

Definitions and Symbols

1. A **set** is a collection of objects. It can be specified by listing the objects in the set or by describing the objects in the set.
2. We write $a \in A$ to mean “a is an element of set A” and $a \notin A$ to mean “a is not an element of set A”
3. If each element of a set A is also an element of set B, then we say A is a **subset** of B and we write $A \subset B$.
4. The **union** of two sets A and B, designated by $A \cup B$, is the set of elements which are either in set A or in set B or in both sets A and B. It is a combination of all of the elements in sets A and B.
5. The **intersection** of two sets A and B, designated by $A \cap B$, is the set of elements that are in both A and B. It consists of the elements which are common to A and B.
6. The **empty set**, designated by \emptyset , is the set containing no elements.
7. The **universal set** U consists of all elements under consideration in a specific example.
8. The **complement** of a set A (relative to U), designated by A' , consists of all elements of U that are not in set A.

Exercises

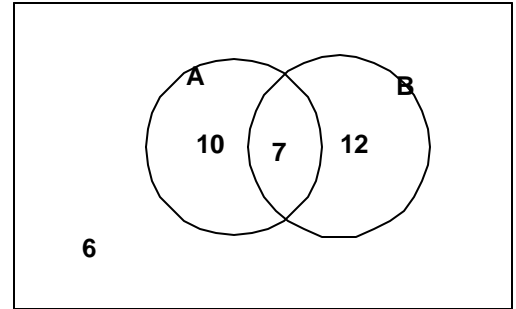
1. Let $U = \{\text{automobiles}\}$
 $R = \{\text{red automobiles}\}$
 $C = \{\text{automobiles with CD players}\}$
 - (a) In words, describe each of the following sets:

R'	C'
$R \cap C$	$R \cup C$
$R \cap C'$	$R \cup C'$

- (b) For each set in part (a), determine if a red car with no CD player is a member of that set.

2. Using the Venn Diagram shown, determine the number of elements in each set.

- (a) U
- (b) A
- (c) B
- (d) $A \cup B$
- (e) $A \cap B$
- (f) A'
- (g) $A' \cap B$
- (h) $A' \cup B$



3. In a group of 50 athletes, it was determined that 35 ran for exercise daily, 28 lifted weights daily, and 18 both ran and lifted weights daily. Fill out the Venn Diagram below using this information and then answer each of the following questions.

- (a) How many either ran or lifted weights daily?
- (b) How many did not either run or lift weights daily?
- (c) How many ran daily but did not lift weights daily?
- (d) How many did not lift weights daily?

