Mathematical Foundations of Computer Science

Prerequisite knowledge

This is simply a list of questions that we expect you to be able to answer even before starting the course. If you are unable to answer them, please meet me or Hongling or Yaya

Problems.

1. What is $(x - y)^4$. What is $(a + b)(a - b)(b - c)$.

2. What is the symbol generally used to denote the empty set. What is meant by the complement of a set.

3. What is the set of letters in the word 'MISSISSIPPI'.

4. What are all the subsets of the three element set {red, green, blue}

5. Given the sets $A = \{1, 2, 3, 4\}$, B = $\{4, 5, 6\}$, C = $\{1, 7\}$, what are the values of $A \cap B$, $A \cup B$, $B \cup C$, $B \cap C$ and finally what is $A \cup B \cup C$.

6. What are the elements of the set $\{y \mid y$ is an even natural number between 1 and 9$\}$

7. What are the elements of the set $\{(x, y) \mid 1 \le x \le 10, \, y = x^2\}$

8. Simplify the following $\frac{17!}{4!3!}$

9. Simplify the following $\frac{(n+2)!}{(n-1)!}$

10. Prove the algebraic identity $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

11. What is an example of a rational number that is not an integer. What is an example of an irrational number.

12. Solve the quadratic equation $x^2 - 5x + 6 = 0$