

Sets and Venn Diagrams

Set Theory – Dr. Bashar Al-Shboul

The University of Jordan

- A set is a collection of objects. Two sets are equal if they contain the same elements.
 - Set A is a subset of set B if every element that is in set A is also in set B. The notation for this is $A \subset B$.
 - Set A is a proper subset of set B if every element that is in set A is also in set B and there is at least one element in set B that is not in set A. The notation for this is $A \subsetneq B$.
 - The union of A and B, which is written as $A \cup B$, is the set of all elements that belong either to set A or to set B (or that belong to both A and B).

- The intersection of A and B , which is written as $A \cap B$, is the set of all elements that belong to both to set A and set B .
 - If the intersection of two sets is empty (the empty set is denoted by \emptyset , then the sets are disjoint or mutually exclusive and we write $A \cap B = \emptyset$.
 - The complement of set A , which is written as A^c is the set of all elements that are in the universal set but are not in set A .

Use the following to answer the questions:

- $u = \{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \}$
- $A = \{ 1, 2, 5, 6, 9, 10 \}$
- $B = \{ 3, 4, 7, 8 \}$
- Draw:
 - a. A^c
 - b. $A \cup C$
 - c. $A \cap B$
 - d. $A^c \cap C$
 - e. $(B \cup C)^c$
 - f. $A \cap B \cap C$

Draw Venn Diagrams to represent: B^c , $B^c \cap A$, $(A \cup B)^c$, $A \cup (B \cap C)$

A group of 100 people are asked about their preference for soft drinks. The results are as follows: 55 Like Coke, 25 Like Diet Coke, 45 Like Pepsi, 15 like Coke and Diet Coke 5 Like all 3 soft drinks, 25 Like Coke and Pepsi, 5 Only like Diet Coke, display the results on a Venn Diagram.