**7 Math exercises:**

1. Define the prime numbers and explain their importance. List the first 19 primes.

2. Give the examples of the prepositional and predicate algebraic expressions.

3. Express the implications through AND, OR, NOT.

4. Give the examples of Modus ponens, Modus tollens and Syllogism.

5. 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

6. 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. $\sum\_{i=1}^{n}i^{3}=(\frac{n(n+1)}{2})^{2}$

7. Explain the main quantifiers.

8. Expand.

(a + b)-0.5 = . . .

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

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

11. List the main properties of combinations.

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

13. Explain the applications of the prime numbers in cryptography.

14. Prepare to the Mid-Term Exam better.

**Deadline: 7 November 2014**