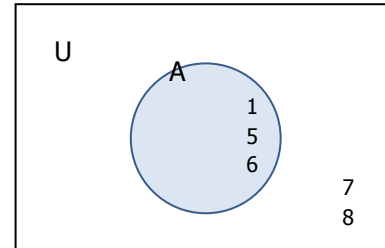


## 2.3 Notes: Venn Diagrams and Set Operations

A **Venn diagram** shows the relationship among sets. The **universal set**, symbolized by **U**, consists of **all** of the elements under discussion and is represented a region inside a rectangle. Subsets within the universal set are represented by circles.

Use the Venn diagram to determine each set.

- 1) U      2) A      3) not in A but are in U



The **complement** of a set A, symbolized by **A'**, is the set of all elements that are in the universal set that are **NOT** in A.

Use the Venn diagram FIGURE 2.11 to answer the following.

- 4) the set of elements in B but not A
- 5) the set of elements in U that are not in A
- 6) B'

The **intersection** of sets A and B, written **A**  $\cap$  **B**, is the set of elements that both sets have in common.

Find the following:

7)  $\{1,3,5,7,10\} \cap \{6,7,10,11\}$

8)  $\{1,2,3\} \cap \{4,5,6,7\}$

9)  $\{1,2,3\} \cap \emptyset$

The **union** of sets A and B, written  $\mathbf{A \cup B}$ , is the set of elements that are in A or B or both.

Find the following:

10)  $\{1,3,5,7,10\} \cup \{6,7,10,11\}$

11)  $\{1,2,3\} \cup \{4,5,6,7\}$

12)  $\{1,2,3\} \cup \emptyset$

13-16 Given  $U=\{a,b,c,d,e\}$   $A=\{b,c\}$   $B=\{b,c,e\}$

13)  $A \cup B'$

14)  $A' \cap B'$

15)  $(A \cap B)'$

16)  $(A \cup B)'$

17-22 Refer to the Venn diagram FIGURE 2.17:

17)  $A \cap B$

18)  $(A \cap B)'$

19)  $A \cup B$

20)  $(A \cup B)'$

21)  $A' \cup B$

22)  $A \cap B'$

23)  $U \cap B$

When describing collections in English, the word **or** refers to the **union** of the sets. The word **and** refers to the **intersection** of the sets.

Refer to the Venn diagram FIGURE 2.18

24) How many people speak Spanish **and** English?

25) How many people speak Spanish **or** English?

26) Set A contains 20 elements, set B contains 35 elements, and 10 elements are common to both sets A and B. How many elements are in  $A \cup B$  ?