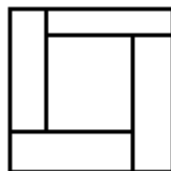


International Mathematical Olympiad

"Formulo de Integreco" 2012/13

PROBLEMS OF THE SECOND ROUND FOR GRADE 7 (2^o ESO) PARTICIPANTS



1. A square is divided into five rectangles (see the picture). Prove that if the areas of the four "corner" rectangles are equal then the "central" one is a square.
2. Every day Andrew goes down into the underground using an escalator. If he runs one stair per second, he spends 96 seconds to go down, and if he runs two stairs per second, he spends 60 seconds. What time would Andrew spend if he would simply stay on the escalator?
3. Each Martian has a head, a back, an arm, a leg and a tail. Each of these parts of body can be red, yellow, green or blue. Once upon a day, a company of Martians went together and they saw that every of them had at least one "unique" part of body (a part of body, for example a *leg*, is unique if there are no other *legs* of the same color). What is the maximal possible amount of Martians in the company?
4. How many numbers from 1 to 2013 are divisible by 5 and have the sum of digits that is also divisible by 5?
5. There are ten boxes on the table. The first box contains 550 sweets; the second box contains 450 sweets, and the other boxes are empty. It is allowed to choose any two boxes and move some sweets from one box to another one in such a way that the numbers of sweets in those two boxes become equal. (If these numbers become non-integer, such operation is prohibited.) Is it possible, after several operations, to obtain 2 boxes with 200 sweets each and 8 boxes with 75 sweets each?

International Mathematical Olympiad

"Formulo de Integreco" 2012/13

PROBLEMS OF THE SECOND ROUND FOR GRADE 8 (3^o ESO) PARTICIPANTS

1. In a hexagon ABCDEF, opposite sides are parallel; moreover, $AB=DE$. Prove that $BC=EF$ and $CD=FA$.
2. Every day Andrew goes down into the underground using an escalator. If he runs one stair per second, he spends 96 seconds to go down, and if he runs two stairs per second, he spends 60 seconds. What time would Andrew spend if he would simply stay on the escalator?
3. Each Martian has a head, a back, an arm, a leg and a tail. Each of these parts of body can be red, yellow, green or blue. Once upon a day, a company of Martians went together and they saw that every of them had at least one "unique" part of body (a part of body, for example a *leg*, is unique if there are no other *legs* of the same color). What is the maximal possible amount of Martians in the company?
4. How many numbers from 1 to 2013 are divisible by 5 and have the sum of digits that is also divisible by 5?
5. Parents gave Nick six sticks, all the sticks having different lengths. Nick formed two similar triangles using each stick as a side of one triangle. After that, Darya went up to him and formed two other triangles using those sticks which also found out to be similar. (We call two triangles similar if they have same shapes.) Give an example of such a set of sticks, that is, of their lengths.