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TEXTBOOK TESTBANKS

Test Bank for A Survey of Mathematics with Applications 12th Angel

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

Determine whether the set is well defined or not well defined.

1) The set of the best luggage
   A) not well defined
   B) well defined

   Answer: A

2) The set of people who wear expensive perfume
   A) not well defined
   B) well defined

   Answer: A

3) The set of five countries in Europe having the smallest area
   A) not well defined
   B) well defined

   Answer: B

4) The set of rivers that flow south to north
   A) well defined
   B) not well defined

   Answer: A

5) The set of children in second grade at Maple Elementary School that are girls
   A) well defined
   B) not well defined

   Answer: A

6) The set of children in third grade at Maple Elementary School that are studious
   A) well defined
   B) not well defined

   Answer: B

7) The set of U.S. state flags which display depictions of flowers
   A) not well defined
   B) well defined

   Answer: B

8) The set of professional basketball players over the age of 36
   A) not well defined
   B) well defined

   Answer: B

9) The set of birds nesting in trees at Elm Nature Center on March 13th, 2012
   A) not well defined
   B) well defined

   Answer: B

10) The set of manufacturers of computers that enjoyed sizeable profits in the fourth quarter of 2012
A) not well defined
B) well defined

Answer: A

Identify the set as finite or infinite.

11) {8, 9, 10, . . ., 32}
A) Infinite
B) Finite

Answer: B

12) $\{1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots\}$
A) Finite
B) Infinite

Answer: B

13) {x | x is a fraction between 90 and 91}
A) Finite
B) Infinite

Answer: B

14) {2, 4, 6, 8, . . .}
A) Infinite
B) Finite

Answer: A

15) The set of odd whole numbers less than 50
A) Infinite
B) Finite

Answer: B

16) The set of even numbers greater than 100
A) Finite
B) Infinite

Answer: B

17) The set of multiples of 3 between 0 and 100
A) Finite
B) Infinite

Answer: A

18) The set of fractions that are less than 1 but greater than 0
A) Infinite
B) Finite

Answer: A

19) The set of people watching fireworks at Miller Park on July 4, 2012 at 9:45 P.M.
A) Finite
B) Infinite

Answer: A

20) The set of stars in the Milky Way Galaxy at 12:00 A.M. on January 1, 2012
A) Finite
B) Infinite

Answer: A

Express the set in roster form.

21) {x | x is a whole number between 2 and 6}
A) {2, 3, 4, 5, 6}
B) {3, 4, 5}
C) {2, 3, 4, 5}
D) {3, 4, 5, 6}

Answer: B

22) {x | x is an integer between 1 and 5}
A) {2, 3, 4}
B) {2, 3, 4, 5}
C) {1, 2, 3, 4}
D) {1, 2, 3, 4, 5}

Answer: A

23) {x | x is a negative multiple of 6}
A) {- 6, - 36, - 216, . . .}
B) {0, - 6, - 12, . . .}
C) {- 6, - 12, - 18, . . .}
D) {6, 12, 18, . . .}

Answer: C

24) {x | x is an integer greater than - 4}
A) {- 3, - 2, - 1, . . .}
B) {- 5, - 6, - 7, . . .}
C) {- 3, - 2, - 1, }
D) {- 5, - 6, - 7}

Answer: A

25) The set of all whole numbers greater than 4 and less than 8
A) {5, 6, 7, 8}
B) {5, 6, 7}
C) {4, 5, 6, 7, 8}
D) {4, 5, 6, 7}

Answer: B

26) {x | x is a natural number multiple of 4}

A) ∅

B) {4, 8, 12, . . .}

C) {8, 12, 16, . . .}

D) {0, 4, 8, 12,. . .}

Answer: B

27) {x | x is a natural number less than - 4}

A) {- 5, - 6, - 7, . . .}

B) ∅

C) {. . ., - 7, - 6, - 5}

D) {- 3, - 2, - 1,. . .}

Answer: B

28) The set of integers greater than 3 and less than 7

A) {4, 5, 6, 7}

B) {3, 4, 5, 6, 7}

C) {3, 4, 5, 6}

D) {4, 5, 6}

Answer: D

29) The set of seasons in a year

A) {winter, summer}

B) {January, March, June, September}

C) {winter, spring, summer, fall}

D) {cold, warm, hot, cool}

Answer: C

30) The set of the days of the week

A) {Saturday, Sunday}

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

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

D) {Tuesday, Thursday}

Answer: C

Solve the problem.

31) Use the following table, which shows the average price for a new beverage that is served at a coffee chain. Let the 10 selected regions represent the universal set. Use the list to represent the set in roster form.

Region	Price
A	$7.06
B	$6.67
C	$6.23
D	$5.68
E	$4.36
F	$3.79
G	$3.02
H	$2.83
K	$2.28
L	$1.60

The set of regions in which the average price for the new beverage is more than $5.00.

A) {A, B, C}
B) {E, F, G, H, K, L}
C) {A, B, C, D, E}
D) {A, B, C, D}

Answer: D

32) Use the following table, which shows the average price for a new beverage that is served at a coffee chain. Let the 10 selected regions represent the universal set. Use the list to represent the set in roster form.

Region	Price
A	$7.27
B	$6.71
C	$6.31
D	$5.71
E	$4.17
F	$3.85
G	$3.41
H	$2.94
K	$2.20
L	$1.99

The set of regions in which the average price for the new beverage is less than $3.50.

A) {F, G, H, K, L}
B) {G, H, K, L}
C) {H, K, L}
D) {A, B, C, D, E, F}

Answer: B

33) Use the following table, which shows the average price for a new beverage that is served at a coffee chain. Let the 10 selected regions represent the universal set. Use the list to represent the set in roster form.

Region	Price
A	$7.79
B	$6.65
C	$6.49
D	$5.56
E	$4.99
F	$3.99
G	$3.09
H	$2.64
K	$2.23
L	$1.57

The set of regions in which the average price for the new beverage is between $3.00 and $4.99.

A) {E, F, G}
B) {H, K, L}
C) {E, F, G, H}
D) {A, B, C, D, H, K, L}

Answer: A

34) Use the following table, which shows the average price for a new beverage that is served at a coffee chain. Let the 10 selected regions represent the universal set. Use the list to represent the set in roster form.

Region	Price
A	$7.85
B	$6.62
C	$6.17
D	$5.99
E	$4.56
F	$3.78
G	$3.43
H	$2.91
K	$2.29
L	$1.55

{x | x is a region in which the average price of the new beverage is at least $6.00}

A) {A, B, C, D}
B) {A, B}
C) {A, B, C}
D) {D, E, F, G, H, K, L}

Answer: C

35) Use the following table, which shows the average price for a new beverage that is served at a coffee chain. Let the 10 selected regions represent the universal set. Use the list to represent the set in roster form.

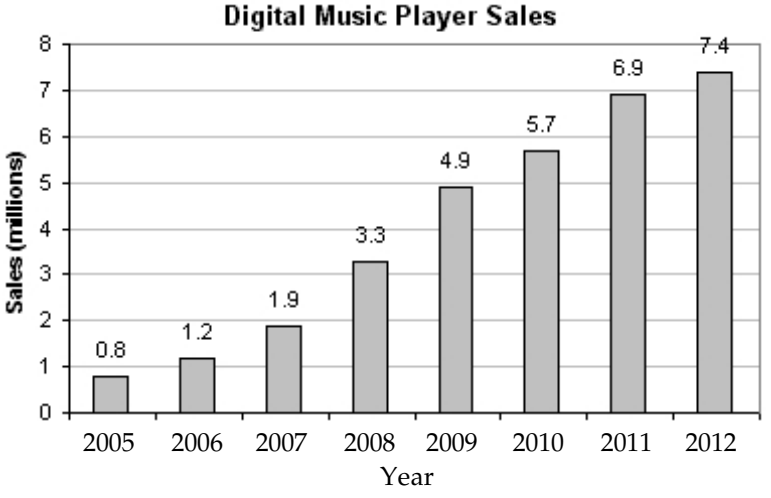
Region	Price
A	$7.18
B	$6.64
C	$6.29
D	$5.72
E	$4.06
F	$3.95
G	$3.17
H	$2.51
K	$2.28
L	$1.73

{x | x is a region in which the average price of the new beverage is at most $6.00}

A) {E, F, G, H, K, L}
B) {A, B, C}
C) {A, B, C, D}
D) {D, E, F, G, H, K, L}

Answer: D

36) Use the following graph, which shows the sales of digital music players, in millions, at a national electronics retail store for the years 2005- 2012. Use the graph to represent the set in roster form.

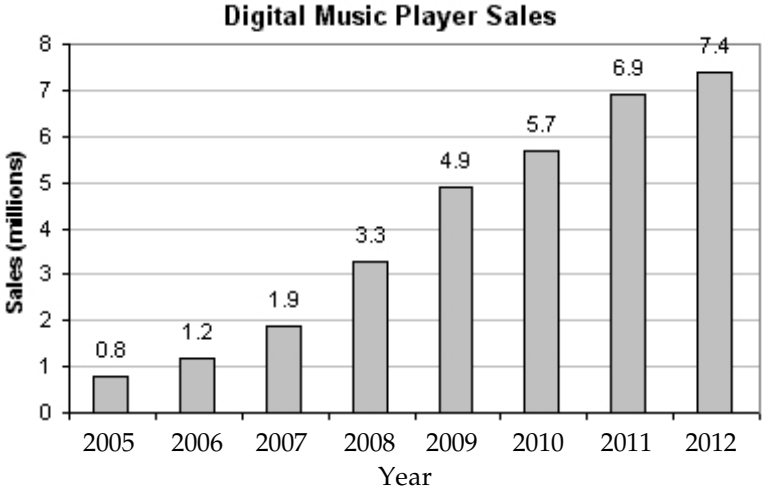


The set of years included in the graph in which digital music player sales were between 2 million and 5 million.

A) {2007, 2008, 2009}
B) {2008, 2009, 2010}
C) {2008, 2009}
D) {2009, 2010}

Answer: C

37) Use the following graph, which shows the sales of digital music players, in millions, at a national electronics retail store for the years 2005- 2012. Use the graph to represent the set in roster form.

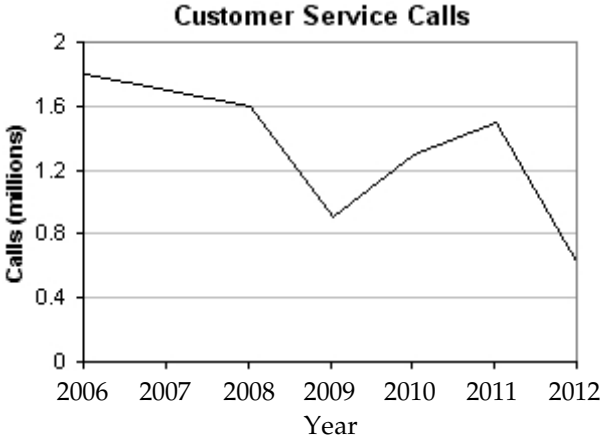


The set of years included in the graph in which digital music player sales were more than 10 million.

A) {0}
B) {2005, 2006, 2007, 2008, 2009, 2010, 2011}
C) {2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012}
D) { }

Answer: D

38) Use the following graph which shows the number of customer service calls to a major appliance manufacturer, in millions, for the years 2006- 2012. Use the graph to represent the set in roster form.

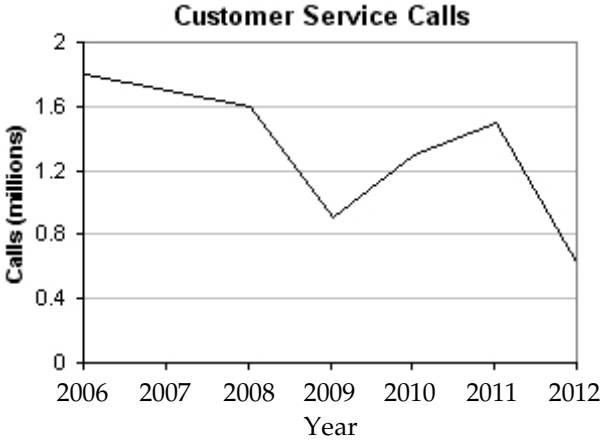


The set of years in which the number of customer service calls were below 1 million.

A) {2009, 2010, 2012}
B) {2012}
C) {2008, 2009, 2012}
D) {2009, 2012}

Answer: D

39) Use the following graph which shows the number of customer service calls to a major appliance manufacturer, in millions, for the years 2006- 2012. Use the graph to represent the set in roster form.



The set of years in which the number of customer service calls exceeded 1.2 million.

A) {2006, 2007, 2008, 2010, 2011}
B) {2009, 2012}
C) {2006, 2007, 2008, 2009, 2010, 2011}
D) {2006, 2007, 2008, 2011}

Answer: A

Write the set in set-builder notation.

40) {5}

A) {x}
B) {x | x is the natural number 5}
C) {x is a constant}
D) {x | x is a natural number}

Answer: B

41) {2, 4, 6, 8}

A) {x | x is an even natural number less than 10}
B) {x | x is any even natural number}
C) {2, 4, 6, 8}
D) {x | x is any integer}

Answer: A

42) {18, 19, 20, 21}

A) {x | x is an integer between 18 and 21}
B) {18, 19, 20, 21}
C) {x | x is an integer between 17 and 22}
D) {x | x is an integer less than 22}

Answer: C

43) {42, 48, 54, 60,..., 102}

A) {x | x is a multiple of 6 between 36 and 108}
B) {x | x is a multiple of 6 greater than 42}
C) {x | x is a multiple of 6 between 42 and 102}
D) {x | x is a multiple of 6}

Answer: A

44) The set of all calculus books
A) {a calculus book}
B) {x | x is a calculus book}
C) {x is a calculus book}
D) {any calculus book}

Answer: B

45) The set of all cars owned by students
A) {x | x is a car owned by a student}
B) {x is a car}
C) {x is a student with a car}
D) {x | x is a student with a car}

Answer: A

46) The odd natural numbers less than 49
A) {x|x ∈N < 48}
B) {x|x ∈N < 49}
C) {x|x ∈N ≤ 47 and x is odd}
D) {x|x ∈N ≤ 49 and x is odd}

Answer: C

Write a description of the set.

47) S = {5, 10, 15, 20, 25, . . .}
A) Set S is the set of integers.
B) Set S is the set of natural numbers that are multiples of 5.
C) Set S is the set of natural numbers greater than or equal to 5.
D) Set S is the set of integers that are greater than or equal to 5.

Answer: B

48) D = {- 3, - 2, - 1, , 1, 2, 3, . . .}
A) Set D is the set of natural numbers.
B) Set D is the set of natural numbers greater than or equal to - 3.
C) Set D is the set of integers.
D) Set D is the set of integers greater than or equal to - 3.

Answer: D

49) E = {x | x ∈I and - 6 < x ≤ 6}
A) E is the set of natural numbers greater than or equal to - 6 and less than 6.
B) E is the set of integers greater than - 6 and less than or equal to 6.
C) E is the set of natural numbers greater than - 6 and less than or equal to 6.
D) E is the set of integers greater than or equal to - 6 and less than 6.

Answer: B

50) E = {x | x ∈N and 1 < x ≤ 23}
A) E is the set of integers greater than 1 and less than or equal to 23.
B) E is the set of natural numbers greater than or equal to 1 and less than 23.
C) E is the set of natural numbers greater than 1 and less than or equal to 23.
D) E is the set of natural numbers greater than 23 and less than or equal to 1.

Answer: C

51) D = {January, February, March, April, May, June, July, August, . . .}
A) Set D is the set of time zones in America.
B) Set D is the set of seasons.
C) Set D is the set of the months in a year.
D) Set D is the set of days in a week.

Answer: C

52) S = {Monday, Tuesday, Wednesday, Thursday, Friday}
A) Set S is the set of days in a month.
B) Set S is the set of the five business days in a week.
C) Set S is the set of months in a year.
D) Set S is the set of all the days in a week.

Answer: B

53) V = {rose, daffodil, tulip, lily, orchid, . . .}
A) Set V is the set of types of fruit.
B) Set V is the set of types of trees.
C) Set V is the set of colors.
D) Set V is the set of types of flowers.

Answer: D

Tell whether the statement is true or false. If false, give the reason.

54) $9 \in \{18, 27, 36, 45, 54\}$
A) False; 9 is not an element of the set.
B) True
C) False; 9 is a set.
D) False; 9 is a factor of the elements.

Answer: A

55) {4, 10, 14} = {0, 4, 10, 14}
A) False; 0 is not a valid member of a set.
B) False; each set must have 4 elements.
C) True
D) False; 0 must be an element of both sets.

Answer: D

56) $17 \notin \{16, 14, 13, . . ., 1\}$
A) False; 17 is a set.
B) False; 17 is smaller than the elements of the set.
C) True
D) False; 17 is an element of the set.

Answer: C

57) {8} = {x | x is an even counting number between 10 and 16}
A) False; 8 is less than 10
B) True
C) False; 8 is a set, and not an element of the set.
D) False; 8 is less than 16

Answer: A

58) {56, 57, 56, 57} = {56, 57}
A) False; the elements cannot be repeated.
B) False; the elements are not equal.
C) False; there must be the same number of elements.
D) True

Answer: D

59) {2, 16, 23, 7, 38} = {38, 16, 7, 32, 2}
A) True
B) False; the elements are not in the same order.
C) False; the elements must have the same sum.
D) False; the elements are not the same.

Answer: D

60) {x | x is a counting number greater than 34} = {34, 35, 36, . . .}
A) True
B) False; 34 is not a counting number.
C) False; 34 is less than any element in the set.
D) False; 34 is not greater than 34.

Answer: D

61) $11 \notin \{x \mid x \text{ is an even counting number}\}$
A) False; 11 is a counting number.
B) False; 11 is an even counting number.
C) False; 11 is an element of the set.
D) True

Answer: D

Find n(A) for the set.

62) A = {7, 9, 11, 13, 15}
A) n(A) = 5
B) n(A) = 15
C) n(A) = 2
D) n(A) = 4

Answer: A

63) A = {900, 901, 902, . . ., 9000}
A) n(A) = 4
B) n(A) = 9,000
C) n(A) = 8,100
D) n(A) = 8,101

Answer: D

64) A = {x | x is a month in the year}
A) n(A) = 24
B) n(A) = 52
C) n(A) = 12
D) n(A) = 1

Answer: C

65) A = {x | x is a number on a clock face}
A) n(A) = 12
B) n(A) = 3
C) n(A) = 24
D) n(A) = 6
Answer: A

66) A = {x | x is a second in a minute}
A) n(A) = 120
B) n(A) = 60
C) n(A) = 12
D) n(A) = Infinite
Answer: B

67) A = {x|x ∈N and 16 ≤ x ≤ 23}
A) n(A) = 8
B) n(A) = 40
C) n(A) = 39
D) n(A) = 6
Answer: A

Determine whether the sets are equal, equivalent, both, or neither.

68) {69, 3, 61} and {3, 61, 69}
A) Equivalent
B) Equal
C) Both
D) Neither
Answer: C

69) {L, M, N, O} and {l, m, n, o}
A) Equivalent
B) Equal
C) Neither
D) Both
Answer: A

70) {x | x is a whole number} and {x | x is an integer}
A) Neither
B) Both
C) Equivalent
D) Equal
Answer: C

71) {brake} and {break}
A) Equivalent
B) Both
C) Equal
D) Neither
Answer: A

72) {4, 12} and {41, 2}
A) Equal
B) Equivalent
C) Neither
D) Both

Answer: B

73) {3, 14} and {3, 1, 4}
A) Neither
B) Equal
C) Both
D) Equivalent

Answer: A

74) {first, second, third} and {1, 2, 3}
A) Equivalent
B) Equal
C) Both
D) Neither

Answer: A

75) {1/10, 2/10, 3/10} and {0.1, 0.2, 0.3}
A) Equal
B) Neither
C) Equivalent
D) Both

Answer: D

Determine whether the number used is a cardinal or an ordinal number.

76) The baby gained four ounces since his last check- up.
A) Cardinal
B) Ordinal

Answer: A

77) The prize in the raffle is five hundred dollars.
A) Ordinal
B) Cardinal

Answer: B

78) Max placed fourteenth in the cross country race.
A) Ordinal
B) Cardinal

Answer: A

79) The physician prescribed five different types of pills for Aunt Martha.
A) Ordinal
B) Cardinal

Answer: B

80) The novel has 594 pages.
A) Cardinal
B) Ordinal

Answer: A

81) The math assignment is on page 594.
A) Ordinal
B) Cardinal

Answer: A

82) Hal's birthday is on February fifteenth.
A) Ordinal
B) Cardinal

Answer: A

83) Move the box to the fifth floor.
A) Ordinal
B) Cardinal

Answer: A

Let A = {1, 3, 5, 7}
B = {5, 6, 7, 8}
C = {5, 8}
D = {2, 5, 8}
U = {1, 2, 3, 4, 5, 6, 7, 8}.
Determine whether the statement is true or false.

84) $C \subseteq D$
A) False; D is a subset of C.
B) False; C is not a subset of D.
C) True
D) False; the elements are the same in C and D.

Answer: C

85) $D \subseteq B$
A) False; the elements are not the same.
B) False; the sets must have the same number of elements.
C) False; the elements are the same.
D) True

Answer: A

86) $A \neq \{7, 5, 3, 1\}$
A) False; A has different elements than those listed.
B) True
C) False; the elements in A are in a different order.
D) False; the elements in A are the same as those listed.

Answer: D

87) $\{5\} \subseteq D$

A) False; 5 is not an element of D.
B) False; 5 is not a subset of D.
C) True
D) False; 5 is an element of the set, not a subset.

Answer: C

88) $\{0\} \subseteq U$

A) False; {0} is not a subset of set U, because 0 is not an element of U.
B) False; 0 is an element of set U, not a subset.
C) True
D) False; the empty set is a subset of set U.

Answer: A

89) $C \subset D$

A) False; C is not equal to D.
B) True
C) False; D is a subset of C.
D) False; C is equal to D.

Answer: B

90) $C \subset A$

A) False; C has one different element than A does.
B) False; C is equal to A.
C) True
D) False; A is a subset of C.

Answer: A

91) $\{\ \} \subset U$

A) False; the empty set is not a subset of U.
B) False; the elements in the empty set are not the same elements as in U.
C) True
D) False; the empty set is not a subset of any set.

Answer: C

92) $A \not\subset A$

A) False; A is a subset of itself.
B) True
C) False; A is not a subset of itself.
D) False; the set is equal to itself.

Answer: B

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

93) $\{10, 11, 12\}$ ____ $\{9, 10, 11, 12\}$

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

Answer: A

94) ∅ ____ {9, 13, 30, 38}

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

Answer: C

95) {5, 6, 7} ____ {5, 6, 7}

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

Answer: A

96) {0} ____ ∅

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

Answer: B

97) {a, b} ____ {z, a, y, b, x, c}

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

Answer: C

98) {s, r, t} ____ {s, r, t}

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

Answer: C

99) {x | x ∈ N and x > 8} ____ {x | x ∈ N and 1 < x ≤ 8}

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

Answer: B

100) {All states west of the Rocky Mountains} ____ {All states west of the Atlantic Ocean}

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

Answer: D

List all subsets or determine the number of subsets as requested.

101) Determine the number of subsets of {7, 8, 9}

A) 7
B) 3
C) 6
D) 8

Answer: D

102) Determine the number of subsets of {0}

A) 4
B) 0
C) 1
D) 2

Answer: D

103) Determine the number of subsets of {mom, dad, son, daughter}

A) 16
B) 8
C) 12
D) 14

Answer: A

104) Determine the number of subsets of {1, 2, 3, ..., 8}

A) 256
B) 512
C) 16
D) 252

Answer: A

105) List all the subsets of {8}.

A) {8}, { }, {∅}
B) {8}, { }
C) {8}
D) {0, 8}, {8}

Answer: B

106) List all the subsets of {wolf, cat, pig}.

A) {wolf, cat, pig}, {wolf, cat}, {wolf, pig}, {cat, pig}, {wolf}, {cat}, {pig}, { }
B) {wolf, cat}, {wolf, pig}, {cat, pig}, {wolf}, {cat}, {pig}
C) {wolf, cat, pig}, {wolf, cat}, {wolf, pig}, {cat, pig}, {wolf}, {cat}, {pig}
D) {wolf, cat}, {wolf, pig}, {cat, pig}, {wolf}, {cat}, {pig}, { }

Answer: A

107) At MegaSalad, a salad can be ordered with some, all, or none of the following set of ingredients on top of the salad greens: {ham, turkey, chicken, tomato, feta cheese, cheddar cheese, cucumbers, onions, red peppers, hot peppers }. How many different variations are there for ordering a salad?

A) 512
B) 1012
C) 2048
D) 1024

Answer: D

If the statement is true for all sets C and D, write "true." If it is not true for all sets C and D, write "false." Assume that $C \neq \emptyset$, $U \neq \emptyset$, and $C \subset U$.

108) $\emptyset \subseteq C$

A) True
B) False

Answer: A

109) $C \subseteq U$

A) True
B) False

Answer: B

110) $U \subset \emptyset$

A) True
B) False

Answer: B

111) $U \subseteq \emptyset$

A) True
B) False

Answer: B

112) $\emptyset \subset \emptyset$

A) True
B) False

Answer: B

113) $\emptyset \subseteq A$

A) True
B) False

Answer: A

114) $\emptyset \subseteq \emptyset$

A) True
B) False

Answer: A

115) If $C \subset D$, then $C \subseteq D$.

A) True
B) False

Answer: A

116) If $C \subseteq D$, then $C \subset D$.

A) True
B) False

Answer: B

117) D ⊆ D

A) True

B) False

Answer: A

Answer the question.

118) Anna goes to a frozen yogurt shop. She can choose from any of the following toppings: cashews, marshmallow cream, peanut butter chips, blackberries, and brownie bits. How many different variations of yogurt and toppings can be made?

A) 64

B) 32

C) 6

D) 16

Answer: B

119) Joe goes to a mexican restaurant and order nachos. He can have just cheese or add any of the following: steak, green peppers, salsa or refried beans. How many different variations of nachos are possible?

A) 32

B) 64

C) 16

D) 8

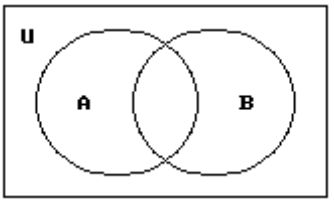
Answer: C

For the given sets, construct a Venn diagram and place the elements in the proper region.

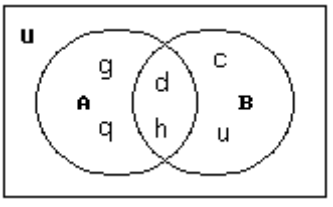
120) Let U = {c, d, g, h, k, u, q}

A = {d, h, g, q}

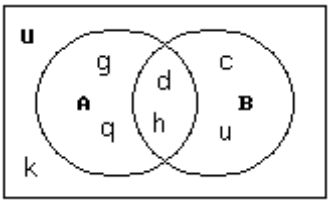
B = {c, d, h, u}



A)

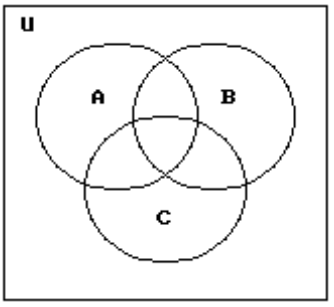


B)

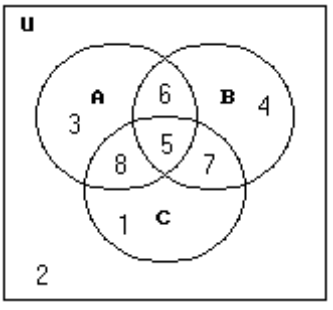


Answer: B

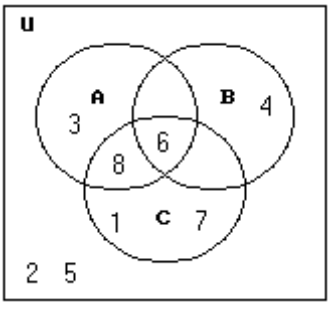
121) Let U = {1, 2, 3, 4, 5, 6, 7, 8}
A = {3, 6, 8}
B = {4, 6}
C = {1, 6, 7, 8}



A)

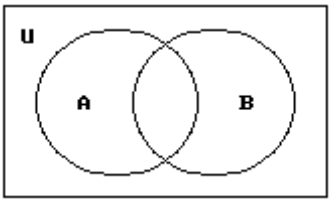


B)

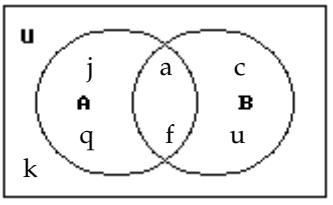


Answer: B

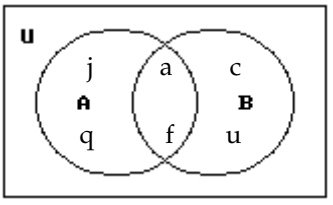
122) Let U = {c, a, f, j, k, q, u}
A = {a, f, j, q}
B = {c, a, f, u}



A)



B)



Answer: A

Let U = {all soda pops}, A = {all diet soda pops}, B = {all cola soda pops}, C = {all soda pops in cans}, and D = {all caffeine-free soda pops}. Describe the set in words.

123) A ∩ B
A) All diet or all cola soda pops
B) All diet cola soda pops
C) All soda pops
D) All diet and all cola soda pops

Answer: B

124) A' ∩ C
A) All diet soda pops and all soda pops in cans
B) All diet soda pops in cans
C) All non- diet soda pops in cans
D) All non- diet soda pops and all soda pops in cans

Answer: C

125) $A \cap B \cap D$

A) All diet, caffeine- free cola pops in cans
B) All diet and all cola and all caffeine- free soda pops
C) All soda pops not in cans
D) All diet, caffeine- free cola soda pops

Answer: D

126) $(A \cup B) \cup D$

A) All soda pops
B) All diet, caffeine- free cola soda pops
C) All diet and all cola and all caffeine- free soda pops
D) All soda pops not in cans

Answer: C

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

A) All diet cola soda pops not in cans
B) All non- diet, non- cola soda pops not in cans
C) All diet and all cola soda pops not in cans
D) All cola soda pops not in cans

Answer: A

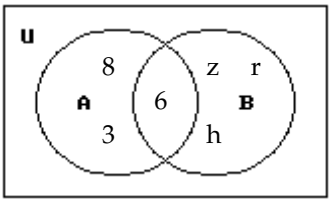
128) $(A \cup D) \cap C'$

A) All non- cola soda pops not in cans
B) All diet soda pops and all caffeine- free soda pops, not in cans
C) All diet, caffeine- free soda pops not in cans
D) All non- diet, non- caffeine- free soda pops not in cans

Answer: B

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

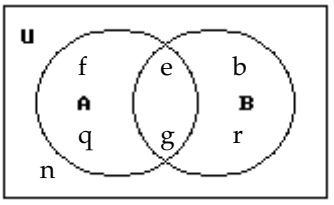
129) Find A.



A) {8, 3, 6}
B) {6, z, r, h}
C) {8, 3, 6, z}
D) {6}

Answer: A

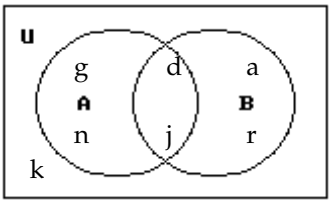
130) Find A ∪ B.



A) {b, e, g, f, n, q, r}
B) {b, e, g, f, q, r}
C) {n}
D) {e, g}

Answer: B

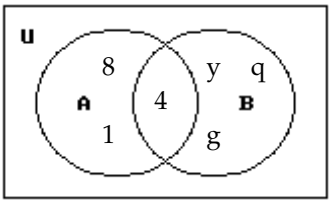
131) Find A ∩ B.



A) {k}
B) {a, d, j, g, n, r}
C) {d, j}
D) {a, d, j, g, k, n, r}

Answer: C

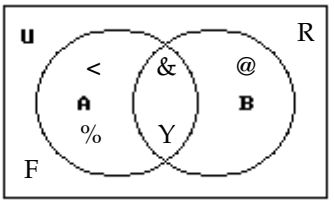
132) Find (A ∪ B)'.



A) {8, 1, 4}
B) {8, 1, 4, y, q, g}
C) ∅
D) {8}

Answer: C

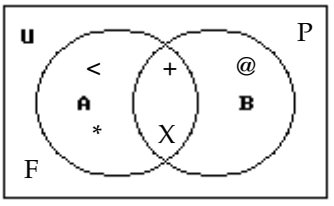
133) Find A ∩ B'.



A) {R, F, <, %}
B) {R, F}
C) {Y, R, F, <, &, %}
D) {<, %}

Answer: D

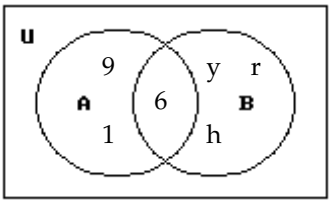
134) Find A' ∪ B.



A) {X, <, *}
B) {X, P, @, F, +}
C) {P, @, F}
D) {X, P, @ , <, *}

Answer: B

135) Find A' ∩ B'.



A) {9, 1, 6, y, r, h}
B) {6}
C) {9}
D) ∅

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}.
Determine the following.

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

137) $(A \cup B)'$
A) {t, v, x}
B) {r, t, v, x}
C) {r, s, t, u, v, w, x, z}
D) {s, u, w}
Answer: B

138) $(A \cap B)'$
A) {q, s, t, u, v, w, x, y}
B) {t, v, x}
C) {s, u, w}
D) {r, t, u, v, w, x, z}
Answer: D

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

140) $A \cup (B \cap C)$
A) {q, r, w, y, z}
B) {q, s, u, w, y, z}
C) {q, w, y}
D) {q, y, z}
Answer: B

141) $A \cap (B \cup C)$
A) {q, r, w, y, z}
B) {q, s, w, y}
C) {q, y, z}
D) {q, s, u, w, y, z}
Answer: B

142) $C' \cup A'$

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

143) $C' \cap A'$

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

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}
Determine the following.

144) $A \cup (B \cap C)$

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

Answer: C

145) $A \cap (B \cup C)$

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

Answer: C

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

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

Answer: B

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

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

Answer: B

148) $(A \cup B')' \cap C'$
A) {q, r, s, t, u}
B) {v, w, x, y}
C) ∅
D) {q, r, s, t, u, z}
Answer: C

149) $B \cap (A - C)$
A) {q, s, u, y, z}
B) {q, s}
C) {q, r, s, t, u, v, w, x, y}
D) {q, s, u, y}
Answer: B

150) $(A \cap B') \cup (B \cap A')$
A) {q, s, u, w, y, z}
B) {q, s, y}
C) {u, w, z}
D) {u, w, y, z}
Answer: C

Find the indicated product.

151) Let A = {6, 7, 8} and B = {a, b, c}, determine A × B.
A) {(a, 6), (b, 6), (c, 6), (a, 7), (b, 7), (c, 7), (a, 8), (b, 8), (c, 8)}
B) {(6, a), (6, b), (6, c), (7, a), (7, b), (7, c), 8, a), (8, b), (8, c)}
C) {(a, 6), (b, 7), (c, 8)}
D) {(6, a), (7, b), (8, c)}
Answer: B

152) Let A = {4, 5, 6} and B = {a, b, c} determine B × A.
A) {(a, 4), (a, 5), (a, 6), (b, 4), (b, 5), (b, 6), (c, 4), (c, 5), (c, 6)}
B) {(4, a), (5, b), (6, c)}
C) {(a, 4), (b, 5), (c, 6)
D) {(4, a), (4, b), (4, c), (5, a), (5, b), (5, c), (6, a), (6, b), (6, c)}
Answer: A

153) Let A = {3, 4} and B = {a, b}, determine n(A × B).
A) 0
B) 4
C) 2
D) 6
Answer: B

154) Let A = {8, 9, 10} and B = {3, 4, 5}, determine n(A × B).
A) 1
B) 6
C) 3
D) 9
Answer: D

Provide an appropriate response.

155) Let U represent the set of all national parks in the United States. Let A represent the set of national parks in Washington. Describe A'.

A) The set of state parks not in the state of Washington.
B) The set of national parks in the state of Washington.
C) The set of national parks that are not in the state of Washington.
D) The set of all national parks in the United States

Answer: C

156) Let U represent the set of prisoners in United States prisons. Let A represent the set of prisoners in Texas state prisons. Describe A'.

A) The set of prisoners in all the prisons in the world.
B) The set of prisoners in Texas state prisons.
C) The set of United States prisoners that are not in Texas state prisons.
D) The set of prisoners in Texas state prisons who aren't United States citizens.

Answer: C

157) A survey at Village Pizza showed that 57 people like Canadian bacon pizza, 25 people like Hawaiian pizza, and 16 people like both Canadian bacon pizza and Hawaiian pizza. How many people like either Canadian bacon pizza or Hawaiian pizza?

A) 82
B) 98
C) 73
D) 66

Answer: D

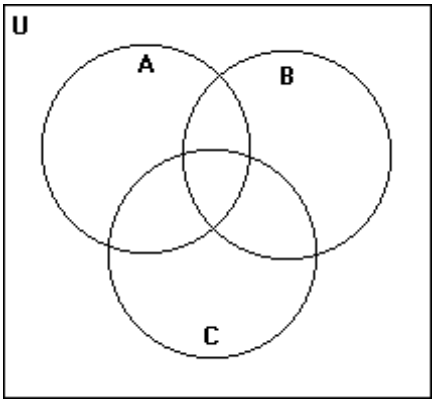
158) At Wilson High School 34 girls participate in soccer, 30 girls participate in basketball, and 12 girls participate in both soccer and basketball. How many girls participate in either soccer or basketball?

A) 76
B) 64
C) 12
D) 52

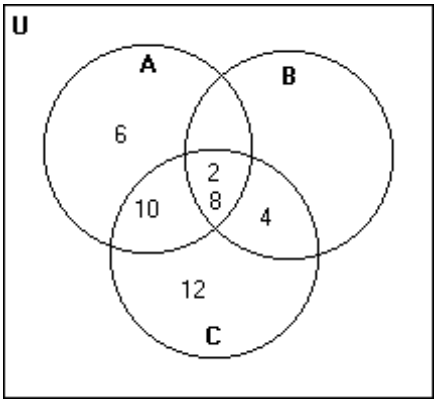
Answer: D

Construct a Venn diagram illustrating the following sets.

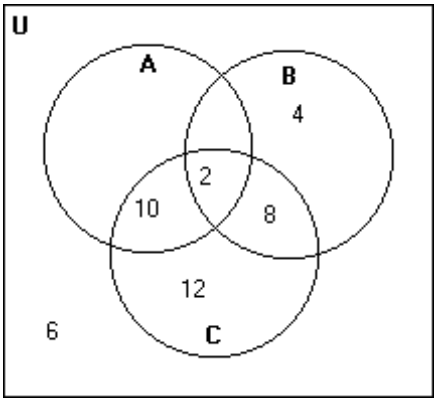
159) U = {2, 4, 6, 8, 10, 12}
A = {2, 6, 10}
B = {2, 4, 8}
C = {2, 8, 10, 12}



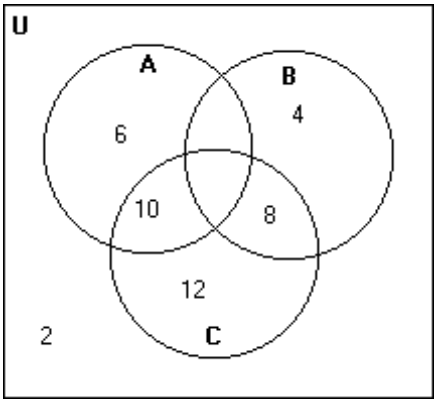
A)



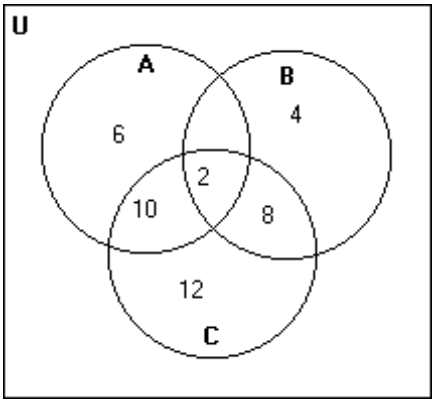
B)



C)

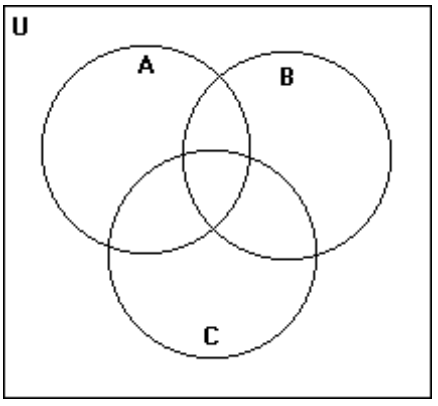


D)

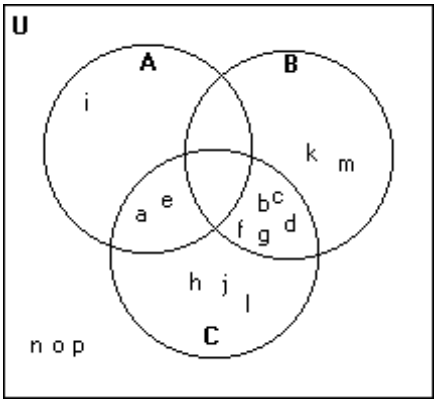


Answer: D

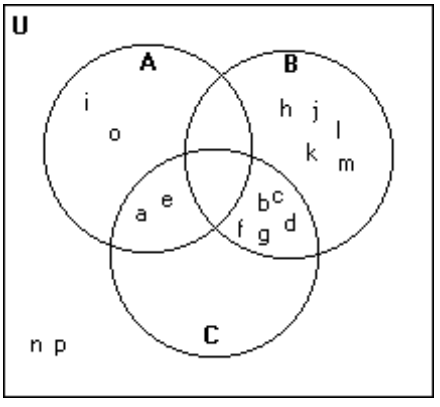
160) U = {a, b, c, d, e, f, g, h, i,j , k, l, m, n, o, p}
A = {a, e, i, o}
B = {b, c, d, f, g, h, j, k, l, m}
C = {a, b, c, d, e, f, g}



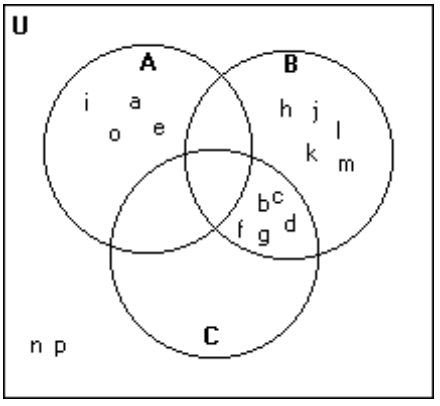
A)



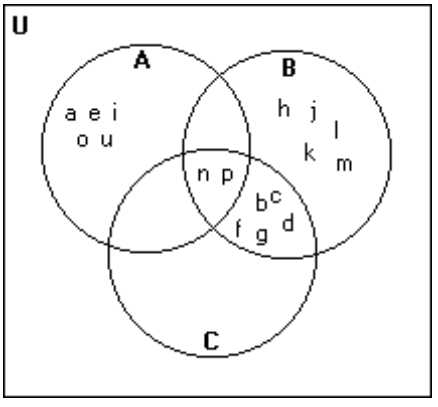
B)



C)

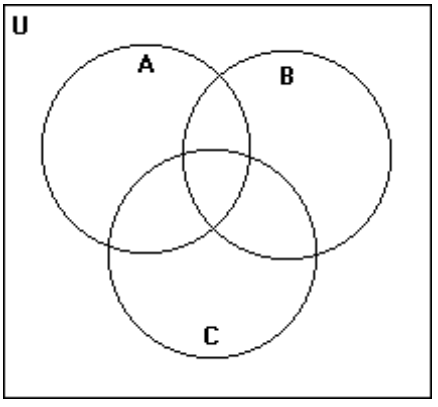


D)

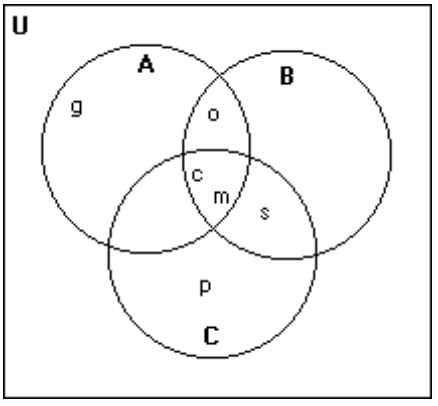


Answer: B

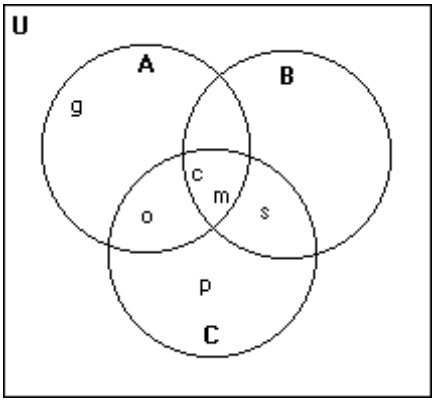
161) Let U = {cheese (c), sausage (s), pepperoni (p), onion (o), garlic (g), mushroom (m)}. Let A be the set of the four most popular pizzas ordered at Village Pizza in March- April. Let B be the four most popular pizzas in February- March, and let C be the four most popular pizzas in January- February. Then
A = {cheese (c), onion (o), garlic (g), mushroom (m)}
B = {cheese (c), onion (o), sausage (s), mushroom (m)}
C = {cheese (c), sausage (s), pepperoni (p), mushroom (m)}



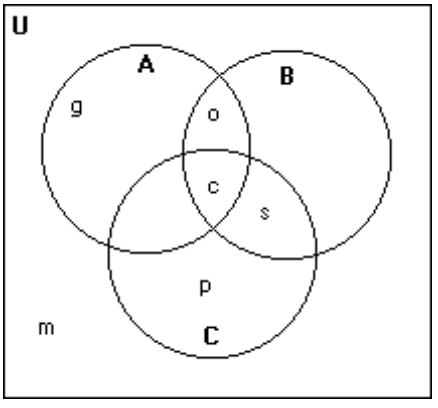
A)



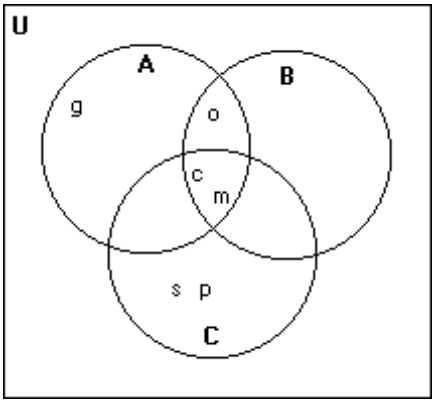
B)



C)



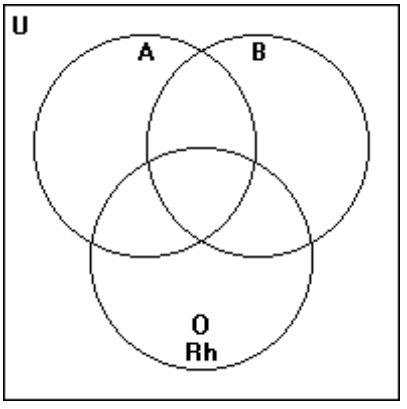
D)



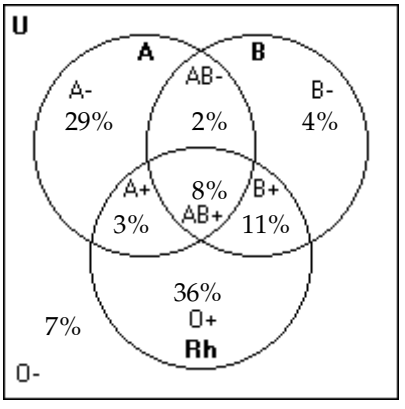
Answer: A

162) A hematology text gives the following information on percentages of the different types of blood in the western hemisphere.

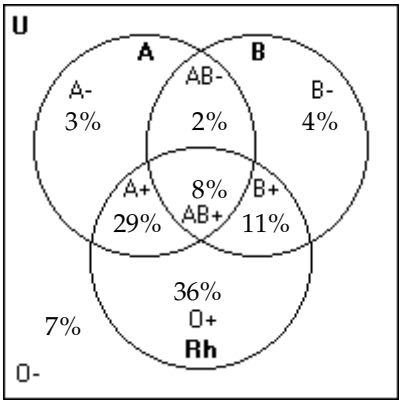
Type	positive blood, %	Negative blood, %
A	29	3
O	36	7
B	11	4
AB	8	2



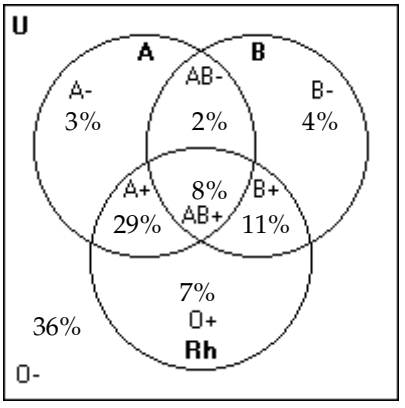
A)



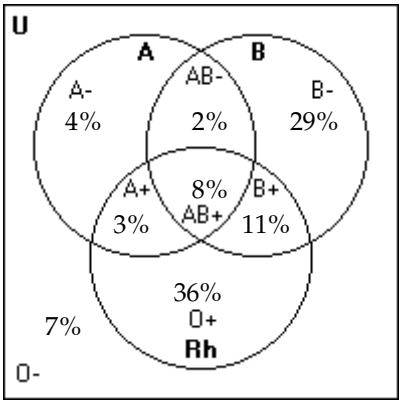
B)



C)



D)

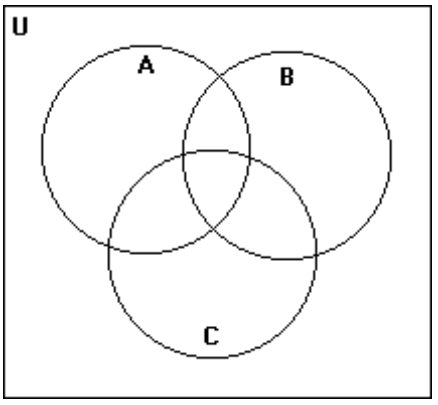


Answer: B

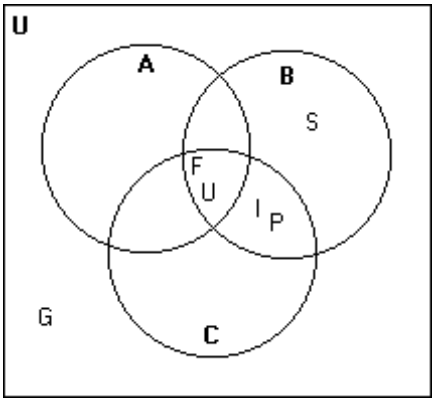
163) Consider the following chart which shows teams that won at least 7 medals in wine- tasting competitions. Let the vineyards shown represent the universal set.

	Gold	Silver	Bronze	Total
Franklin (F)	13	12	9	34
Upper (U)	12	5	13	31
Springton (S)	9	3	12	24
Inland (I)	9	5	2	16
Parkway (P)	2	9	3	14
Greenville (G)	3	2	2	7

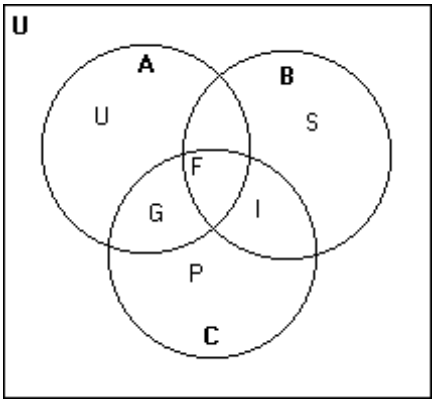
Let A = set of teams that won at least 31 medals.
Let B = set of teams that won at least 9 gold medals.
Let C = set of teams that won at least 5 silver medals.



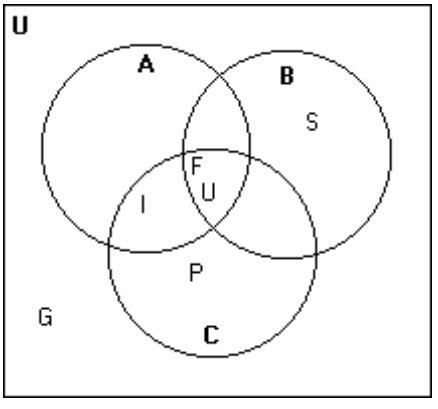
A)



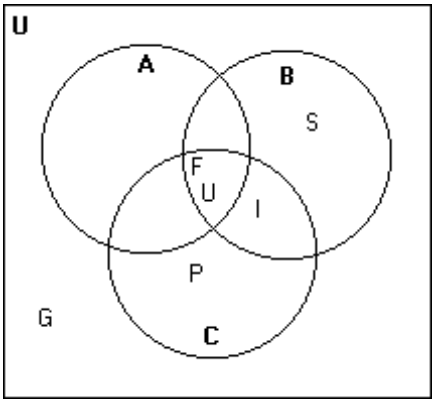
B)



C)



D)

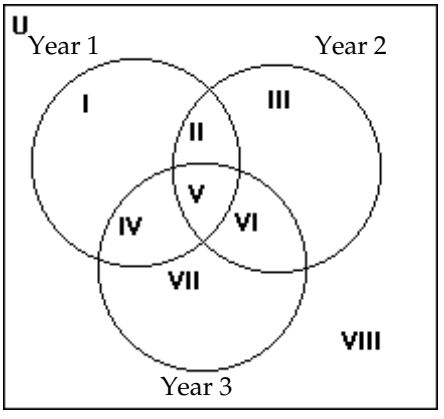


Answer: D

Determine which region, I through VII, the indicated element belongs.

164) The chart that follows shows people's loyalty to specific grocery stores. In the Venn diagram given, the set indicated as Year 1 represents the set of grocery stores listed in the table under Year 1, and so on.

Year 1	Year 2	Year 3
1. Tagget	1. Whirl	1. Foodhut
2. Sloan's	2. J- Mart	2. Whirl
3. Whirl	3. Sloan's	3. Markette
4. Koff's	4. Foodhut	4. J- Mart
5. Noodles	5. Tagget	5. Tagget
6. Charter	6. Markette	6. Gem
7. Foodhut	7. Koff's	7. Sloan's



Tagget

A) V

B) VIII

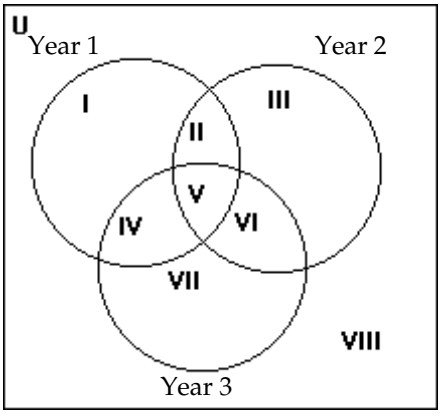
C) VI

D) III

Answer: A

165) The chart that follows shows people's loyalty to specific grocery stores. In the Venn diagram given, the set indicated as Year 1 represents the set of grocery stores listed in the table under Year 1, and so on.

Year 1	Year 2	Year 3
1. Tagget	1. Whirl	1. Foodhut
2. Sloan's	2. J- Mart	2. Whirl
3. Whirl	3. Sloan's	3. Markette
4. Koff's	4. Foodhut	4. J- Mart
5. Noodles	5. Tagget	5. Tagget
6. Charter	6. Markette	6. Gem
7. Foodhut	7. Koff's	7. Sloan's



J- Mart

A) II

B) VII

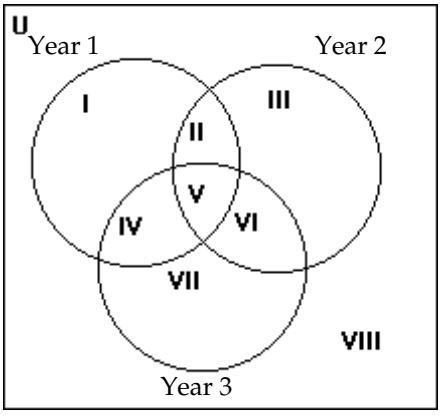
C) I

D) VI

Answer: D

166) The chart that follows shows people's loyalty to specific grocery stores. In the Venn diagram given, the set indicated as Year 1 represents the set of grocery stores listed in the table under Year 1, and so on.

Year 1	Year 2	Year 3
1. Tagget	1. Whirl	1. Foodhut
2. Sloan's	2. J- Mart	2. Whirl
3. Whirl	3. Sloan's	3. Markette
4. Koff's	4. Foodhut	4. J- Mart
5. Noodles	5. Tagget	5. Tagget
6. Charter	6. Markette	6. Gem
7. Foodhut	7. Koff's	7. Sloan's



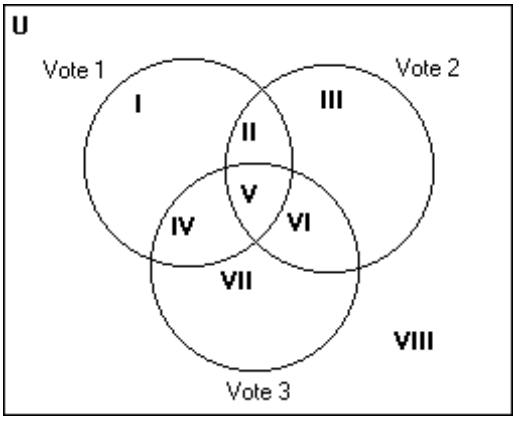
Noodles

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

Answer: A

167) During a special club meeting of the Garden Club, three items were voted on. The votes of nine members are shown in the table that follows. Determine in which region of the Venn diagram the member in question would be placed. The set labeled "Vote 1" represents the set of members who voted "yes" on vote 1, and so on.

Member	Vote 1	Vote 2	Vote 3
1. Marcus	yes	yes	no
2. Patterson	no	no	yes
3. Klein	yes	no	yes
4. Myers	no	no	yes
5. Parker	no	no	yes
6. Patel	yes	yes	yes
7. Smith	yes	yes	no
8. Szabo	yes	no	yes
9. Ruiz	yes	yes	no



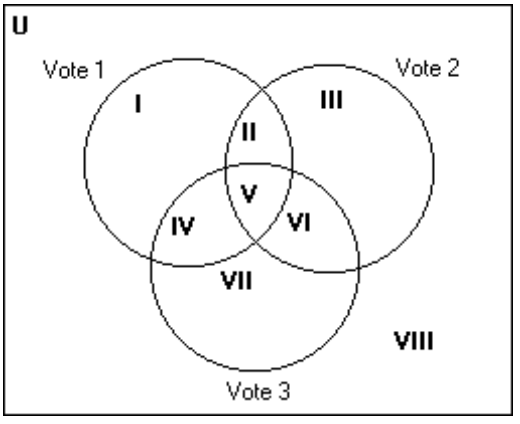
Myers

A) VII
B) II
C) III
D) VI

Answer: A

168) During a special club meeting of the Garden Club, three items were voted on. The votes of nine members are shown in the table that follows. Determine in which region of the Venn diagram the member in question would be placed. The set labeled "Vote 1" represents the set of members who voted "yes" on vote 1, and so on.

Member	Vote 1	Vote 2	Vote 3
1. Marcus	yes	yes	no
2. Patterson	no	no	yes
3. Klein	yes	no	yes
4. Myers	no	no	yes
5. Parker	no	no	yes
6. Patel	yes	yes	yes
7. Smith	yes	yes	no
8. Szabo	yes	no	yes
9. Ruiz	yes	yes	no



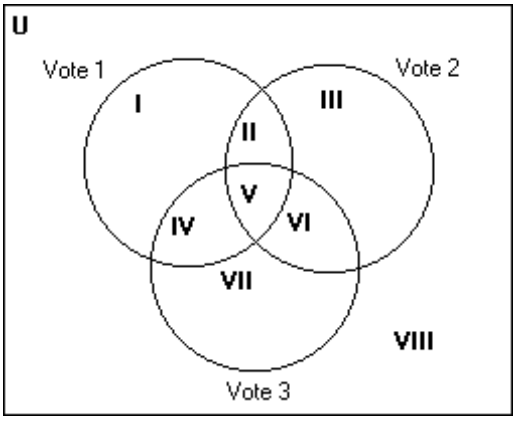
Klein

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

Answer: C

169) During a special club meeting of the Garden Club, three items were voted on. The votes of nine members are shown in the table that follows. Determine in which region of the Venn diagram the member in question would be placed. The set labeled "Vote 1" represents the set of members who voted "yes" on vote 1, and so on.

Member	Vote 1	Vote 2	Vote 3
1. Marcus	yes	yes	no
2. Patterson	no	no	yes
3. Klein	yes	no	yes
4. Myers	no	no	yes
5. Parker	no	no	yes
6. Patel	yes	yes	yes
7. Smith	yes	yes	no
8. Szabo	yes	no	yes
9. Ruiz	yes	yes	no

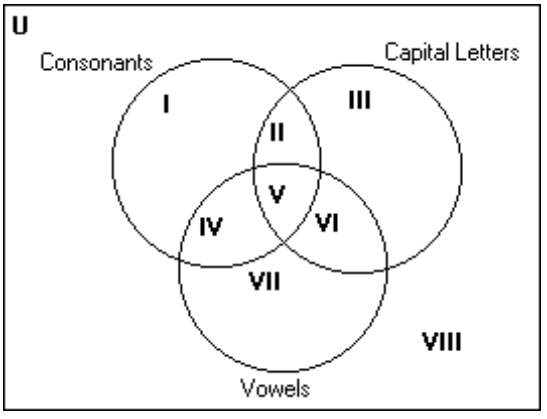


Ruiz

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

Answer: B

170) Determine in which region of the Venn diagram the letter in question would be placed.

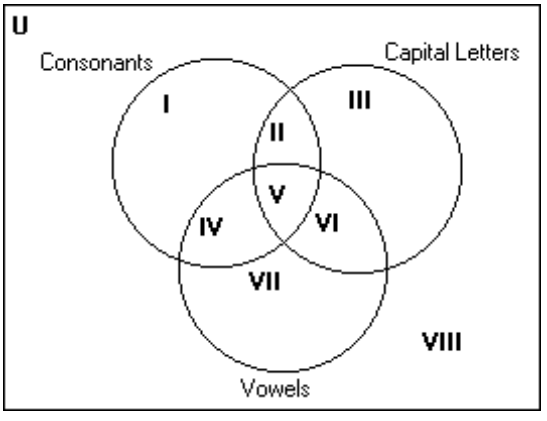


O

A) I
B) VI
C) V
D) III

Answer: B

171) Determine in which region of the Venn diagram the letter in question would be placed.

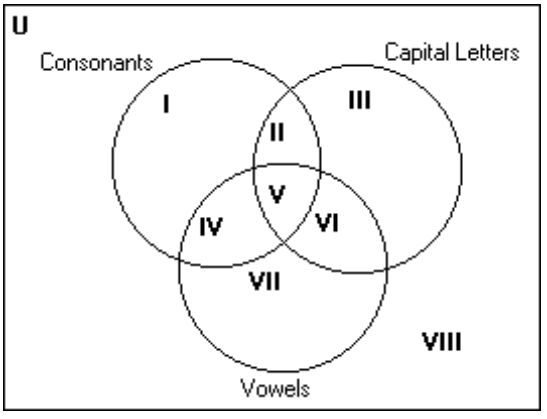


I

A) V
B) III
C) VI
D) I

Answer: C

172) Determine in which region of the Venn diagram the letter in question would be placed.

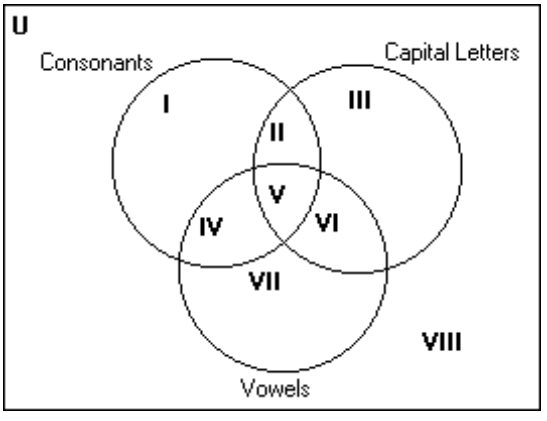


r

A) VIII
B) V
C) III
D) I

Answer: D

173) Determine in which region of the Venn diagram the letter in question would be placed.

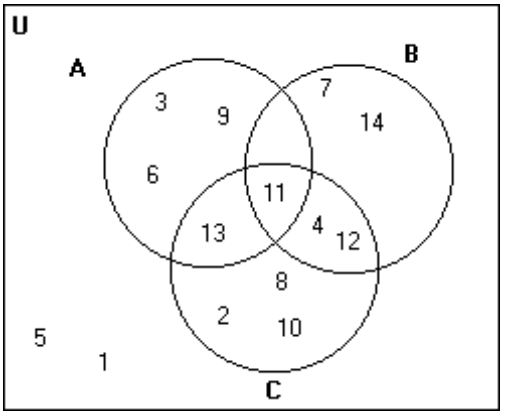


Q

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

Answer: D

Use the Venn diagram shown to list the set in roster form.



174) B

A) {0, 4, 7, 11, 12, 14}
B) {4, 12}
C) {4, 7, 11, 12, 14}
D) {7, 14}

Answer: C

175) U

A) {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14}
B) {11}
C) {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14}
D) {1, 5}

Answer: C

176) $B \cup C$

A) {2, 4, 7, 8, 10, 11, 12, 13, 14}
B) {2, 4, 7, 8, 10, 12, 13, 14}
C) {4, 11, 12}
D) {2, 7, 8, 10,14}

Answer: A

177) $A \cap C$

A) {2, 3, 4, 6, 8, 9, 10, 11, 12, 13}
B) {11, 13}
C) {11}
D) {4, 11, 12}

Answer: B

178) $(A \cup B)'$

A) {2, 5, 8, 10, 11, 12}
B) {1, 2, 5, 8, 10}
C) {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14}
D) {3, 4, 6, 7, 9, 11, 12, 13, 14}

Answer: B

179) $(A \cap B)'$
A) {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14}
B) {11}
C) {1, 2, 5, 8, 10}
D) {1, 2, 3, 5, 6, 9, 10}
Answer: A

180) $A \cup B \cup C$
A) {2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14}
B) {2, 3, 6, 7, 8, 9, 10, 14}
C) {1, 5}
D) {11}
Answer: A

181) C'
A) {1, 3, 5, 6, 7, 9, 14}
B) {2, 4, 8, 10, 11, 12, 13}
C) {3, 6, 7, 9, 14}
D) {11}
Answer: A

Use Venn diagrams to determine whether the following statements are equal for all sets A and B.

182) $(A \cap B)'$, $A' \cup B'$
A) not equal
B) equal
Answer: B

183) $(A \cup B)'$, $A' \cup B'$
A) not equal
B) equal
Answer: A

184) $A' \cap B'$, $A \cup B$
A) not equal
B) equal
Answer: A

185) $(A' \cup B)'$, $A \cap B'$
A) not equal
B) equal
Answer: B

186) $(A \cup B)'$, $(A' \cap B')'$
A) not equal
B) equal
Answer: A

187) $A \cap (B \cup C)$, $(A \cap B) \cup C$

A) equal

B) not equal

Answer: B

188) $A \cup (B \cap C)$, $(B \cap C) \cup A$

A) not equal

B) equal

Answer: B

189) $B \cup (A \cap C)$, $(B \cup A) \cap (B \cup C)$

A) not equal

B) equal

Answer: B

190) $A \cup (B \cap C)'$, $A \cup (B' \cup C')$

A) equal

B) not equal

Answer: A

191) $(A \cap B) \cup (B \cap C)$, $B \cap (A \cap C)$

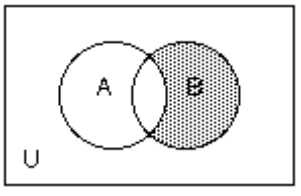
A) not equal

B) equal

Answer: A

Use set statements to write a description of the shaded area. Use union, intersection and complement as necessary.

192)



A) A - B

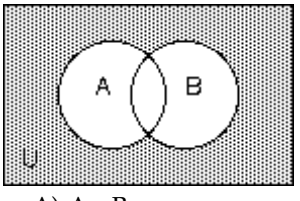
B) B - A'

C) $B \cap A'$

D) $A \cap B'$

Answer: C

193)



A) $A \cup B$

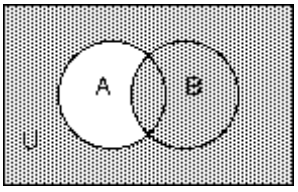
B) A - B

C) $A' \cap B'$

D) $(A \cap B)'$

Answer: C

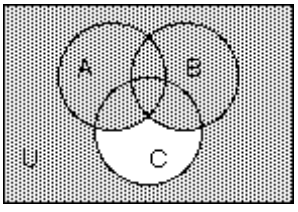
194)



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

Answer: C

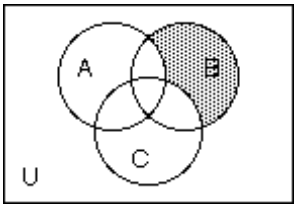
195)



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

Answer: A

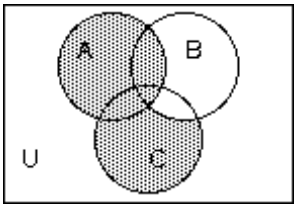
196)



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

Answer: B

197)



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

Answer: C

Solve the problem.

198) 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 neither red nor green jelly beans?

A) 8
B) 17
C) 13
D) 12

Answer: A

199) 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) 25
B) 3
C) 10
D) 12

Answer: D

200) 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 Allen?

A) 400
B) 250
C) 150
D) 100

Answer: B

201) 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 550 responses with the following results:

165 were interested in an interview show and a documentary, but not reruns.
22 were interested in an interview show and reruns but not a documentary
77 were interested in reruns but not an interview show.
132 were interested in an interview show but not a documentary.
55 were interested in a documentary and reruns.
33 were interested in an interview show and reruns.
44 were interested in none of the three.

How many are interested in exactly one kind of show?

A) 254
B) 244
C) 274
D) 264

Answer: D

202) A survey of 240 families showed that

91 had a dog;
70 had a cat;
31 had a dog and a cat;
91 had neither a cat nor a dog nor a parakeet;
7 had a cat and dog and a parakeet.

How many had a parakeet only?
A) 24
B) 29
C) 34
D) 19

Answer: D

203) A survey of a group of 116 tourists was taken in St. Louis. The survey showed the following:

65 of the tourists plan to visit Gateway Arch;
51 plan to visit the zoo;
11 plan to visit the Art Museum and the zoo, but not the gateway Arch;
13 plan to visit the Art Museum and the Gateway Arch, but not the zoo;
18 plan to visit the Gateway Arch and the zoo, but not the Art Museum;
9 plan to visit the Art Museum, the zoo, and the Gateway Arch;
14 plan to visit none of the three places.

How many plan to visit the Art Museum only?
A) 51
B) 102
C) 38
D) 13

Answer: D

204) A survey of 148 college students was done to find out what elective courses they were taking. Let A = the set of those taking art, B = the set of those taking basketweaving, and C = the set of those taking canoeing. The study revealed the following information.

$n(A) = 45$ $n(A \cap B) = 12$
$n(B) = 55$ $n(A \cap C) = 15$
$n(C) = 40$ $n(B \cap C) = 23$
$n(A \cap B \cap C) = 2$

How many students were not taking any of these electives?
A) 10
B) 66
C) 58
D) 56

Answer: D

Show that the set is infinite by placing it in a one-to-one correspondence with a proper subset of itself. Be sure to show the pairing of the general terms in the sets.

205) $\{5, 6, 7, 8, ...\}$

A) $\{\ 5,\ 6,\ 7,\ 8, ..., n+4, ...\}$
$\quad\downarrow\ \downarrow\ \downarrow\ \downarrow\ \quad\downarrow$
$\{\ 6,\ 7,\ 8,\ 9, ..., n+6, ...\}$

B) $\{\ 5,\ 6,\ 7,\ 8, ..., n+4, ...\}$
$\quad\downarrow\ \downarrow\ \downarrow\ \downarrow\ \quad\downarrow$
$\{\ 4,\ 5,\ 6,\ 7, ..., n+3, ...\}$

C) $\{\ 5,\ 6,\ 7,\ 8, ..., n+5, ...\}$
$\quad\downarrow\ \downarrow\ \downarrow\ \downarrow\ \quad\downarrow$
$\{\ 4,\ 5,\ 6,\ 7, ..., n+3, ...\}$

D) $\{\ 5,\ 6,\ 7,\ 8, ..., n+4, ...\}$
$\quad\downarrow\ \downarrow\ \downarrow\ \downarrow\ \quad\downarrow$
$\{\ 6,\ 7,\ 8,\ 9, ..., n+5, ...\}$

Answer: D

206) $\{3, 5, 7, 9, ...\}$

A) $\{\ 3,\ 5,\ 7,\ 9, ...,\ 2n+1, ...\}$
$\quad\downarrow\ \downarrow\ \downarrow\ \downarrow\ \quad\downarrow$
$\{\ 5,\ 7,\ 9,\ 11, ..., 2n+3, ...\}$

B) $\{\ 3,\ 5,\ 7,\ 9, ...,\ 2n+1, ...\}$
$\quad\downarrow\ \downarrow\ \downarrow\ \downarrow\ \quad\downarrow$
$\{\ 4,\ 6,\ 8,\ 10, ..., 2n+3, ...\}$

C) $\{\ 3,\ 5,\ 7,\ 9, ...,\ 2n+2, ...\}$
$\quad\downarrow\ \downarrow\ \downarrow\ \downarrow\ \quad\downarrow$
$\{\ 5,\ 7,\ 9,\ 11, ..., 2n+4, ...\}$

D) $\{\ 3,\ 5,\ 7,\ 9, ...,\ 2n+5, ...\}$
$\quad\downarrow\ \downarrow\ \downarrow\ \downarrow\ \quad\downarrow$
$\{\ 5,\ 7,\ 9,\ 11, ..., 2n+3, ...\}$

Answer: A

207) $\{3, 10, 17, 24, ...\}$

A) $\{\ 3,\ 10,\ 17,\ 24,\ ...,\ 7n-4,\ ...\}$
$\quad\downarrow\ \ \downarrow\ \ \downarrow\ \ \downarrow\ \quad\downarrow$
$\{10,\ 17,\ 24,\ 31,\ ...,\ 7n+2,\ ...\}$

B) $\{\ 3,\ 10,\ 17,\ 24,\ ...,\ 7n+4,\ ...\}$
$\quad\downarrow\ \ \downarrow\ \ \downarrow\ \ \downarrow\ \quad\downarrow$
$\{10,\ 17,\ 24,\ 31,\ ...,\ 7n+3,\ ...\}$

C) $\{\ 3,\ 10,\ 17,\ 24,\ ...,\ 7n-4,\ ...\}$
$\quad\downarrow\ \ \downarrow\ \ \downarrow\ \ \downarrow\ \quad\downarrow$
$\{10,\ 17,\ 24,\ 31,\ ...,\ 7n+3,\ ...\}$

D) $\{\ 3,\ 10,\ 17,\ 24,\ ...,\ 7n-10,\ ...\}$
$\quad\downarrow\ \ \downarrow\ \ \downarrow\ \ \downarrow\ \quad\downarrow$
$\{10,\ 17,\ 24,\ 31,\ ...,\ 7n-3,\ ...\}$

Answer: C

208) $\left\{\frac{4}{11}, \frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \ldots\right\}$

A) $\left\{\frac{4}{11}, \frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \ldots, \frac{n+4}{11}, \ldots\right\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \frac{8}{11}, \ldots, \frac{n+5}{11}, \ldots\right\}$

B) $\left\{\frac{4}{11}, \frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \ldots, \frac{n}{11}, \ldots\right\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \frac{8}{11}, \ldots, \frac{n+1}{11}, \ldots\right\}$

C) $\left\{\frac{4}{11}, \frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \ldots, \frac{n+3}{11}, \ldots\right\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \frac{8}{11}, \ldots, \frac{n+4}{11}, \ldots\right\}$

D) $\left\{\frac{4}{11}, \frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \ldots, \frac{n-4}{11}, \ldots\right\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{5}{11}, \frac{6}{11}, \frac{7}{11}, \frac{8}{11}, \ldots, \frac{n-5}{11}, \ldots\right\}$

Answer: C

Show that the set has cardinal number $\aleph_0$ by establishing a one-to-one correspondence between the set of counting numbers and the given set. Be sure to show the pairing of the general terms in the sets.

209) {5, 10, 15, 20, ...}

A) { 1, 2, 3, 4, ..., n, ...}
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
{ 5, 10, 15, 20, ..., 5n, ...}

B) { 1, 2, 3, 4, ..., n, ...}
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
{ 5, 10, 15, 20, ..., 6n, ...}

C) { 0, 1, 2, 3, ..., n, ...}
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
{ 5, 10, 15, 20, ..., 5n, ...}

D) { 1, 2, 3, 4, ..., n, ...}
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
{ 5, 10, 15, 20, ..., n, ...}

Answer: A

210) {200, 201, 202, 203, ...}

A) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 200, 201, 202, 203, ..., 200 + n - 1, ...}

B) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 200, 201, 202, 203, ..., 200 + n + 1, ...}

C) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 200, 201, 202, 203, ..., 200 + n, ...}

D) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 200, 201, 202, 203, ..., 2 + n - 1, ...}

Answer: A

211) {0, 5, 10, 15, 20, ...}

A) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 0, 5, 10, 15, ..., 5n - 1, ...}

B) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 0, 5, 10, 15, ..., 5n + 5, ...}

C) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 0, 5, 10, 15, ..., 5n - 5, ...}

D) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 0, 5, 10, 15, ..., 5n, ...}

Answer: C

212) {3, 7, 11, 15, ...}

A) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 3, 7, 11, 15, ..., 3n + 2, ...}

B) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 3, 7, 11, 15, ..., 4n + 1, ...}

C) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 3, 7, 11, 15, ..., 4n - 1, ...}

D) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 3, 7, 11, 15, ..., 3n - 2, ...}

Answer: C

213) {7, 12, 17,22, ...}

A) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{7, 12, 17, 22, \ldots, 5n + 1, \ldots\}$

B) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{7, 12, 17, 22, \ldots, 4n + 2, \ldots\}$

C) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{7, 12, 17, 22, \ldots, 4n - 1, \ldots\}$

D) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{7, 12, 17, 22, \ldots, 5n + 2, \ldots\}$

Answer: D

214) $\left\{\frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \ldots\right\}$

A) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7} \ldots, \frac{1}{n+2}, \ldots\right\}$

B) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7} \ldots, \frac{1}{n}, \ldots\right\}$

C) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7} \ldots, \frac{1}{n+3}, \ldots\right\}$

D) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7} \ldots, \frac{1}{n-3}, \ldots\right\}$

Answer: C

215) $\left\{\frac{1}{3}, \frac{3}{5}, \frac{5}{7}, \frac{7}{9}, \ldots\right\}$

A) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{3}, \frac{3}{5}, \frac{5}{7}, \frac{7}{9}, \ldots, \frac{2n+1}{2n-1}, \ldots\right\}$

B) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{3}, \frac{3}{5}, \frac{5}{7}, \frac{7}{9}, \ldots, \frac{3n-1}{n+1}, \ldots\right\}$

C) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{3}, \frac{3}{5}, \frac{5}{7}, \frac{7}{9}, \ldots, \frac{n+1}{3n-1}, \ldots\right\}$

D) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{3}, \frac{3}{5}, \frac{5}{7}, \frac{7}{9}, \ldots, \frac{2n-1}{2n+1}, \ldots\right\}$

Answer: D

216) $\{1, 8, 27, 64, \ldots\}$

A) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{1, 8, 27, 64, \ldots, 2n^3, \ldots\}$

B) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{1, 8, 27, 64, \ldots, n^4, \ldots\}$

C) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{1, 8, 27, 64, \ldots, n^3, \ldots\}$

D) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{1, 8, 27, 64, \ldots, n^2, \ldots\}$

Answer: C

217) $\{2, 4, 8, 16, \ldots\}$

A) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{2, 4, 8, 16, \ldots, n^2, \ldots\}$

B) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{2, 4, 8, 16, \ldots, 2n, \ldots\}$

C) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{2, 4, 8, 16, \ldots, 2^{2n}, \ldots\}$

D) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{2, 4, 8, 16, \ldots, 2^n, \ldots\}$

Answer: D

218) $\left\{\frac{1}{2}, \frac{1}{6}, \frac{1}{18}, \frac{1}{54}, \ldots\right\}$

A) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{2}, \frac{1}{6}, \frac{1}{18}, \frac{1}{54}, \ldots, \frac{1}{3(2^{n-1})}, \ldots\right\}$

B) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{2}, \frac{1}{6}, \frac{1}{18}, \frac{1}{54}, \ldots, \frac{1}{2(3^{n})}, \ldots\right\}$

C) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{2}, \frac{1}{6}, \frac{1}{18}, \frac{1}{54}, \ldots, \frac{1}{2(3^{n-1})}, \ldots\right\}$

D) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\left\{\frac{1}{2}, \frac{1}{6}, \frac{1}{18}, \frac{1}{54}, \ldots, \frac{1}{3(2^{n})}, \ldots\right\}$

Answer: C

1) A
2) A
3) B
4) A
5) A
6) B
7) B
8) B
9) B
10) A
11) B
12) B
13) B
14) A
15) B
16) B
17) A
18) A
19) A
20) A
21) B
22) A
23) C
24) A
25) B
26) B
27) B
28) D
29) C
30) C
31) D
32) B
33) A
34) C
35) D
36) C
37) D
38) D
39) A
40) B
41) A
42) C
43) A
44) B
45) A
46) C
47) B
48) D
49) B
50) C

51) C
52) B
53) D
54) A
55) D
56) C
57) A
58) D
59) D
60) D
61) D
62) A
63) D
64) C
65) A
66) B
67) A
68) C
69) A
70) C
71) A
72) B
73) A
74) A
75) D
76) A
77) B
78) A
79) B
80) A
81) A
82) A
83) A
84) C
85) A
86) D
87) C
88) A
89) B
90) A
91) C
92) B
93) A
94) C
95) A
96) B
97) C
98) C
99) B
100) D

101) D
102) D
103) A
104) A
105) B
106) A
107) D
108) A
109) B
110) B
111) B
112) B
113) A
114) A
115) A
116) B
117) A
118) B
119) C
120) B
121) B
122) A
123) B
124) C
125) D
126) C
127) A
128) B
129) A
130) B
131) C
132) C
133) D
134) B
135) D
136) D
137) B
138) D
139) D
140) B
141) B
142) D
143) C
144) C
145) C
146) B
147) B
148) C
149) B
150) C

151) B
152) A
153) B
154) D
155) C
156) C
157) D
158) D
159) D
160) B
161) A
162) B
163) D
164) A
165) D
166) A
167) A
168) C
169) B
170) B
171) C
172) D
173) D
174) C
175) C
176) A
177) B
178) B
179) A
180) A
181) A
182) B
183) A
184) A
185) B
186) A
187) B
188) B
189) B
190) A
191) A
192) C
193) C
194) C
195) A
196) B
197) C
198) A
199) D
200) B

201) D
202) D
203) D
204) D
205) D
206) A
207) C
208) C
209) A
210) A
211) C
212) C
213) D
214) C
215) D
216) C
217) D
218) C