# Test 1 Sample Questions

**Express the set using the roster method.**

1) the set of natural numbers less than or equal to 9 1) _____

A) {0, 1, 2, 3, . . . , 8} B) {1, 2, 3, . . . , 9}

C) {0, 1, 2, 3, . . . , 9} D) {1, 2, 3, . . . , 8}

**Determine if the set is the empty set.**

2) $\{x \mid x < 6 \text{ and } x > 10\}$ 2) _____

A) Yes, it is the empty set. B) No, it is not the empty set.

**Find the cardinal number for the set.**

3) {x | x is a day of the week that begins with the letter N} 3) _____

A) 2 B) 0 C) 1 D) 3

**Determine whether the set is finite or infinite.**

4) $\{x \mid x \in N \text{ and } x \leq 100\}$ 4) _____

A) Finite B) Infinite

**Are the sets equal?**

5) {7, 7, 12, 12, 15} = {7, 12, 15} 5) _____

A) Yes B) No

**Are the sets equivalent?**

6) A = {13, 14, 14, 15, 15, 15, 16, 16, 16, 16} 6) _____

B = {16, 15, 14, 13}

A) Yes B) No

**Determine whether the statement is true or false.**

7) $9 \in \{1, 3, 5, 7, 9\}$ 7) _____

A) True B) False

**Fill in the blank with either $\in$ or $\notin$ to make the statement true.**

8) Manitoba _____ the set of states in the United States 8) _____

A) $\notin$ B) $\in$

**List the elements in the set.**

9) The set of the days of the week 9) _____

A) {Friday, Monday, Saturday, Sunday, Thursday, Tuesday, Wednesday}

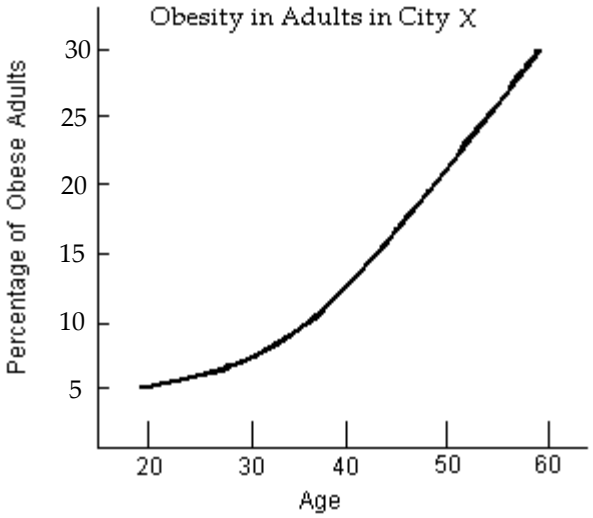
B) {Tuesday, Thursday}

C) {Saturday, Sunday}

D) {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Sunday}

**The line graph shows the percentage of obese adults in a certain city by age. Based on the information in the graph, represent the set using the roster method.**

10) 10) _____




{x | x is an age at which 20% of adults in city X are obese}

A) {60} B) {50} C) {40} D) {30}

**Provide an appropriate response.**

11) If set A is equivalent to the set of natural numbers, then $n(A) < \aleph_0$. 11) _____

A) True B) False

**List all the subsets of the given set.**

12) {Siamese, domestic shorthair} 12) _____

A) {Siamese}, {domestic shorthair}, { }

B) {Siamese, domestic shorthair}, {Siamese}, {domestic shorthair},

C) {Siamese, domestic shorthair}, {domestic shorthair}, { }

D) {Siamese, domestic shorthair}, {Siamese}, {domestic shorthair}, { }

**Calculate the number of subsets and the number of proper subsets for the set.**

13) the set of natural numbers less than 10 13) _____

A) 510; 511 B) 512; 511 C) 511; 510 D) 511; 512

**Use $\subseteq$, $\not\subseteq$, $\subset$, or both $\subset$ and $\subseteq$ to make a true statement.**

14) {x | x is a male who is registered with Selective Service} _____ {x | x is a male who is in the Army} 14) _____

A) $\subseteq$ B) $\subset$ C) $\not\subseteq$ D) $\subseteq$ and $\subset$

**Write $\subseteq$ or $\not\subseteq$ in the blank so that the resulting statement is true.**

15) {x | x is a tree} _____ {x | x is a birch tree} 15) _____

A) $\subseteq$ B) $\not\subseteq$

**Determine whether the statement is true or false.**

16) {Carol} $\subseteq$ {Bob, Carol, Ted, Alice} 16) _____

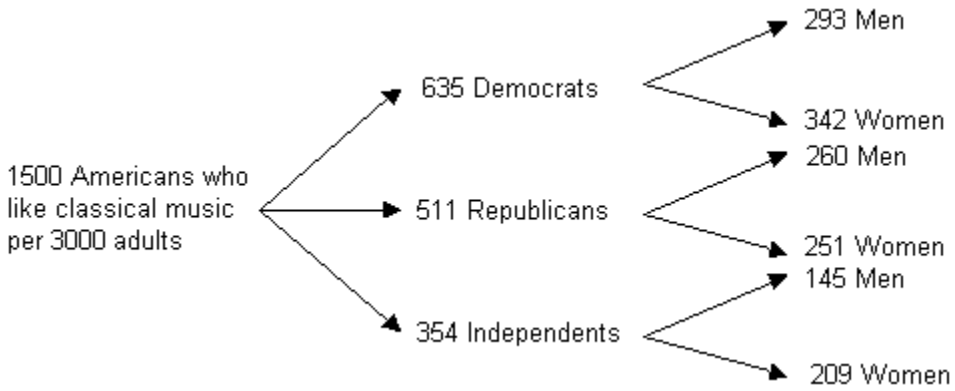
A) True B) False

**Use the formula for the number of subsets of a set with n elements to solve the problem.**

17) A village has 4 fire engines. If a radio dispatcher receives a call, depending on the nature of the situation, no engines, one engine, two engines, three engines, or all four engines can be sent to a fire. How many options does the dispatcher have for sending the fire engines to the scene of the caller? 17) _____

A) 15 B) 16 C) 8 D) 7

**Consider below the branching tree diagram based on the number per 3000 American adults.**




Let T = the set of Americans who like classical music
R = the set of Republicans who like classical music
D = the set of Democrats who like classical music
I = the set of Independents who like classical music

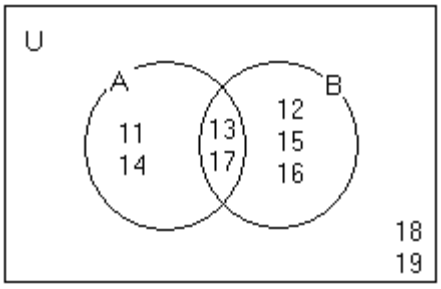
**Determine whether the statement is true or false.**

18) $D \in T$ 18) _____

A) True B) False

**Use the Venn diagram to list the elements of the set in roster form.**

19) 19) _____

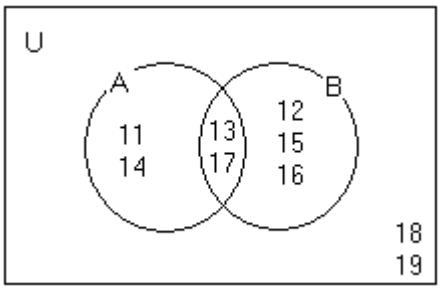



$(A \cap B)'$

A) {11, 12, 14, 15, 16, 18, 19} B) {13, 17}

C) {11, 12, 14, 15, 16} D) {18, 19}

20) 20) _____




$A' \cap B$

A) {11, 13, 14, 17, 18, 19}
B) {12, 15, 16, 18, 19}
C) {11, 14}
D) {12, 15, 16}

**Let U = {21, 22, 23, ..., 40}, A = {21, 22, 23, 24, 25}, B = {26, 27, 28, 29}, C = {21, 23, 25, 27, ..., 39}, and D = {22, 24, 26, 28, ..., 40}. Use the roster method to write the following set.**

21) A' 21) _____

A) A' = {26, 28, 30, . . . , 40}
B) A' = {21, 22, 23, . . . , 40}
C) A' = {26, 27, 28, . . . , 40}
D) A' = {27, 29, 31, . . . , 39}

**Let U = {q, r, s, t, u, v, w, x, y, z}**
**A = {q, s, u, w, y}**
**B = {q, s, y, z}**
**C = {v, w, x, y, z}. List the elements in the set.**

22) $A \cap B'$ 22) _____

A) {q, s, t, u, v, w, x, y}
B) {u, w}
C) {t, v, x}
D) {r, s, t, u, v, w, x, z}

23) $A \cap B$ 23) _____

A) {q, s, y}
B) {v, w, x, y, z}
C) {q, s, u, w, y, z}
D) {r, t, u, v, w, x, z}

24) $(A \cup B)'$ 24) _____

A) {r, t, v, x}
B) {t, v, x}
C) {s, u, w}
D) {r, s, t, u, v, w, x, z}

25) $A' \cup B$ 25) _____

A) {q, s, t, u, v, w, x, y}
B) {q, r, s, t, v, x, y, z}
C) {r, s, t, u, v, w, x, z}
D) {s, u, w}

26) $A \cap B$ 26) _____

A) {q, s, y}
B) {v, w, x, y, z}
C) {r, t, u, v, w, x, z}
D) {q, s, u, w, y, z}

27) $B \cup U$ 27) _____

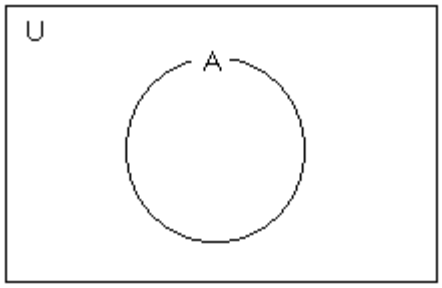
A) {v, w, x, y, z}
B) {q, s, u, w, y}
C) {q, s, y, z}
D) {q, r, s, t, u, v, w, x, y, z}

28) A' 28) _____

A) {q, r, s, t, u, v, w, x, y, z}
B) {s, u, w, y}
C) {r, t, v, x, z}
D) {q, s, y, z}

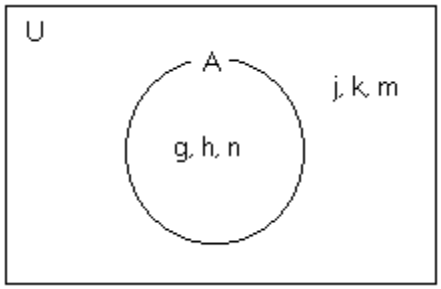
**Place the various elements in the proper regions of the Venn diagram.**

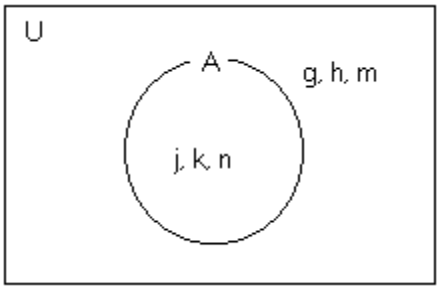
29) Let U = {g, h, j, k, m, n} and A = {g, h, n}. Find A'. Then use a Venn diagram to illustrate the relationship among the sets U, A, and A'. 29) _____




A) A' = {j, k, m}

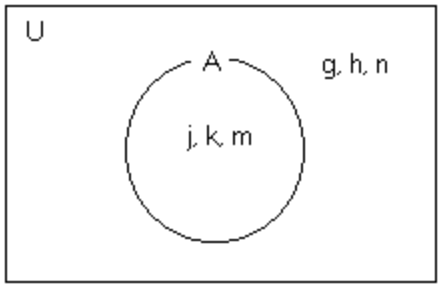
B) A' = {g, h, m}

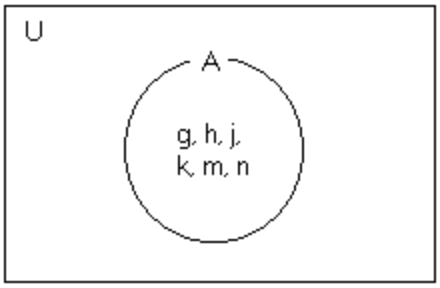



C) A' = {g, h, n}

D) A' = ∅




**Provide an appropriate response.**

30) The word _____ refers to the union of sets; the word _____ refers to the intersection of sets. 30) _____

A) and; or
B) universal; common
C) or; and
D) common; universal

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

**Describe a universal set U that includes all elements in the given sets. Answers may vary.**

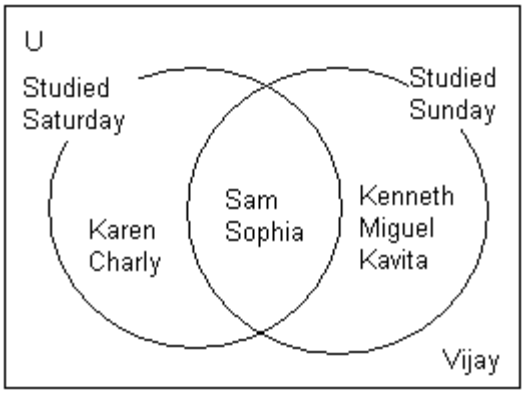
31) A = {fruit juice, coffee} 31) _____
B = {tea, spring water}

**Use the formula for the cardinal number of the union of two sets to solve the problem.**

32) Set A contains 9 letters and 9 numbers. Set B contains 12 letters and 9 numbers. Three letters and 2 numbers are common to both sets A and B. Find the number of elements in set A or set B. 32) _____

A) 39 B) 23 C) 44 D) 34

**Use the Venn diagram to list the elements of the set in roster form.**




33) The set of students who studied neither Saturday nor Sunday 33) _____

A) {Vijay} B) {U, Vijay}

C) {Vijay, Karen, Charly} D) {}

34) The set of students who studied Saturday and not Sunday 34) _____

A) {Kenneth, Miguel, Kavita} B) {Karen, Charly, Vijay}

C) {Sam, Sophia} D) {Karen, Charly}

**Let U = {q, r, s, t, u, v, w, x, y, z}**

**A = {q, s, u, w, y}**

**B = {q, s, y, z}**

**C = {v, w, x, y, z}. List the elements in the set.**

35) $A \cap (B \cup C)$ 35) _____

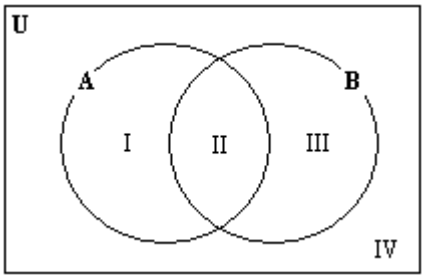
A) {q, s, w, y} B) {q, s, u, w, y, z} C) {q, r, w, y, z} D) {q, y, z}

36) $A \cup (B \cap C)$ 36) _____

A) {q, r, w, y, z} B) {q, w, y} C) {q, y, z} D) {q, s, u, w, y, z}

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

**Use the Venn diagram shown below to solve the problem.**




37) a) Which regions are represented by $A \cap B'$? 37) _____
b) Which regions are represented by $(A' \cup B)'$?
c) Based on parts a) and b), what can you conclude about the relationship between $A \cap B'$ and $(A' \cup B)'$?

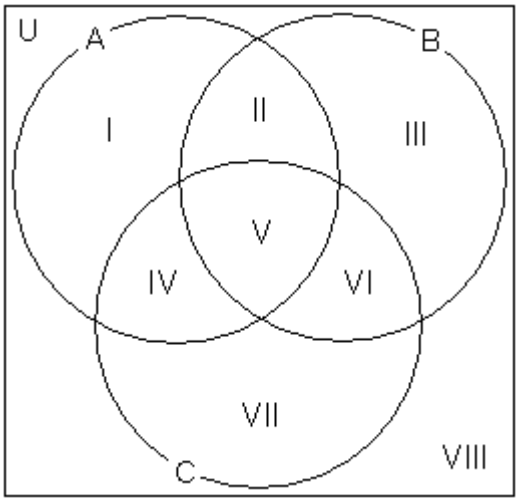
38) a) Which regions are represented by $(A' \cup B)'$? 38) _____
b) Which regions are represented by $A' \cap B$?
c) Based on parts a) and b), what can you conclude about the relationship between $(A' \cup B)'$ and $A' \cap B$?

**The chart shows the most common causes of death in certain areas of the United States.**

**Most Common Causes of Death in U.S.**

| Region A | Region B | Region C |
|---|---|---|
| 1. heart disease | 1. heart disease | 1. heart disease |
| 2. cerebrovascular | 2. cerebrovascular | 2. cerebrovascular |
| 3. COPD | 3. COPD | 3. COPD |
| 4. pneumonia | 4. accidents | 4. accidents |
| 5. accidents | 5. pneumonia | 5. liver disease |

**Use the Venn diagram to indicate in which region each cause should be placed.**




39) heart disease 39) _____

A) IV B) V C) VI D) II

**Use the following information to construct a Venn Diagram that illustrates the given sets.**

40) U = the set of members of the bookclub shown in the chart 40) _____

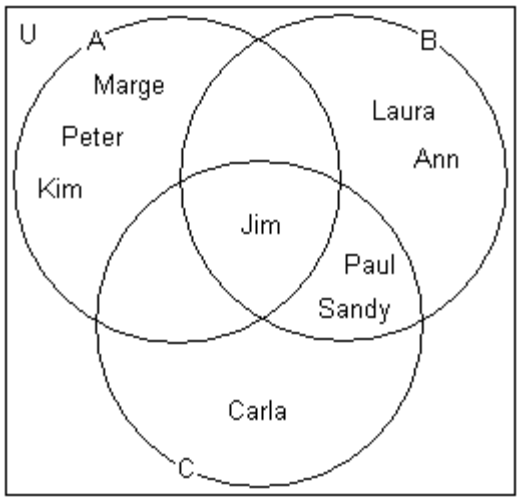
A = the set of members of the bookclub who read at least 25 books

B = the set of members of the bookclub who suggested 5 or less books

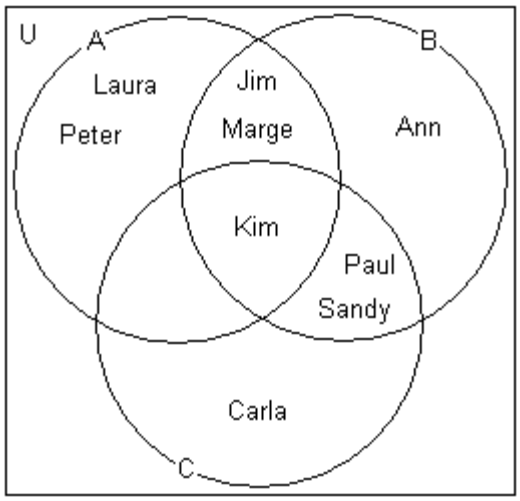
C = the set of members of the bookclub who have been members for less than 7 years

| Members of the bookclub | Numbers of books read | Numbers of books suggested | Years of membership |
|---|---|---|---|
| Carla | 24 | 7 | 6 |
| Marge | 25 | 4 | 7 |
| Sandy | 5 | 1 | 5 |
| Laura | 43 | 15 | 9 |
| Kim | 42 | 11 | 9 |
| Peter | 32 | 9 | 8 |
| Jim | 39 | 4 | 7 |
| Ann | 24 | 1 | 7 |
| Paul | 17 | 4 | 5 |

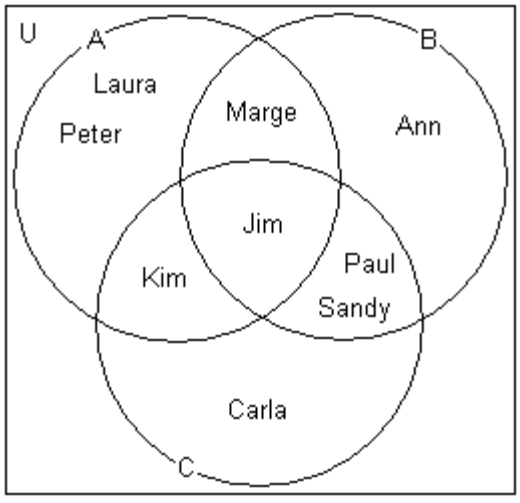
A)


U
A
B
Marge
Peter
Kim
Laura
Ann
Jim
Paul
Sandy
Carla
C

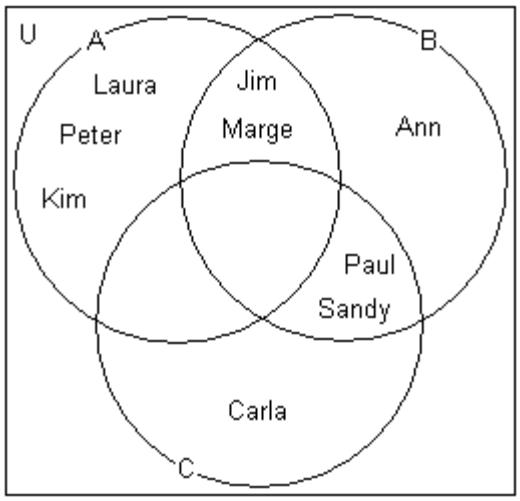
B)


U
A
B
Laura
Peter
Jim
Marge
Ann
Kim
Paul
Sandy
Carla
C

C)

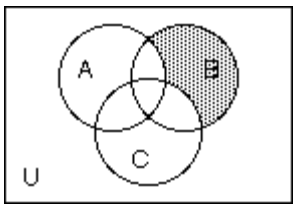

U
A
B
Laura
Peter
Marge
Ann
Jim
Kim
Paul
Sandy
Carla
C

D)




**Use set notation to identify the shaded region.**

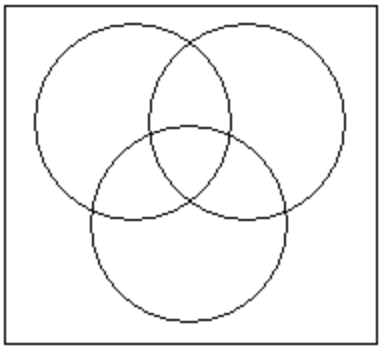
41) 41) _____



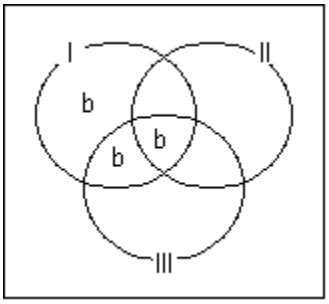

A) B' ∩ (A ∪ B) B) A ∩ B ∩ C C) A' ∩ C' ∩ B D) B ∩ (A ∩ C)'

**A pollster conducting a telephone poll asked three questions:**
**1. Are you religious?**
**2. Have you spent time with a person convicted of a crime?**
**3. Are you in favor of the death penalty?**
**Solve the problem.**

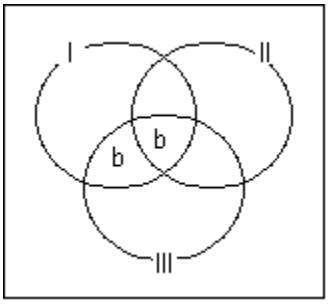
42) Write the letter b in every region of the diagram that represents all religious persons polled who are not in favored of death penalty. 42) _____



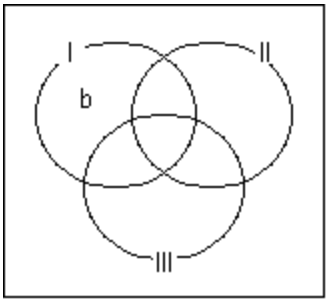
A)



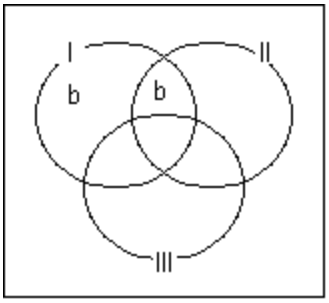

B)




C)

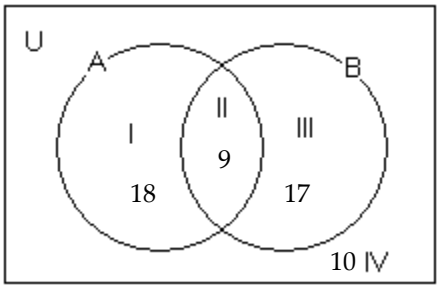



D)



**Use the accompanying Venn diagram that shows the number of elements in regions I through IV to answer the question.**

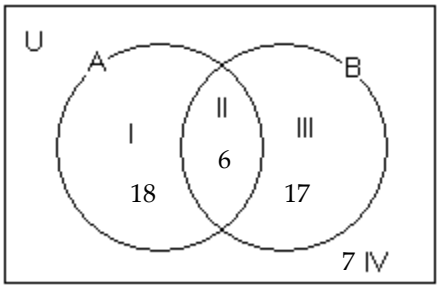
43) 43) _____




How many elements belong to set A or set B?

A) 54 B) 35 C) 44 D) 9

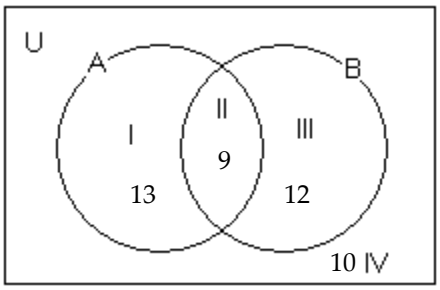
44) 44) _____




How many elements belong to set B?

A) 35 B) 23 C) 17 D) 24

45) 45) _____




How many elements belong to set A but not set B?

A) 9 B) 12 C) 10 D) 13