First and last name of the student

Calculus problems

1. If the following natural numbers $n; n+1; n+3; n+9$ are prime numbers, then the number $n^{n+3} + (n+1)^n + (n+3)^{n+1}$ is equal to:

   $a)176 \quad b)166 \quad c)254 \quad d)83$

2. The sum of the last three figures (digits) of the number $a = 2^{2021} - 2^{2019} + 2^{2016}$ is:

   $a)4 \quad b)16 \quad c)6 \quad d)8$

3. If $x = \left[2017 - \left(\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + ... + \frac{2016}{2017} \right) \right] : \left(1 + \frac{1}{2} + \frac{1}{3} + ... + \frac{1}{2017} \right)$ then x is:

   $a) \frac{1}{2017} \quad b)2017 \quad c)0 \quad d)1$

Logical problems

1. There are 5 children in a group: the liars (children who always tell lies) and the sincere (children who always tell the truth). To the question "How many liars are there in the group?" each child gave a single answer. The answers were: one, two, three, four and five. How many liars are there in the group?

   $a)1 \quad b)2 \quad c)3 \quad d)4$

2. Andrei, Alin and their classmates are walking in an Indian file: there are 15 children behind Andrei, and 20 children in front of Alin, among whom Andrei, too. There are 5 children between Andrei and Alin. How many children are there in the class?

   $a)26 \quad b)27 \quad c)28 \quad d)30$

3. In an exam, there are 100 choices numbered from 1 to 100. Which is the probability for a choice to be a prime number?

   $a)25\% \quad b)10\% \quad c)15\% \quad d)24\%$

Practical applications

1. I have less than 300 books and I want to put them in order in the bookcase. If I place 5 books on each shelf there will be 3 odd books left, if I place 6 books on each shelf there will be 4 odd ones left, and if I put 8 on each shelf there will be 6 left. How many books do I have in the bookcase, knowing that if I arrange them in sevens, there will be no odd book left?

   $a)124 \quad b)238 \quad c)156 \quad d)298$

2. Cris has a rectangular synthetic football pitch. If we multiply its length by 3 and its width by 4, we obtain a square whose perimeter is 96 cm. What is the area of the football pitch?

    $a)$ 256 $b)$ 96 $c)$ 48 $d)$ 192

3. Three ships leave the harbour of Constanţa on the 1st of March 2013. The first one comes back after 27 days and sets sail again after another 3 days. The second one returns in 32 days and leaves the harbour again after 4 days. The third ship returns in 39 days and leaves again after 6 days. Which is the day when the departure of all the three boats from Constanta again is the closest?

    $a)$ 23.08.2013 $b)$ 25.07.2014 $c)$ 27.07.2013 $d)$ 27.08.2013