**9 task in math:**

1.i. List and explain the basic symbols of math.

1.ii. Explain the importance of the prime numbers. List the first 25 primes.

2.i. Write the main concepts of the Sets Theory.

2.ii. Give the examples of Modus ponens, Modus tollens and Syllogism.

3. Express the logical operations through the arithmetic and implications through AND, OR, NOT.

4. Tick the predicates.

 a. 1 + 1 = 2 b. A cat is black. c. A cat is white. d. 5 – 1 = 8 e. 7 + x = 6

5. Prove by induction that these predicates are true for all *n*.

 a. 1 + 2 + . . . + n = 0.5n(n+1) b. $\sum\_{i=1}^{n}\left(2i-1\right)=n^{2}$ c. $\sum\_{i=1}^{n}i^{3}=\frac{n^{2}(n+1)^{2}}{4}$

6.i. Explain the multiplication and the addition laws.

6.ii. How many up to 8-symbol passwords can be made using 10 digits (0-9) and 26 English letters (a-z)?

7.i. How many different products of pairs of numbers from 1, 3, 5, 7 are there?

7.ii. Compute the number of different quotinets of pairs of numbers from 1, 3, 5, 7.

8. List the main properties of combinations and permutations.

 Prove that C(n, r) = C(n, n-r); C(n, r) + C(n, r+1) = C(n+1, r+1); $\sum\_{i=0}^{n}C(n,i)=2^{n}$

9. Calculate the number of lines linking *n* points.

10. Expand. a. (a + b)2 = . . . b. (a + b)3 = . . . c. (a + b)4 = . . . d. (a + b)5 = . . . e. (a + b)-0.5 =

**Deadline: 19.11.2014**