Thinking Mathematically 6th Edition Blitzer Test Bank
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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write a word description of the set.

1) {January, February, March, April, May, June, July, August, September, October, November, December}
A) days of the week B) months of the year C) seasons of the year D) days of the year

Answer: B

2) {26, 28, 30, 32, ..., 100}
A) even numbers from 26 to 100 B) odd numbers from 26 to 100
C) all even numbers D) numbers from 26 to 100

Answer: A

List the elements in the set.

3) The set of the days of the week
A) {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Sunday}
B) {Tuesday, Thursday}
C) {Saturday, Sunday}
D) {Friday, Monday, Saturday, Sunday, Thursday, Tuesday, Wednesday}

Answer: D

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

Express the set using the roster method.

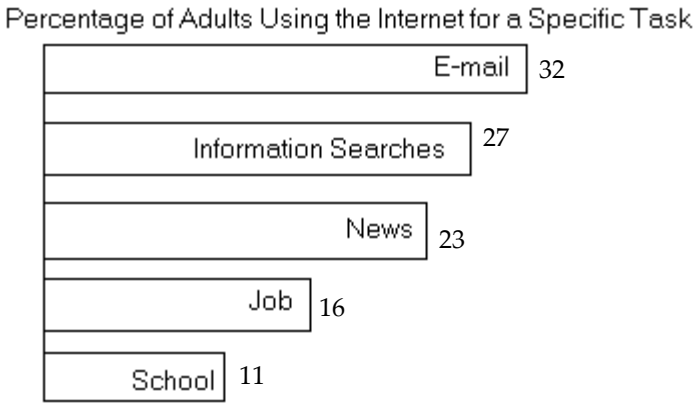
4) {x | x is a city in the country where you live}

Answer: Answers may vary. Possible answers are:
{Chicago}, {Los Angeles}, {New York City}, and {Springfield}

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The bar graph shows the percentage of adults that use the Internet for specific tasks. Use the graph to represent the given set using the roster method.

5)



the set of tasks in which usage exceeds 21%
A) {e–mail, information searches, news, job} B) {job, school}
C) {e–mail, information searches, news} D) {e–mail, information searches}

Answer: C

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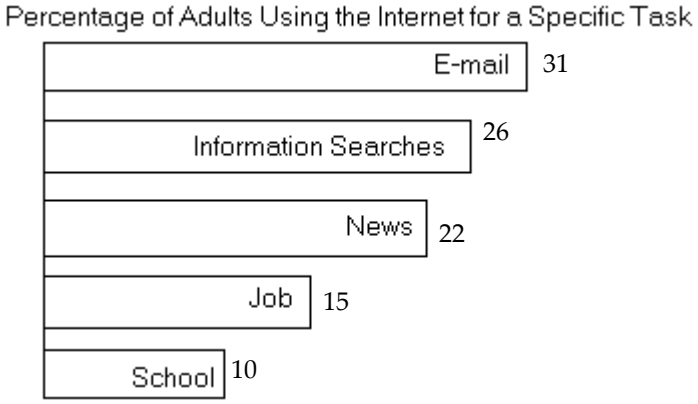
6)



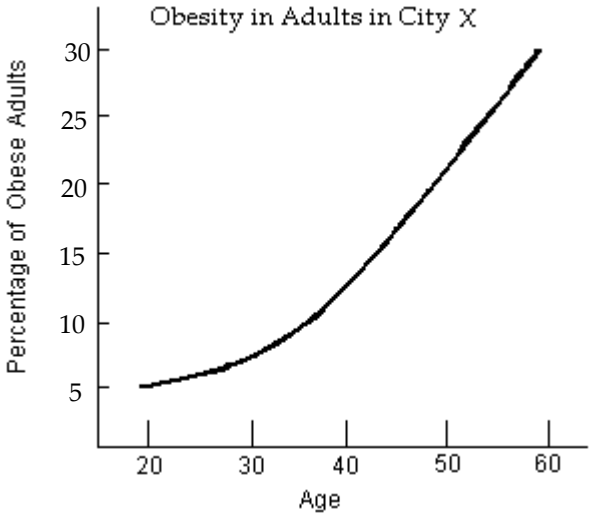
{x | x is a task in which usage lies between 12% and 30%}

A) {information searches, news, job}
B) {news}
C) {email, information searches, news, job, school}
D) {news, job}

Answer: A

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.

7)



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

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

Answer: C

Determine if the set is the empty set.

8) {0, ∅}

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

Answer: B

9) {x|x is a living U.S. president born after 1700}

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

Answer: B

10) {x | x is the number of living U.S presidents born before 1700}

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

Answer: B

11) {x | x is a day of the week whose name begins with the letter Y}

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

Answer: A

12) {x | $x < 6$ and $x > 10$}

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

Answer: A

13) {x | $x \in N$ and $8 < x < 12$}

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

Answer: B

14) {x | x is a number less than 8 or greater than 12}

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

Answer: B

Determine whether the statement is true or false.

15) $9 \in \{1, 3, 5, 7, 9\}$

A) True B) False

Answer: A

16) $12 \in \{1, 2, 3, ..., 15\}$

A) True B) False

Answer: A

17) $15 \in \{2, 4, 6, ..., 20\}$

A) True B) False

Answer: B

18) $17 \notin \{1, 2, 3, ..., 10\}$

A) True B) False

Answer: A

19) $7 \notin \{1, 2, 3, ..., 40\}$

A) True B) False

Answer: B

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

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

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

Answer: B

21) 49,872 _____ the set of even natural numbers

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

Answer: B

22) 0 _____ ∅

A) ∉ B) ∈

Answer: A

Express the set using the roster method.

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

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

Answer: C

24) the set of odd natural numbers less than 21

A) {1, 3, 5, . . . , 21} B) {0, 1, 3, 5, . . . , 19} C) {2, 4, 6, . . . , 20} D) {1, 3, 5, . . . , 19}

Answer: D

25) {x | x ∈ N and x is greater than 13}

A) {14,15,16,...} B) {14,16,18,...} C) {14,15,16} D) {13,14,15,...}

Answer: A

26) {x | x ∈ N and x lies between 0 and 4}

A) {1, 2, 3, 4} B) {0, 1, 2, 3, 4} C) {0, 1, 2, 3} D) {1, 2, 3}

Answer: D

Express the set using set–builder notation. Use inequality notation to express the condition x must meet in order to be a member of the set.

27) A = {6, 7, 8, 9, 10,...}

A) {x | x ∈ N and x ≤ 6} B) {x | x ∈ N and x ≥ 6}

C) {x | x ∈ N and x ≥ 10} D) {x | x ∈ N and x > 6}

Answer: B

28) A = {200, 201, 202, . . ., 2000}

A) {x | x ∈ N and x ≥ 200 } B) {x | 200 < x < 2000}

C) {x | x ∈ N and x ≤ 2000} D) {x | x ∈ N and 200 ≤ x ≤ 2000}

Answer: D

Find the cardinal number for the set.

29) {27, 29, 31, 33, 35}

A) 4 B) 27 C) 5 D) 6

Answer: C

30) {8, 10, 12, . . . , 66}

A) 60 B) 20 C) 15 D) 30

Answer: D

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

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

Answer: C

32) Determine the cardinal number of the set {x | x is a letter of the alphabet}

A) 30 B) 26 C) 23 D) 25

Answer: B

Are the sets equivalent?

33) A is the set of residents age 68 or older living in the United States
B is the set of residents age 68 or older registered to vote in the United States
A) Yes B) No

Answer: B

34) A = {7, 8, 9, 10, 11}
B = {6, 7, 8, 9, 10}
A) Yes B) No

Answer: A

35) A = {11, 13, 15, 17, 19}
B = {12, 14, 16, 18, 20}
A) Yes B) No

Answer: A

36) A = {13, 14, 14, 15, 15, 15, 16, 16, 16, 16}
B = {16, 15, 14, 13}
A) Yes B) No

Answer: B

37) A = {Larry, Moe, Curly. Shemp}
B = {Posh, Sporty, Baby, Scary}
A) Yes B) No

Answer: A

Determine whether the set is finite or infinite.

38) $\{x \mid x \in N \text{ and } x \geq 1000\}$
A) Finite B) Infinite

Answer: B

39) $\{x \mid x \in N \text{ and } x \leq 100\}$
A) Finite B) Infinite

Answer: A

40) The set of natural numbers less than 100
A) Finite B) Infinite

Answer: A

41) The set of natural numbers less than 1
A) Finite B) Infinite

Answer: A

Are the sets equal?

42) {p, q, r, s} = {q, s, r, p}
A) Yes B) No

Answer: A

43) {28, 30, 32, 34, 36} = {30, 32, 34, 36}
A) Yes B) No
Answer: B

44) {7, 7, 12, 12, 15} = {7, 12, 15}
A) Yes B) No
Answer: A

45) A is the set of residents age 27 or older living in the United States
B is the set of residents age 27 or older registered to vote in the United States
A) Yes B) No
Answer: B

46) A = {9, 10, 11, 12, 13}
B = {8, 9, 10, 11, 12}
A) Yes B) No
Answer: B

47) A = {27, 29, 31, 33, 35}
B = {28, 30, 32, 34, 36}
A) Yes B) No
Answer: B

48) A = {16, 17, 17, 18, 18, 18, 19, 19, 19, 19}
B = {19, 18, 17, 16}
A) Yes B) No
Answer: A

Write ⊆ or ⊈ in the blank so that the resulting statement is true.

49) {6, 8, 10} __ {5, 6, 7, 8, 10}
A) ⊆ B) ⊈
Answer: A

50) {14, 27, 32} __ {19, 27, 32, 42}
A) ⊆ B) ⊈
Answer: B

51) {red, blue, green} _____ {blue, green, yellow, black}
A) ⊆ B) ⊈
Answer: B

52) {x | x is a tree} _____ {x | x is a birch tree}
A) ⊆ B) ⊈
Answer: B

53) {c, a, n, d, i, d, a, t, e} _____ {a, c, d, e, i, t, a, n, d}
A) ⊆ B) ⊈
Answer: A

54) $\left\{\frac{9}{11}, \frac{5}{7}\right\}$ ——— $\left\{\frac{11}{9}, \frac{7}{5}\right\}$

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

Answer: B

Determine whether the statement is true or false.

55) Ted $\subseteq$ {Bob, Carol, Ted, Alice}

A) True B) False

Answer: B

56) {Carol} $\subseteq$ {Bob, Carol, Ted, Alice}

A) True B) False

Answer: A

57) $\varnothing \subseteq$ {France, Germany, Switzerland}

A) True B) False

Answer: A

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

58) {a, b} __ {z, a, y, b, x, c}

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

Answer: D

59) {4, 5, 6} __ {4, 5, 6}

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

Answer: C

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

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

Answer: C

List all the subsets of the given set.

61) {Siamese, domestic shorthair}

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

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

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

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

Answer: A

62) {11}

A) { } B) {0}, {11}, { } C) {11}, { } D) {11}

Answer: C

63) $\varnothing$

A) { }, {0} B) no subsets C) $\varnothing$ D) {$\varnothing$}

Answer: C

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

64) $\left\{\frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}\right\}$

A) 14; 15 B) 15; 14 C) 15; 16 D) 16; 15

Answer: D

65) {1, 3, 5, 7, 9, 11}

A) 63; 62 B) 63; 64 C) 62; 63 D) 64; 63

Answer: D

66) the set of natural numbers less than 10

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

Answer: B

67) the set of words describing the colors on a stoplight

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

Answer: B

68) {x | x is a day of the week}

A) 128; 127 B) 127; 126 C) 64; 65 D) 128; 129

Answer: A

Provide an appropriate response.

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

A) True B) False

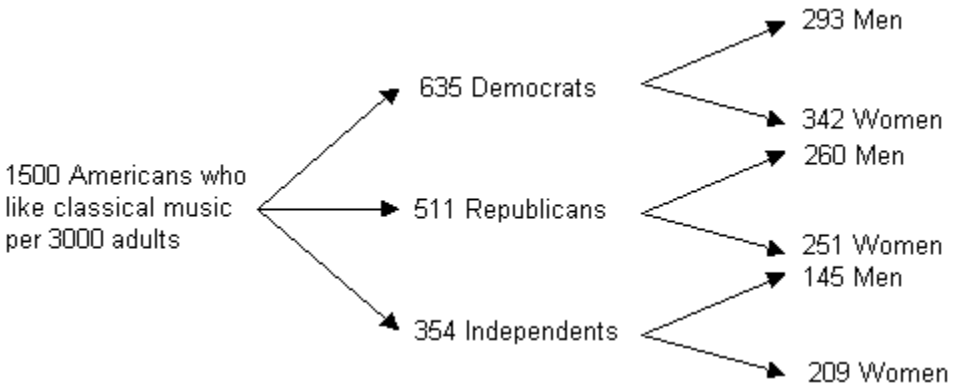
Answer: B

70) If set A is equivalent to the set of odd natural numbers, then $n(A) = \aleph_0$.

A) True B) False

Answer: A

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.

71) $D \in T$
A) True B) False
Answer: B

72) $I \subset T$
A) True B) False
Answer: A

73) Let M = the set of Republican men who like classical music
W = the set of Republican women who like classical music
$M \subset T$
A) True B) False
Answer: A

74) Let M = the set of Republican men who like classical music
W = the set of Republican women who like classical music
If $x \in R$, then $x \in M$.
A) True B) False
Answer: B

75) Let M = the set of Independent men who like classical music
W = the set of Independent women who like classical music
If $x \in W$, then $x \in I$.
A) True B) False
Answer: A

76) If $x \in D$, then $x \notin R$.
A) True B) False
Answer: A

77) Let M = the set of Republican men who like classical music
W = the set of Republican women who like classical music
The set of elements in M and W combined is equivalent to set R.
A) True B) False
Answer: A

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

78) Pasta comes with tomato sauce and can be ordered with some, all, or none of these ingredients in the sauce: {onions, garlic, carrots, broccoli, shrimp, mushrooms, zucchini, green pepper}. How many different variations are available for ordering pasta with tomato sauce?
A) 128 B) 256 C) 255 D) 127
Answer: B

79) 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?
A) 8 B) 7 C) 16 D) 15
Answer: C

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.

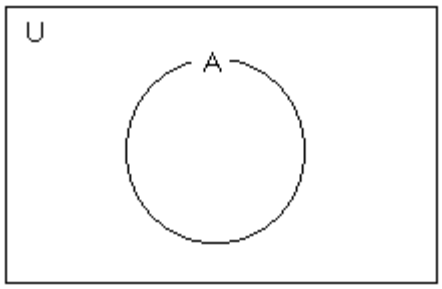
80) A = {Copeland, Gershwin, Bernstein}
B = {Strauss, Mendlssohn}
Answer: Answers may vary. One possible answer is: U = the set of all famous composers.

81) A = {fruit juice, coffee}
B = {tea, spring water}
Answer: Answers may vary. One possible answer is: U = the set of all non–carbonated beverages.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

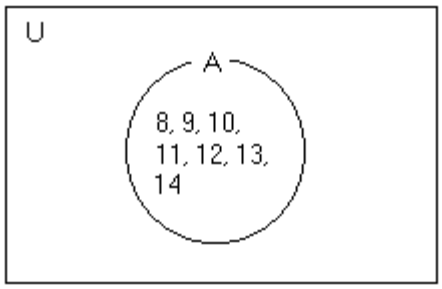
Place the various elements in the proper regions of the Venn diagram.

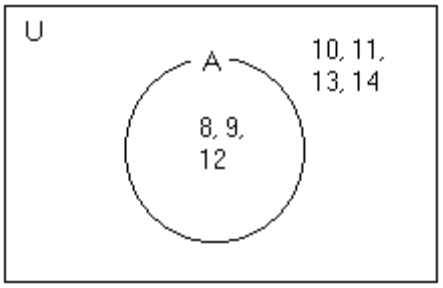
82) Let U = {8, 9, 10, 11, 12, 13, 14} and A = {8, 9, 12}. Find A' and place the elements in the proper region.



A) A' = {8, 9, 10, 11, 12, 13, 14}

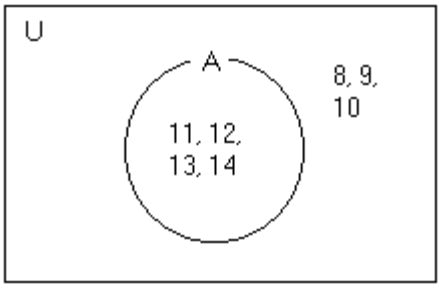
B) A' = {10, 11, 13, 14}

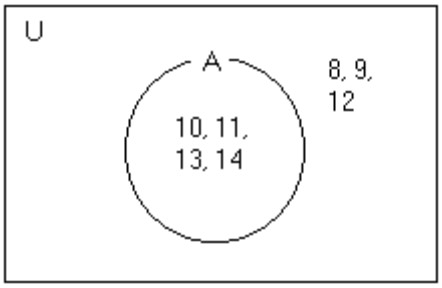




C) A' = {11, 12, 13, 14}

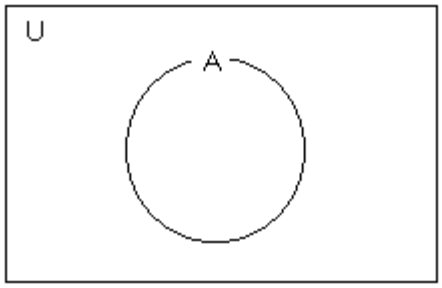
D) A' = {8, 9, 12}





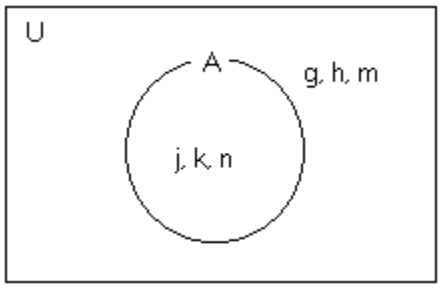
Answer: B

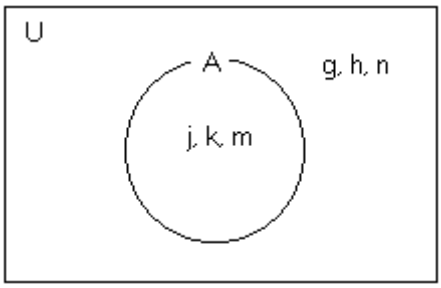
83) Let U = {g, h, j, k, m, n} and A = {g, h, n}. Find A'. Then use a Venn diagram to illustrate the relationship among the sets U, A, and A'.



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

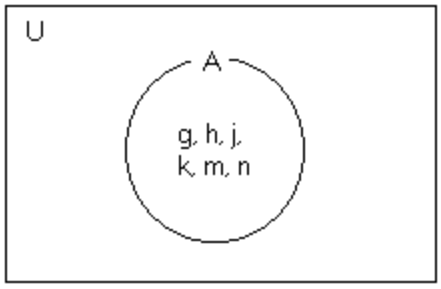
B) A' = {g, h, n}

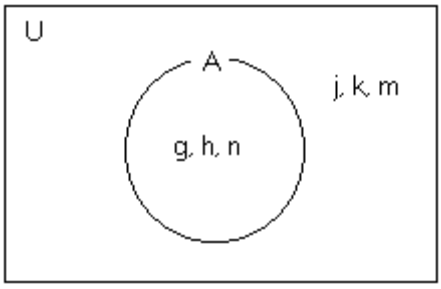




C) A' = ∅

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

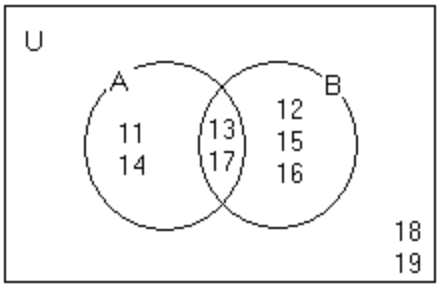




Answer: D

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

84) List the elements of A.



A) {11, 13, 14, 17}

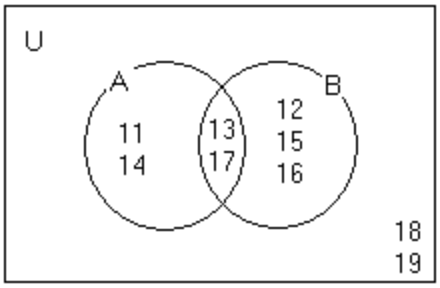
B) {11, 12, 13}

C) {12, 15, 16}

D) {13, 17}

Answer: A

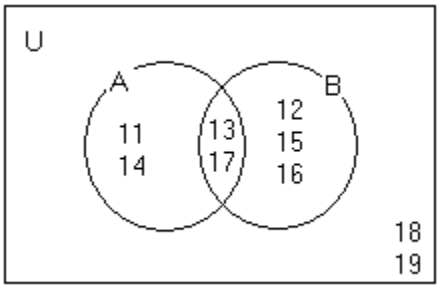
85) List the elements of B.



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

Answer: C

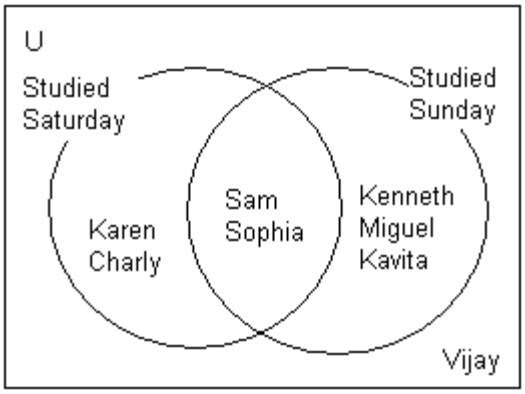
86) List the elements of U.



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

Answer: C

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



87) The set of students who studied Saturday

A) {Karen, Charly, Vijay} B) {Karen, Charly}
C) {Sam, Sophia} D) {Karen, Charly, Sam, Sophia}

Answer: D

88) The set of students who studied Saturday and Sunday

A) {Sam, Sophia, Vijay}
B) {Karen, Charly, Kenneth, Miguel, Kavita}
C) {Sam, Sophia}
D) {Karen, Charly, Kenneth, Miguel, Kavita, Sam, Sophia}

Answer: C

89) The set of students who studied Saturday and not Sunday

A) {Karen, Charly, Vijay}
B) {Karen, Charly}
C) {Kenneth, Miguel, Kavita}
D) {Sam, Sophia}

Answer: B

90) The set of students who studied neither Saturday nor Sunday

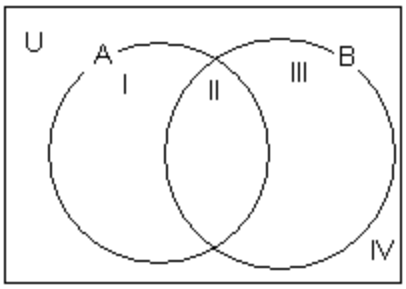
A) {}
B) {U, Vijay}
C) {Vijay, Karen, Charly}
D) {Vijay}

Answer: D

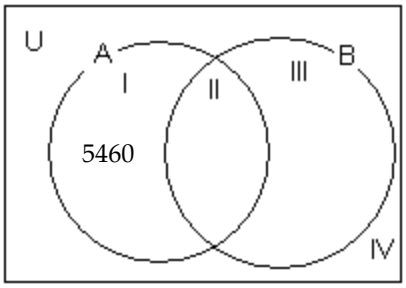
Use the following definition to place the indicated natural number in the correct region of the Venn diagram.

A palindromic number is a natural number whose value does not change if its digits are reversed.
U = the set of natural numbers
A = the set of palindromic numbers
B = the set of odd numbers

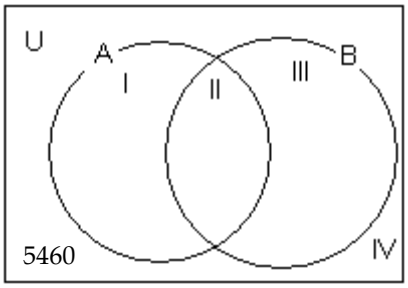
91) 5460



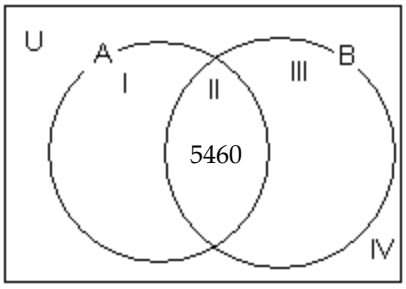
A)



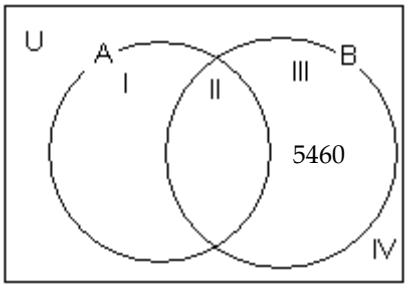
B)



C)

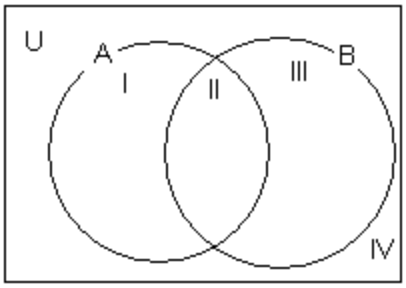


D)

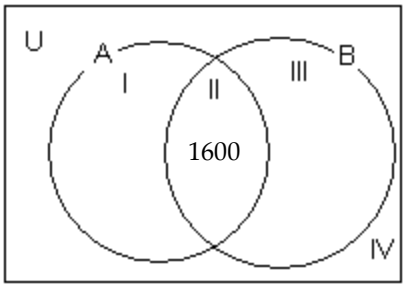


Answer: B

92) 1600



A)



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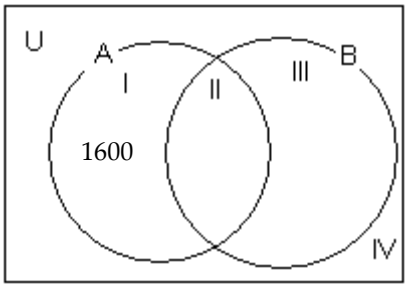
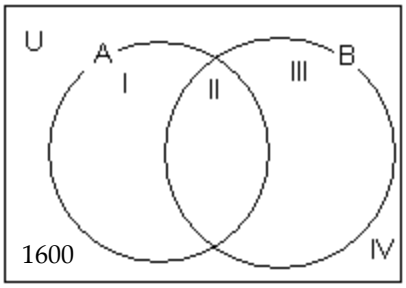
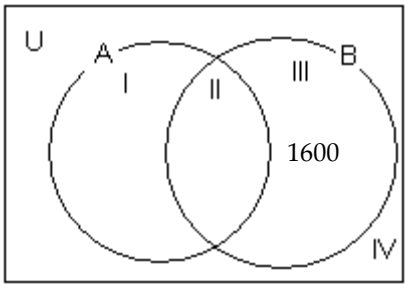


C)

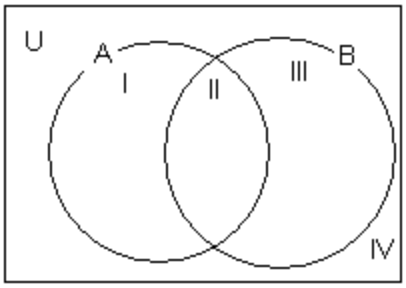


D)

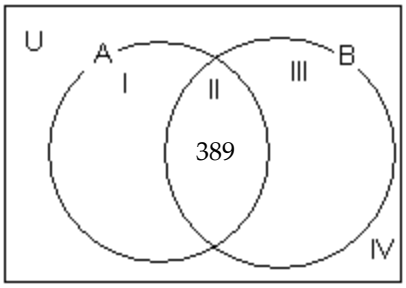


Answer: C

93) 389



A)



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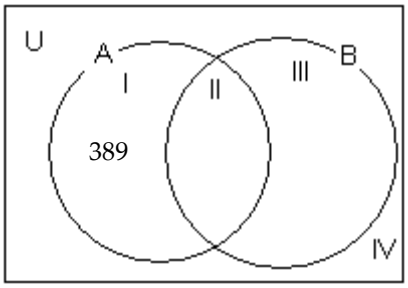

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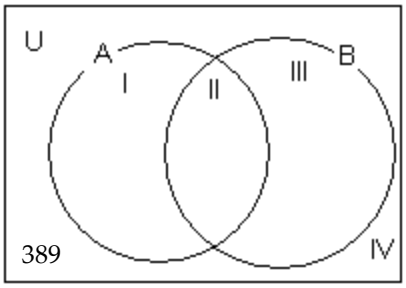
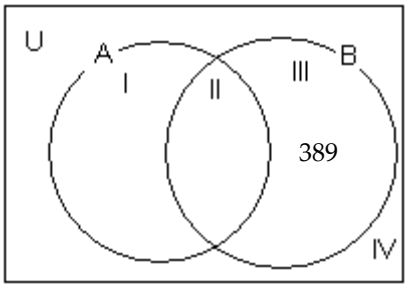
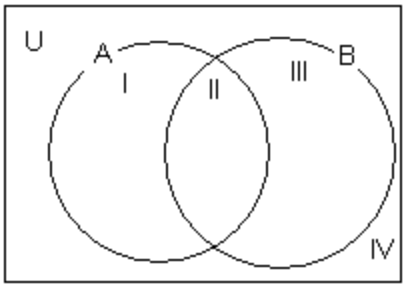


D)

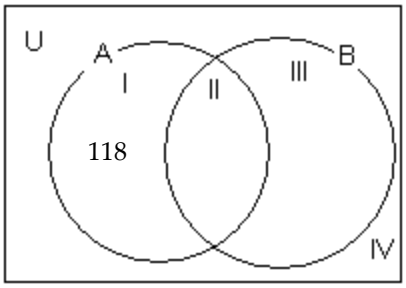


Answer: D

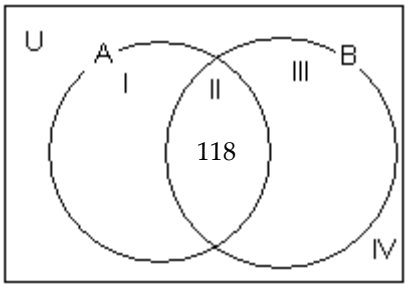
94) 118



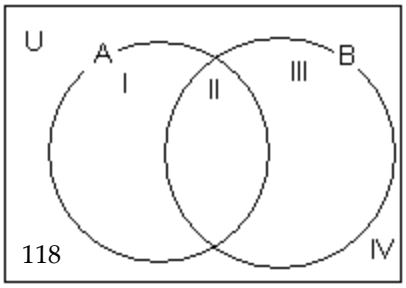
A)



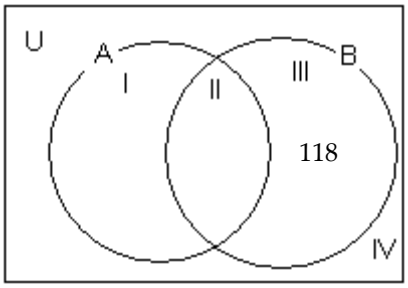
B)



C)



D)



Answer: C

Let U = {1, 2, 4, 5, a, b, c, d, e}. Use the roster method to write the complement of the set.

95) Q = {2, 4, b, d}

A) {1, 3, 5, a, c, e}
B) {1, 5, a, e}
C) {1, 2, 4, 5, a, b, c, d, e}
D) {1, 5, a, c, e}

Answer: D

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.

96) A'

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

Answer: D

Let U = {21, 22, 23, 24, ...}, A = {21, 22, 23, 24, ..., 40}, B = {21, 22, 23, 24, ..., 50}, C = {22, 24, 26, 28, ...}, and D = {21, 23, 25, 27, ...}. Use the roster method to write the following set.

97) C'

A) C' = {21, 22, 23, 24, ...}
B) C' = {22, 24, 26, 28, ...}
C) C' = {21, 23, 25, 27, ..., 39}
D) C' = {21, 23, 25, 27, ...}

Answer: D

Solve the problem.

98) If the universal set is the set of the days of the week and set A is the set of days that begin with the letter T, write A' using the roster method. Describe A' in words.

A) A' = {Tuesday, Thursday}; A' is the days of the week that begin with the letter T.

B) A' = {Sunday, Monday, Friday, Saturday}; A' is the days of the week that do not begin with the letter T.

C) A' = {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}; A' is the days of the week that do not begin with the letter T.

D) A' = {Sunday, Monday, Wednesday, Friday, Saturday}; A' is the days of the week that do not begin with the letter T.

Answer: D

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.

99) A ∩ B'

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

Answer: A

100) (A ∩ B)'

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

Answer: A

101) C' ∩ A'

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

Answer: C

102) A ∩ B

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

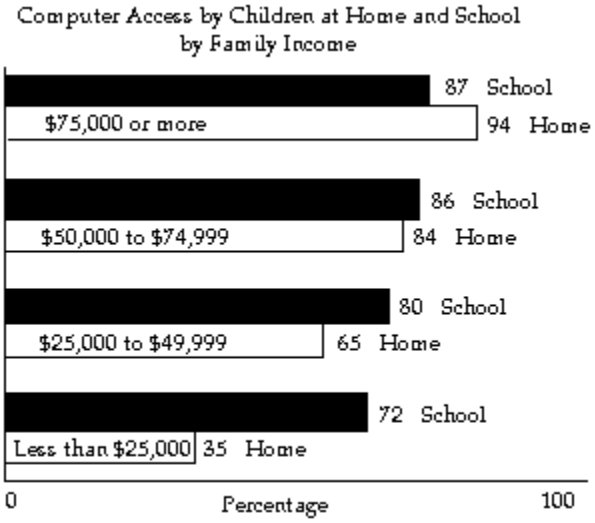
Answer: B

103) (A ∩ C)'

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

Answer: A

Many children do not have access to computers at home. School has an equalizing effect. Family income is a strong factor in access. Use the information in the graph to write the set in the exercise in roster form or express the set as ∅.



104) {x | x is home access by more than 34% of the students} ∩ {x | x is school access by less than 73% of the students}
A) {$75,000 or more}
B) {$50,000 to $74,999}
C) {$25,000 to $49,999}
D) {Less than $25,000}

Answer: D

105) the set of home access by more than 80% of the students and school access by less than 70% of the students}
A) {$50,000 to $74,999}
B) {$50,000 to $74,999, $75,000 or more}
C) {Less than $25,000}
D) ∅

Answer: D

Solve the problem.

106) Let U = the set of the days of the week, A = {Monday, Tuesday, Wednesday, Thursday, Friday} and B = {Friday, Saturday, Sunday}. Find (A ∩ B)'.
A) {Friday}
B) {Saturday, Sunday}
C) {Monday, Tuesday, Wednesday, Thursday, Saturday, Sunday}
D) ∅

Answer: C

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.

107) (A ∪ B)'
A) {s, u, w}
B) {r, t, v, x}
C) {r, s, t, u, v, w, x, z}
D) {t, v, x}

Answer: B

108) A' ∪ B
A) {q, s, t, u, v, w, x, y}
B) {q, r, s, t, v, x, y, z}
C) {s, u, w}
D) {r, s, t, u, v, w, x, z}

Answer: B

109) C' ∪ A'

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

Answer: B

110) B ∪ C

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

Answer: A

111) C ∪ ∅

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

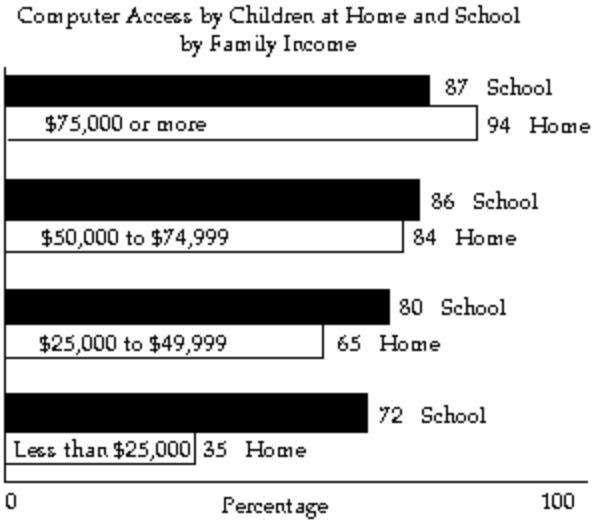
Answer: B

112) B ∪ U

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

Answer: A

Many children do not have access to computers at home. School has an equalizing effect. Family income is a strong factor in access. Use the information in the graph to write the set in the exercise in roster form or express the set as ∅.



113) {x | x is home access by more than 34% of the students} ∪ {x | x is school access by less than 81% of the students}

A) {Less than $25,000, $75,000 or more}
B) {$50,000 to $74,999, $75,000 or more}
C) {Less than $25,000, $25,000 to $49,999}
D) {$25,000 to $49,999, $50,000 to $74,999}

Answer: C

114) the set of home access by more than 80% of the students or school access by less than 87% of the students}

A) {Less than $25,000, $25,000 to $49,999, $50,000 to $74,999}
B) {$50,000 to $74,999, $75,000 or more}
C) {$25,000 to $49,999, $50,000 to $74,999, $75,000 or more}
D) {Less than $25,000, $25,000 to $49,999}

Answer: B

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.

115) A ∩ B'
A) {t, v, x}
B) {r, s, t, u, v, w, x, z}
C) {u, w}
D) {q, s, t, u, v, w, x, y}
Answer: C

116) (A ∪ B)'
A) {r, t, v, x}
B) {s, u, w}
C) {t, v, x}
D) {r, s, t, u, v, w, x, z}
Answer: A

117) (A ∩ B)'
A) {r, t, u, v, w, x, z}
B) {s, u, w}
C) {q, s, t, u, v, w, x, y}
D) {t, v, x}
Answer: A

118) A' ∪ B
A) {s, u, w}
B) {q, r, s, t, v, x, y, z}
C) {q, s, t, u, v, w, x, y}
D) {r, s, t, u, v, w, x, z}
Answer: B

119) C' ∪ A'
A) {s, t}
B) {w, y}
C) {q, s, u, v, w, x, y, z}
D) {q, r, s, t, u, v, x, z}
Answer: D

120) C' ∩ A'
A) {q, r, s, t, u, v, x, z}
B) {q, s, u, v, w, x, y, z}
C) {w, y}
D) {r, t}
Answer: D

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

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

123) A'
A) {q, r, s, t, u, v, w, x, y, z}
B) {s, u, w, y}
C) {q, s, y, z}
D) {r, t, v, x, z}
Answer: D

124) $(A \cap C)'$

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

Answer: B

125) $C \cup \varnothing$

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

Answer: D

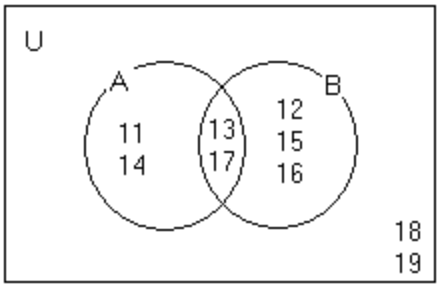
126) $B \cup U$

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

Answer: D

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

127)

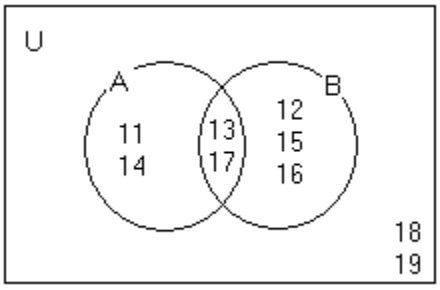


$A \cup B$

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

Answer: D

128)

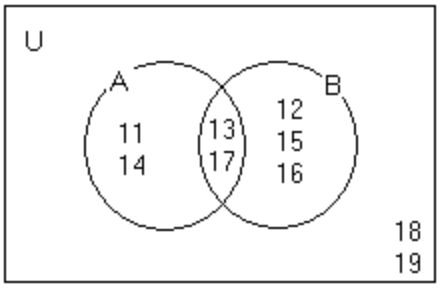


$A \cap B$

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

Answer: C

129)

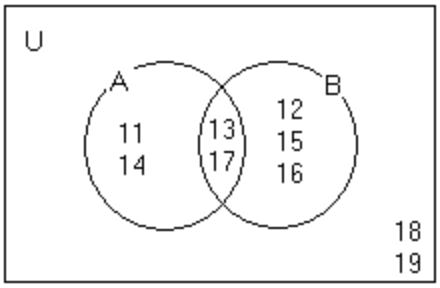


A'

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

Answer: D

130)



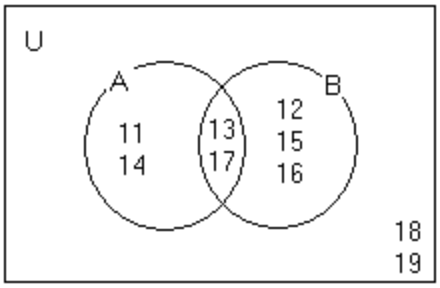
B'

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

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

Answer: D

131)



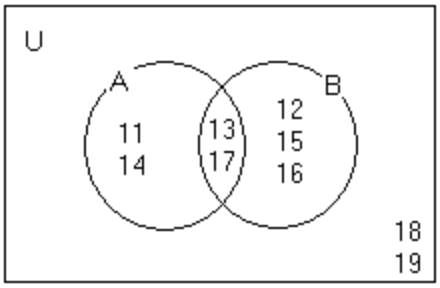
$(A \cap B)'$

A) {13, 17} B) {18, 19}

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

Answer: C

132)

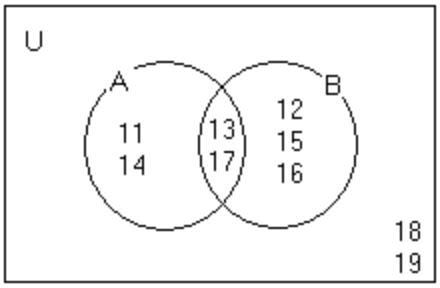


$(A \cup B)'$

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

Answer: D

133)



$A' \cap B$

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

Answer: D

Use sets to solve the problem.

134) Results of a survey of fifty students indicate that 30 like red jelly beans, 29 like green jelly beans, and 17 like both red and green jelly beans. How many of the students surveyed like red or green jelly beans?

A) 13
B) 25
C) 42
D) 17

Answer: C

135) Mrs. Bollo's second grade class of thirty students conducted a pet ownership survey. Results of the survey indicate that 8 students own a cat, 15 students own a dog, and 5 students own both a cat and a dog. How many of the students surveyed own neither a cat nor a dog?

A) 12
B) 10
C) 25
D) 3

Answer: A

136) Monticello residents were surveyed concerning their preferences for candidates Moore and Allen in an upcoming election. Of the 800 respondents, 300 support neither Moore nor Allen, 100 support both Moore and Allen, and 250 support only Moore. How many residents support only Allen?

A) 150
B) 250
C) 300
D) 100

Answer: A

Provide an appropriate response.

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

A) and; or B) or; and

C) common; universal D) universal; common

Answer: B

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

138) Set A contains 5 elements, set B contains 11 elements, and 3 elements are common to sets A and B. How many elements are in A ∪ B?

A) 14 B) 16 C) 12 D) 13

Answer: D

139) 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.

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

Answer: B

140) Set A contains 35 elements and set B contains 22 elements. If there are 40 elements in (A ∪ B) then how many elements are in (A ∩ B)?

A) 8 B) 17 C) 13 D) 5

Answer: B

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.

141) A ∪ (B ∩ C)

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

Answer: B

142) A ∩ (B ∪ C)

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

Answer: C

143) (A ∪ B) ∩ (A ∪ C)

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

Answer: B

144) (A ∩ B) ∪ (A ∩ C)

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

Answer: C

145) A' ∩ (B ∪ C')

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

Answer: A

146) (A' ∩ B) ∪ (A' ∩ C')

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

Answer: B

147) $(A \cup B \cup C)'$

A) {q, s} B) {r, t} C) {v, z} D) {s, t}

Answer: B

148) $(A \cap B \cap C)'$

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

C) ∅ D) {q, s, u, w, z}

Answer: B

149) $(A \cup B)' \cap C$

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

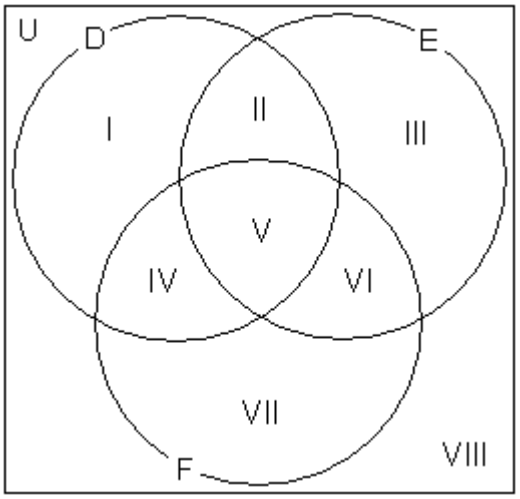
Answer: D

150) $(B \cup C)' \cap A$

A) ∅ B) {v} C) {u} D) {w}

Answer: C

Use the Venn diagram shown to answer the question.



151) Which regions represent set E?

A) I, IV, VII B) III C) II, III, V, VI D) VIII

Answer: C

152) Which regions represent set $D \cup F$?

A) VIII B) I, II, IV, V, VI, VII, VIII

C) III D) I, II, IV, V, VI, VII

Answer: D

153) Which regions represent set $D \cap E$?

A) VIII B) II, V C) IV, V D) I, III, IV, VI

Answer: B

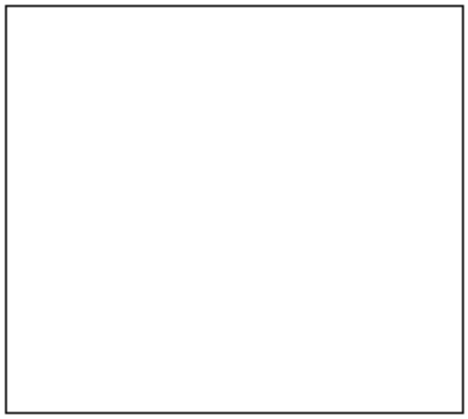
154) Which regions represent set E'?

A) I, IV, VII, VIII B) II, V, VI C) VIII D) II, III, V, VI

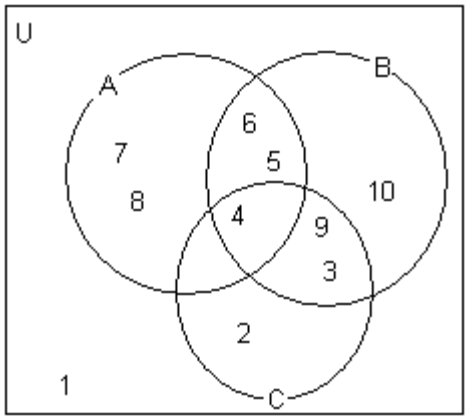
Answer: A

Construct a Venn diagram illustrating the given sets.

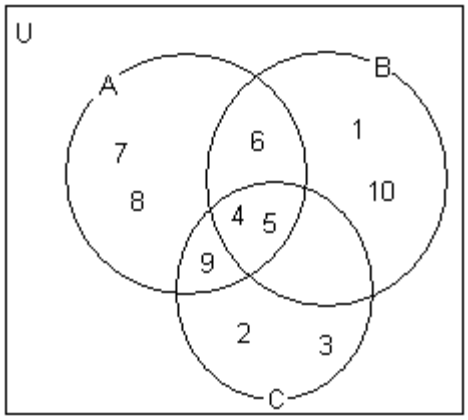
155) A = [4, 5, 6, 7, 8, 9], B = [3, 4, 5, 6, 10], C = [2, 3, 4, 5, 9], U = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]



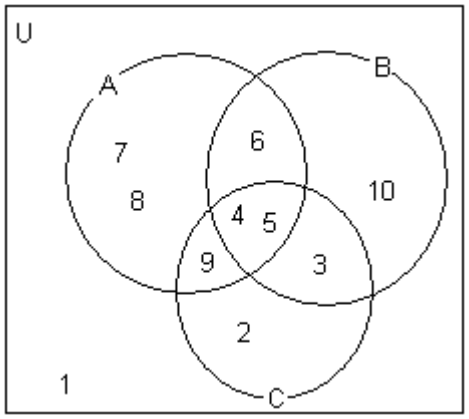
A)



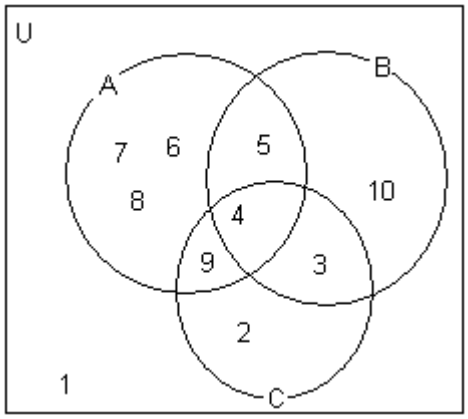
B)



C)



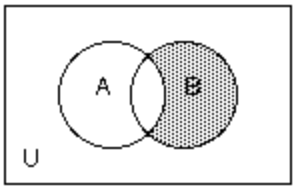
D)



Answer: C

Use set notation to identify the shaded region.

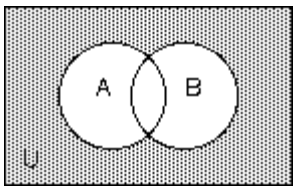
156)



A) $B - \overline{A}$ B) $A - B$ C) $A \cap \overline{B}$ D) $B \cap \overline{A}$

Answer: D

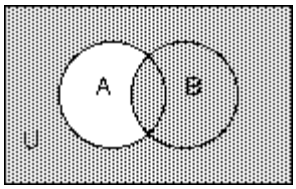
157)



A) $A \cup B$ B) $A - B$ C) $\overline{A} \cap \overline{B}$ D) $\overline{A \cap B}$

Answer: C

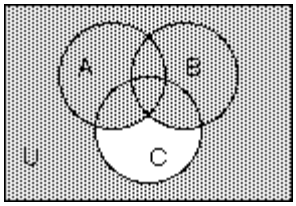
158)



A) $A' \cap B$ B) $(A \cap B)'$ C) $B \cap A'$ D) $A' \cup B$

Answer: D

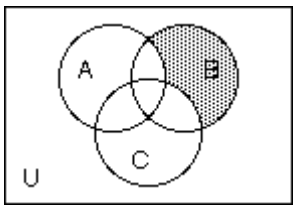
159)



A) $(A \cap B) \cup C'$ B) $(A \cup B \cup C)'$ C) $(A \cup B) \cap C'$ D) $(A \cup B) \cup C'$

Answer: D

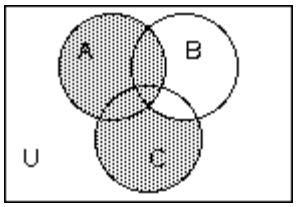
160)



A) $A' \cap C' \cap B$ B) $B \cap (A \cap C)'$ C) $A \cap B \cap C$ D) $B' \cap (A \cup B)$

Answer: A

161)



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

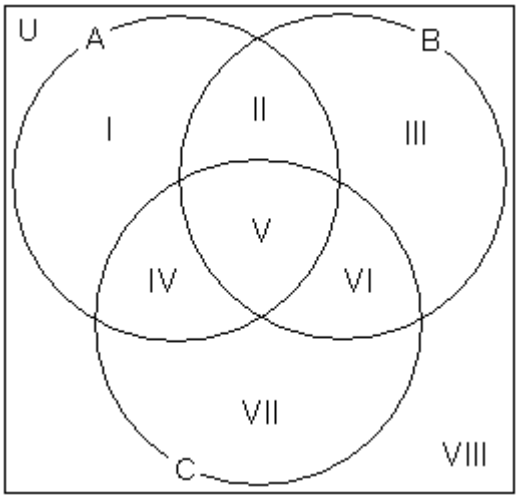
Answer: B

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.



162) liver disease

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

Answer: A

163) pneumonia

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

Answer: C

164) heart disease

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

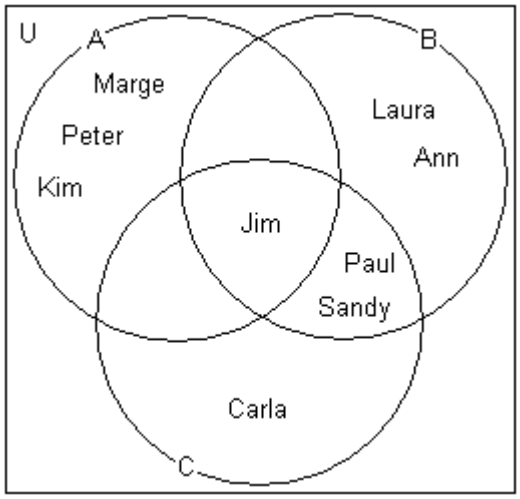
Answer: A

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

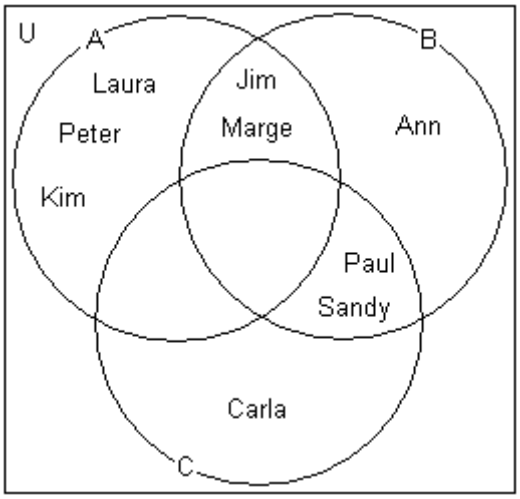
165) U = the set of members of the bookclub shown in the chart
A = the set of members of the bookclub who read at least 25 books
B = the set of members of the bookclub who suggested 5 or less books
C = the set of members of the bookclub who have been members for less than 7 years

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

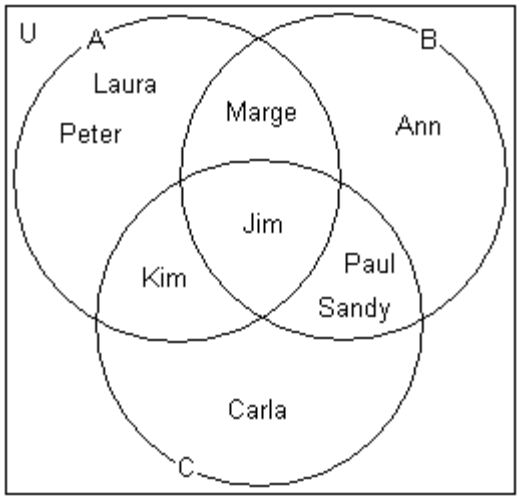
A)



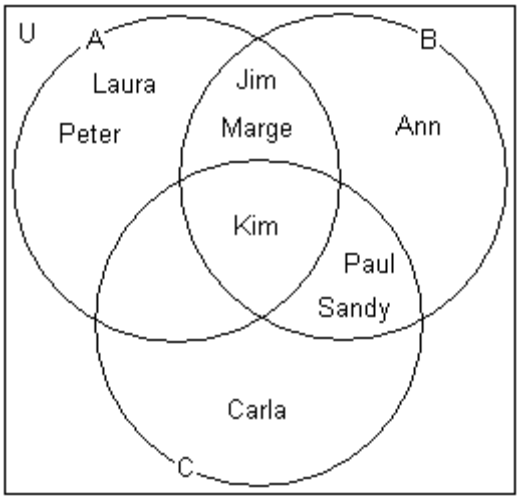
B)



C)



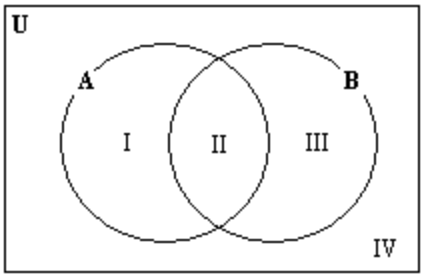
D)



Answer: B

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.



166) a) Which regions are represented by A ∩ B'?
b) Which regions are represented by (A' ∪ B)'?
c) Based on parts a) and b), what can you conclude about the relationship between A ∩ B' and (A' ∪ B)'?
Answer: a) I b) I c) They are equal.

167) a) Which regions are represented by (A' ∩ B)'?
b) Which regions are represented by A ∩ B'?
c) Based on parts a) and b), what can you conclude about the relationship between (A' ∩ B)' and A ∩ B'?
Answer: a) I, II, and IV b) I c) They are not equal.

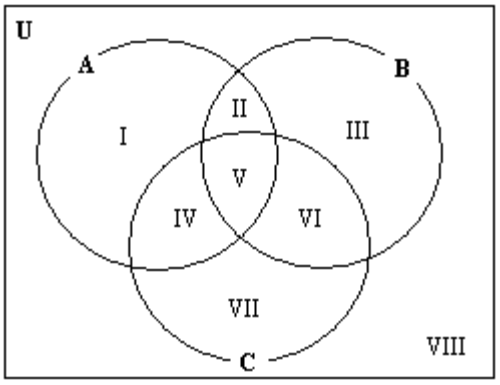
168) a) Which regions are represented by (A ∪ B')'?
b) Which regions are represented by A' ∩ B?
c) Based on parts a) and b), what can you conclude about the relationship between (A ∪ B')' and A' ∩ B?
Answer: a) III b) III c) They are equal.

169) a) Which regions are represented by (A' ∪ B)'?
b) Which regions are represented by A' ∩ B?
c) Based on parts a) and b), what can you conclude about the relationship between (A' ∪ B)' and A' ∩ B?
Answer: a) I b) III c) They are not equal.

170) Show that (A' ∩ B)' = A ∪ B'.
Answer: A' = III, IV
B = II, III
(A' ∩ B) = III
(A' ∩ B)' = I, II, IV

A = I, II
B' = I, IV
A ∪ B' = I, II, IV

Use the Venn diagram shown below to solve the problem.



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

Answer: a) II, IV, V, VI, and VII b) I, II, IV, V, and VI c) They are not equal.

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

Answer: a) II – VI b) II – VI c) They are equal.

173) Show that $B \cup (A \cap C) = (A \cup B) \cap (B \cup C)$.

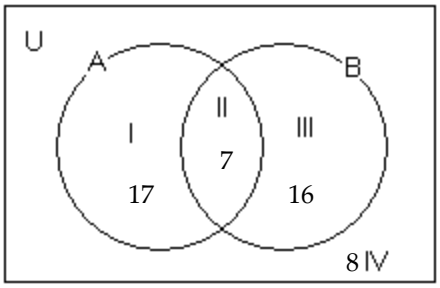
Answer: $(A \cap C)$ = IV, V
B = II, III, V, VI
$B \cup (A \cap C)$ = II, III, IV, V, VI

$(A \cup B)$ = I, II, III, IV, V, VI
$(B \cup C)$ = II, III, IV, V, VI, VII
$(A \cup B) \cap (B \cup C)$ = II, III, IV, V, VI

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

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

174)

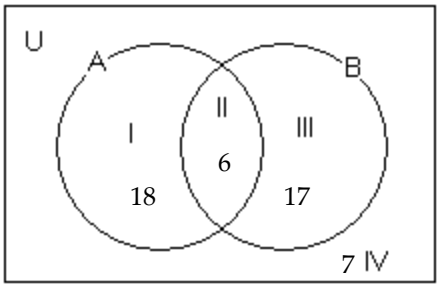


How many elements belong to set A?

A) 24 B) 7 C) 16 D) 17

Answer: A

175)

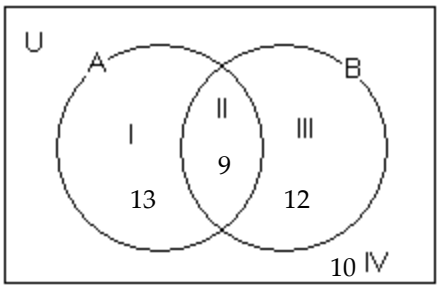


How many elements belong to set B?

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

Answer: C

176)

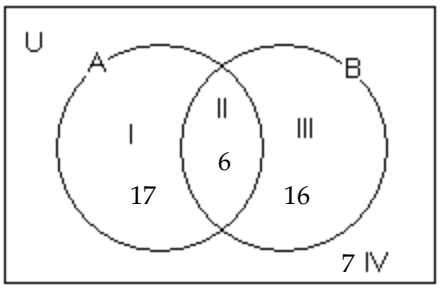


How many elements belong to set A but not set B?

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

Answer: B

177)

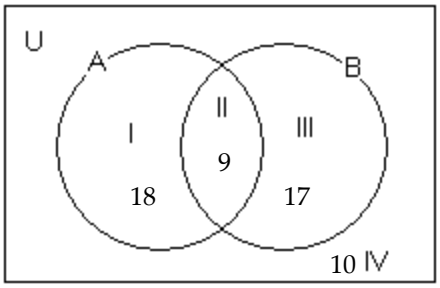


How many elements belong to set B but not set A?

A) 6 B) 17 C) 7 D) 16

Answer: D

178)

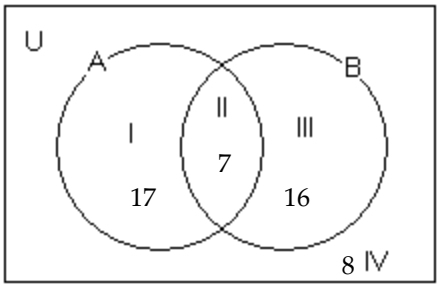


How many elements belong to set A or set B?

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

Answer: B

179)

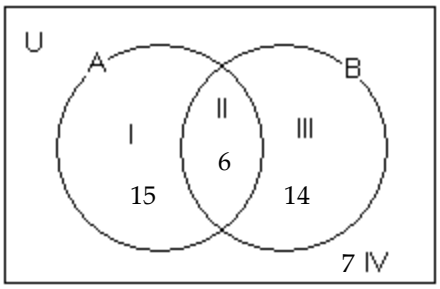


How many elements belong to set A and set B?

A) 33 B) 40 C) 7 D) 8

Answer: C

180)

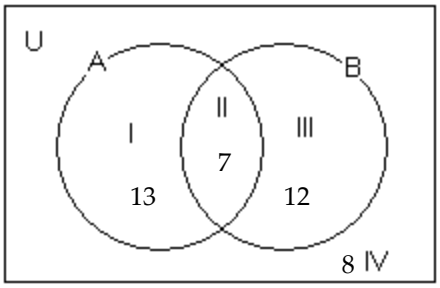


How many elements belong to neither set A nor set B?

A) 15 B) 14 C) 7 D) 6

Answer: C

181)



How many elements are there in the universal set?

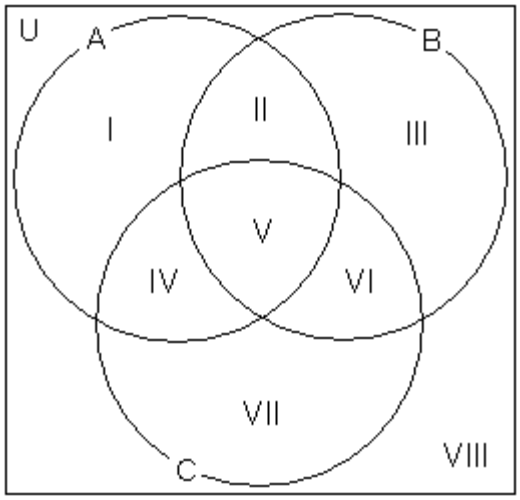
A) 25 B) 40 C) ∅ D) 32

Answer: B

Use the given cardinalities to determine the number of elements in the specific region.

182) n(U) = 114, n(A) = 36, n(B) = 56, n(C) = 31, n(A ∩ B) = 13, n(A ∩ C) = 16, n(B ∩ C) = 12, n(A ∩ B ∩ C) = 7

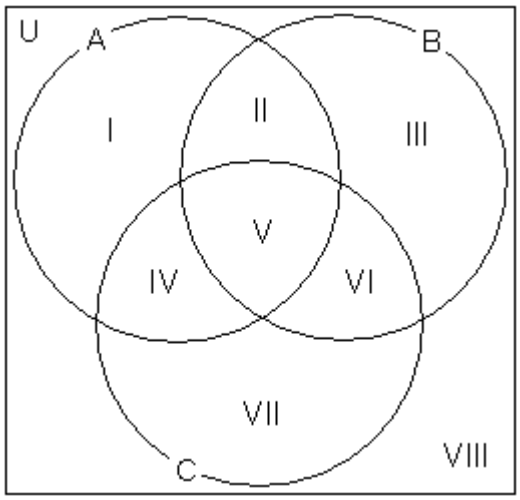
Find III.



A) 8 B) 17 C) 24 D) 38

Answer: D

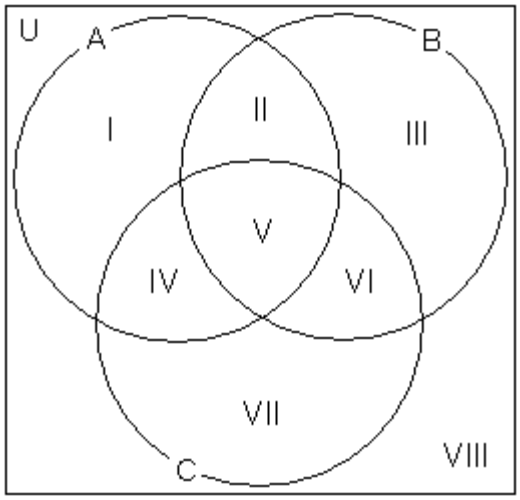
183) n(U) = 224, n(A) = 76, n(B) = 96, n(C) = 81, n(A ∩ B) = 33, n(A ∩ C) = 36, n(B ∩ C) = 32, n(A ∩ B ∩ C) = 17
Find VIII.



A) 55 B) 89 C) 0 D) 76

Answer: A

184) n(U) = 117, n(A) = 81, n(B) = 58, n(C) = 56, n(A ∩ B) = 34, , n(A ∩ C) = 31, n(B ∩ C) = 29, n(A ∩ B ∩ C) = 16
Find VI.



A) 14 B) 15 C) 12 D) 13

Answer: D

Use a Venn diagram to answer the question.

185) At East Zone University (EZU) there are 775 students taking College Algebra or Calculus. 412 are taking College Algebra, 392 are taking Calculus, and 29 are taking both College Algebra and Calculus. How many are taking Algebra but not Calculus?

A) 746 B) 354 C) 383 D) 363

Answer: C

186) At East Zone University (EZU) there are 462 students taking College Algebra or Calculus. 188 are taking College Algebra, 336 are taking Calculus, and 62 are taking both College Algebra and Calculus. How many are taking Calculus but not Algebra?

A) 274 B) 400 C) 64 D) 126

Answer: A

187) A local television station sends out questionnaires to determine if viewers would rather see a documentary, an interview show, or reruns of a game show. There were 950 responses with the following results:

285 were interested in an interview show and a documentary, but not reruns;
38 were interested in an interview show and reruns, but not a documentary;
133 were interested in reruns but not documentaries or interviews;
228 were interested in an interview show but not a documentary;
95 were interested in a documentary and reruns;
57 were interested in an interview show and reruns;
76 were interested in none of the three.

How many are interested in exactly one kind of show?

A) 436 B) 466 C) 446 D) 456

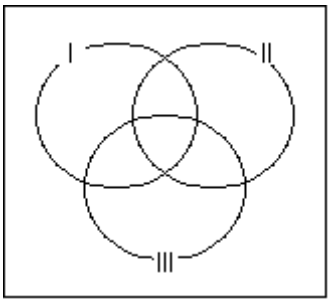
Answer: D

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

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.

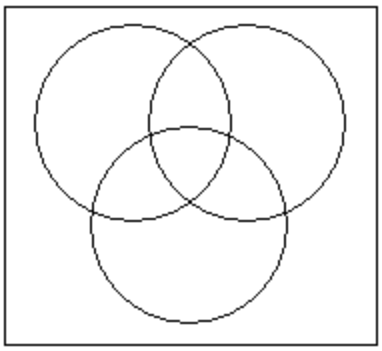
188) Construct a Venn Diagram with three circles that can assist the pollster in tabulating the responses to the three questions.

Answer:

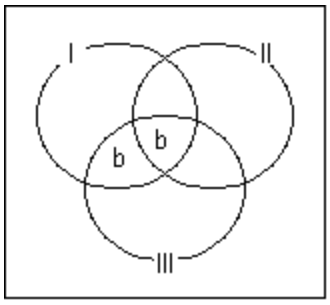


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

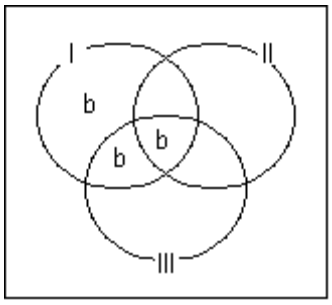
189) Write the letter b in every region of the diagram that represents all religious persons polled who are not in favored of death penalty.



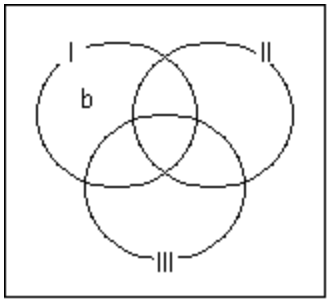
A)



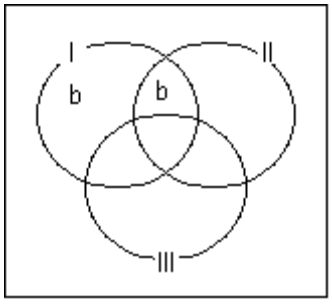
B)



C)

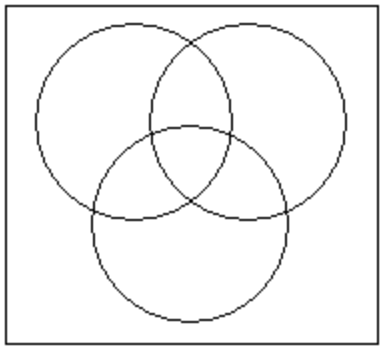


D)

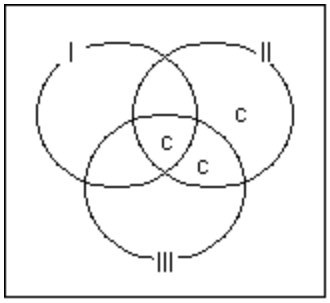


Answer: D

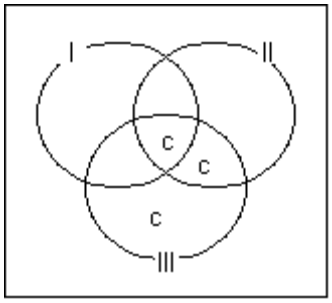
190) Write the letter c in every region of the diagram that represents the people polled who do not consider themselves religious, who have not spent time with a person convicted with a crime, and who are in favor of the death penalty.



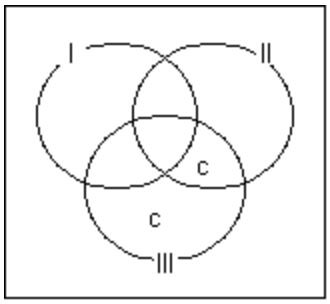
A)



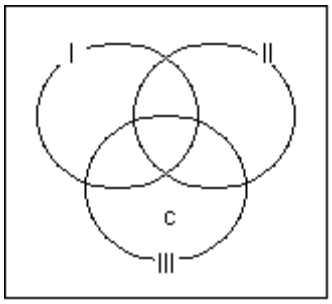
B)



C)



D)



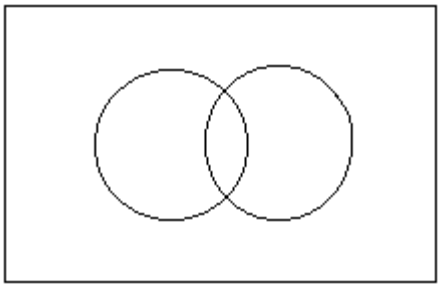
Answer: D

Solve the problem.

191) A pollster conducting a telephone poll asked two questions:

1. Would you like to live to be 100 years old, if it was possible?
2. Do you have confidence that medical science will find cures for major diseases during your lifetime?

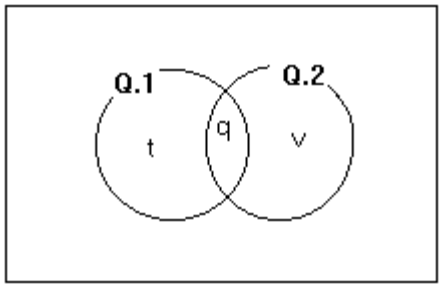
Construct a Venn diagram that allows the respondents to the poll to be identified by whether or not they want to live to be 100 and whether or not they believe cures for major diseases will be found.



Write the letter q in the region of the diagram that identifies those would like to live to be 100 who believe cures will be found.

Write the letter t in the region of the diagram that identifies those would not like to live to be 100 who believe cures will be found.
Write the letter v in the region of the diagram that identifies those would not like to live to be 100 who believe cures will not be found.

A)



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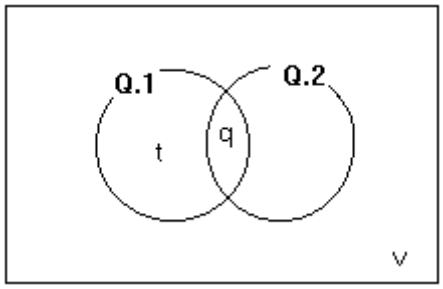
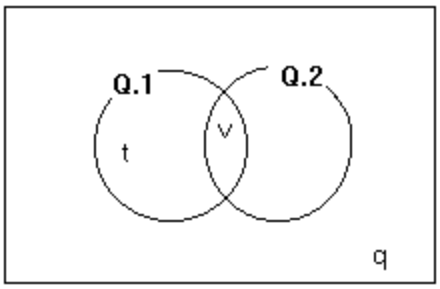
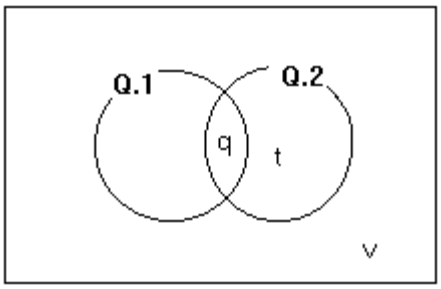


C)



D)

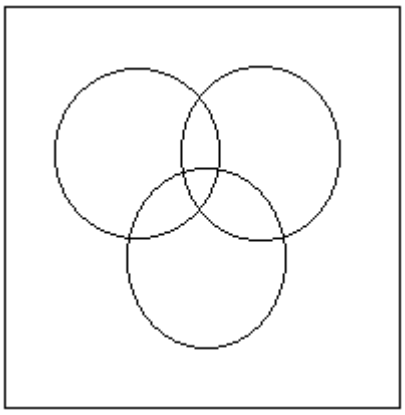


Answer: D

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

192) A pollster conducting a telephone poll asked three questions:
1. Are you a registered voter?
2. Do you currently have any children in grades kindergarten through 12th grade?
3. Would you support a tax increase to build a new school?

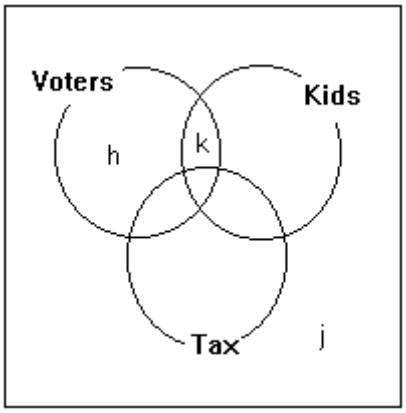
Construct a Venn diagram with three circles that can assist the pollster in tabulating the responses to the three questions.



Write the letter h in the region of the diagram that identifies all registered voters polled who do not have children in school and who do not support a tax increase.
Write the letter j in the region of the diagram that identifies people who are not registered to vote, who do not have children in school, and who do not support a tax increase.

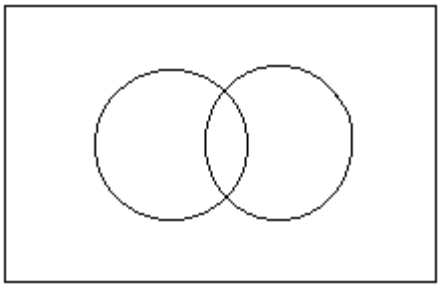
Write the letter k in the region of the diagram that identifies all registered voters polled who have children in school, and who do not support a tax increase.

Answer:



193) There are 777,859 physicians in the United States.
177,030 are women.
33,947 physicians have cardiology as their specialty.
6,817 women physicians specialize in cardiology.

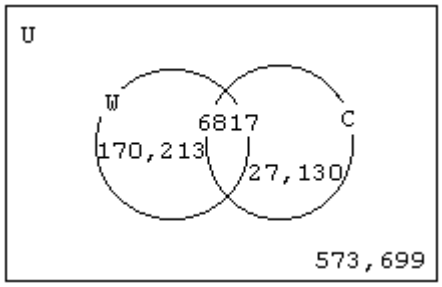
Identify the Venn diagram in which U is the set of all physicians, W is the set of all women physicians, and C is the set of all U.S. physicians specializing in cardiology. Fill in each of the four regions of the Venn diagram with the number of physicians who belong to that region.



Use your Venn diagram to answer the questions.

How many physicians in the United States are there who are men specializing in cardiology?
How many male physicians in the United States do not specialize in cardiology?

Answer:



27,130 male physicians in the United States specialize in cardiology.
573,699 male physicians in the United States do not specialize in cardiology.

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