TUTORIAL: NUMBERING SYSTEM AND SET

1) Change the following into decimal:
   a) 10101001
   b) 11000110
   c) 100101
   d) $24DF_{16}$
   e) $55A_{16}$
   f) 6543_8

2) Change the following into binary and hexadecimal numbers:
   a) 2345
   b) 34
   c) 12987
   d) 102

3) Given set A = {1, 2, 4, a, b, c}. Identify either it is True or False:
   a) $2 \in A$
   b) $3 \in A$
   c) $c \notin A$
   d) $\varnothing \in A$
   e) $\{\} \in A$
   f) $A \in A$

4) Given set A = {1, 2, 3, 4, 5}. Which set is equal with A?
   a) {4, 1, 2, 3, 5}
   b) {2, 3, 4}
   c) {1, 2, 3, 4, 5, 6}
   d) {x | x is an integer and $x^2 \leq 25$}
   e) {x | x is a positive integer and $x \leq 5$}

5) Given set A = {1, 2, 5, 8, 11}. Identify either it is True or False:
   a) $\{5, 1\} \subset A$
   b) $\{8, 1\} \in A$
   c) $\{1, 8, 2, 11, 5\} \not\subset A$
   d) $\varnothing \subset A$
   e) $\{1, 6\} \not\subset A$
   f) $\{2\} \subset A$
   g) $\{3\} \notin A$
   h) $A \subset \{11, 2, 5, 1, 8, 4\}$

6) Given sets A ={1}, B = {1, a, 2, b, c}, C = {b, c}, D = {a, b} and E = {1, a, 2, b, c, d}. For each question below, put the appropriate symbol to make the True statement.
   a) A __ B
   b) $\varnothing$ __ A
   c) B __ C
   d) C __ E
   e) D __ C
   f) B __ E

7) If sets U = {a, b, c, d, e, f, g, h, k}, A = {a, b, c, g}, B = {d, e, f, g}, C = {a, c, f} and D = {f, h, k}. List all the elements of the questions below. Then, find the cardinality.

a) $A \cup B$ b) $B \cup C$ c) $A \cup D$ d) $B \cup D$ e) $A \cap D$

f) $B \cap D$ g) $C \cap D$ h) $A \cap C$ i) $A - B$ j) $B - C$

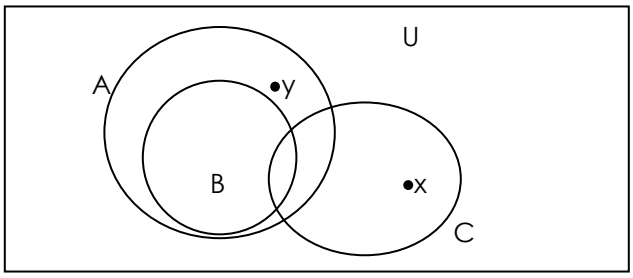
k) A' l) $A \oplus B$ m) $A \oplus C$ n) $C \oplus D$ o) $A \cup B \cup C$

p) $A \cap B \cap C$ q) $A \cap (B \cup C)$ r) $(A \cup B) \cap C$

s) $(A \cup B)'$ t) $(A \cap B)'$ u) $A \cup \varnothing$ v) $A \cup U$ w) $B \cup B$

x) $C \cap \varnothing$ y) $(C \cup D)'$ z) $(C \cap D)'$

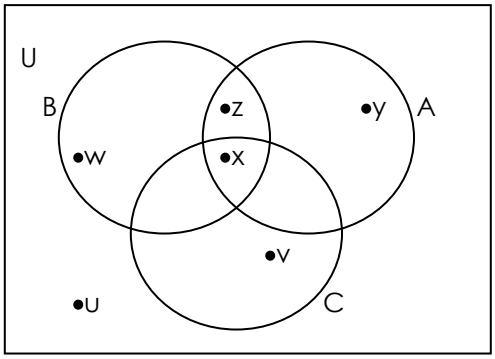
8) Identify either the statements below is True or False.



a) $A \subset B$ b) $B \subset A$ c) $C \subset B$

d) $x \in B$ e) $x \in A$ f) $y \in B$

9) Identify either the statements below is True or False.



a) $y \in A \cap B$ b) $x \in B \cup C$ c) $w \in B \cap C$

d) $u \notin C$ e) $x \in A \cap B \cap C$ f) $y \in A \cup B \cup C$

g) $z \in A \cap C$ h) $v \in B \cap C$

10) A questionnaire was sent to 600 students to gather information about their participant in co-curricular activities in their school. The result of it is as below:

315 students involved in school union

285 students involved in physical activities

300 students involved in minds development

165 students involved in both school union and physical activities

140 students involved in both school union and minds development

125 students involved in both physical activities and minds development

75 students not involved in any.

You are required to:

a) Find the number of students involved in all three co-curricular activities

b) Put all the information into Venn diagram

c) Find the number of students involved in one co-curricular activity only.

11) A questionnaire about 500 TV viewer was sent to get this information:

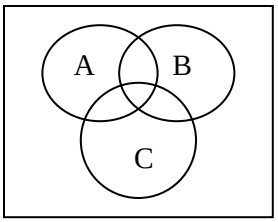
285 watch football(F) games, 195 watch hockey(H) games, 115 watch volleyball(V) games, 45 watch both F and H, 70 watch both F and V, 50 watch both H and V, while 50 do not watch any.

a) Find the number of viewer that watches all three games.

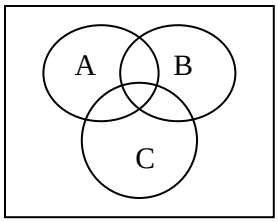
b) Put all the information into Venn diagram

c) Find the number of viewer that watches only one game.

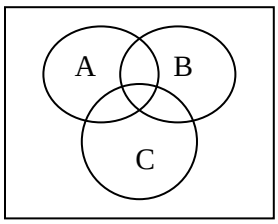
12) Sketch the respected region based on the notation given.



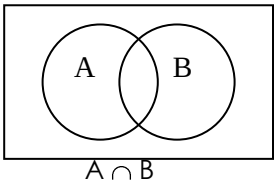
$(A \oplus B) \cup C$



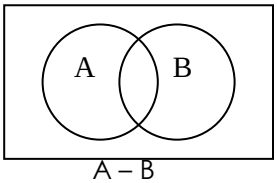
$A \cap B \cap C$



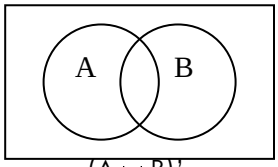
$A \cap (B \cup C)$



$A \cap B$



$A - B$



$(A \cup B)'$