not fly. Andrea is taking a plane. If Marlene neither goes with Dario nor makes use of the aircraft, could you tell us which way of transportation did Thomas use to get to the beach?
- Six friends are around a case of beer, Javier is not sitting next to Octavio and Omar, Cesar is not beside Ruben or Omar, Octavio is not next Reuben or Caesar, Max is with Octavio, on his right. Who sits at the right hand of Caesar?
- A publisher wants to sell a collection of dictionaries to perform translations directly between 5 languages: Spanish, Russian, English, French and German. How many dictionaries will the collection have?

Surface and volume

$A_T = A_B + A_L$
 $A_T = (5 \cdot 4) + 54$
 $A_T = 20 + 54$
 $A_T = 74 \text{ m}^2$

$A_L = 2(A_1 + A_2)$
 $A_L = 2(5 \cdot 3 + 4 \cdot 3)$
 $A_L = 54 \text{ m}^2$

Área de un azulejo:
 $A = a^2 = 25^2 = 625 \text{ cm}^2$

Cantidad de azulejos:
 $74\,0000 \text{ cm}^2 : 625 \text{ dm}^2 = 1\,184$

Ejemplo n° 2

Determinar el área total del cilindro si su radio mide 10 cm y su altura 16 cm

Área lateral	Área base
$Al = 2\pi r h$	$A_b = \pi r^2$
$Al = 2\pi(10)(16)$	$A_b = \pi(10)^2$
$Al = 320\pi \text{ cm}^2$	$A_b = 100\pi \text{ cm}^2$
Área total	
$At = 2A_b + Al$	
$At = 200\pi + 320\pi \Rightarrow At = 520\pi \text{ cm}^2$	

$r: 10 \text{ cm}$
 $h: 16 \text{ cm}$

Área y Volumen de una ESFERA

$$A = 4 \pi r^2 \quad V = \frac{4}{3} \pi r^3$$

Ejemplo de área y volumen de una esfera:

$$A = 4 \pi r^2 = 4 \pi 10^2 = 400\pi \text{ m}^2 = 1256'637 \text{ m}^2$$

$$V = \left(\frac{4}{3}\right) \pi 10^3 \text{ m}^3 = \left(\frac{4}{3}\right) 1000 \pi \text{ m}^3$$

$$V = 1333'333 \pi \text{ m}^3 = 4188'789 \text{ m}^3$$

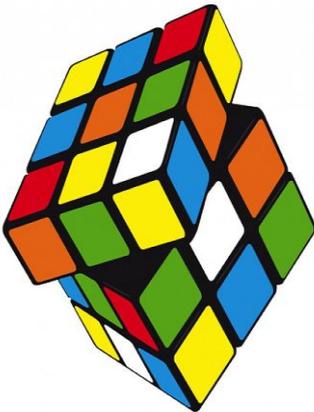


Mean, median, mode

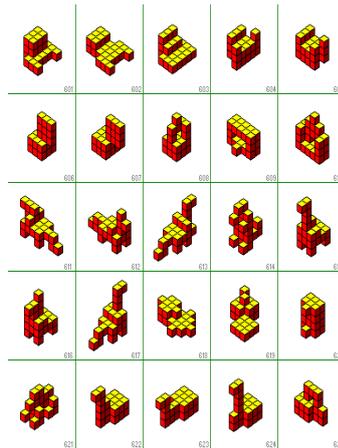


- Find Juan's average in mathematics, knowing that he scored 14 in the 1st month, 17 in the 2nd month, 10 in the 3rd month, 17 in the 4th month, 15 in the 5th month, 13 in the 6th month, 14 in the 7th month and 12 in the 8th month.
- What is the median and mode of the following data: 3, 1, 2, 3, 5, 2, 1, 4, 6, 3, 8, 3.

Rubik Cube



Soma Cube



Tangram

