Survey of Mathematics with Applications 10th edition Angel Test Bank

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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 doctors
A) not well defined B) well defined
Answer: A

2) The set of people who wear expensive clothes
A) not well defined B) well defined
Answer: A

3) The set of five countries in Europe having the smallest population
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 fifth grade at Maple Elementary School that are girls
A) well defined B) not well defined
Answer: A

6) The set of children in fourth grade at Maple Elementary School that are funny
A) not well defined B) well defined
Answer: A

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

8) The set of professional basketball players over the age of 38
A) well defined B) not well defined
Answer: A

9) The set of birds nesting in trees at Elm Nature Center on March 20th, 2012
A) not well defined B) well defined
Answer: B

10) The set of manufacturers of computers that enjoyed sizeable profits in the second 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) Finite B) Infinite
Answer: A

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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 14 and 15}

A) Infinite B) Finite

Answer: A

14) {2, 4, 6, 8, . . .}

A) Finite B) Infinite

Answer: B

15) The set of even whole numbers less than 100

A) Infinite B) Finite

Answer: B

16) The set of natural numbers greater than 100

A) Infinite B) Finite

Answer: A

17) The set of multiples of 5 between 0 and 1000

A) Infinite B) Finite

Answer: B

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) Infinite B) Finite

Answer: B

Express the set in roster form.

21) {x | x is a whole number between 6 and 10}

A) {6, 7, 8, 9} B) {6, 7, 8, 9, 10} C) {7, 8, 9} D) {7, 8, 9, 10}

Answer: C

22) {x | x is an integer between –2 and 2}

A) {–1, 0, 1} B) {–1, 0, 1, 2} C) {–2, –1, 0, 1, 2} D) {–2, –1, 0, 1}

Answer: A

23) {x | x is a negative multiple of 4}

A) {–4, –8, –12, . . .} B) {0, –4, –8, . . .} C) {–4, –16, –64, . . .} D) {4, 8, 12, . . .}

Answer: A

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24) {x | x is an integer greater than –6}
A) {–7, –8, –9, . . .} B) {–5, –4, –3, . . .} C) {–5, –4, –3, –2} D) {–7, –8, –9}
Answer: B

25) The set of all whole numbers greater than 2 and less than 6
A) {2, 3, 4, 5, 6} B) {2, 3, 4, 5} C) {3, 4, 5, 6} D) {3, 4, 5}
Answer: D

26) {x | x is a natural number multiple of 5}
A) {0, 5, 10, 15,. . .} B) {10, 15, 20, . . .} C) ∅ D) {5, 10, 15, . . .}
Answer: D

27) {x | x is a natural number less than –4}
A) ∅ B) {. . ., –7, –6, –5} C) {–5, –6, –7, . . .} D) {–3, –2, –1,. . .}
Answer: A

28) The set of integers greater than –8 and less than –4
A) {–8, –7, –6, –5, –4} B) {–8, –7, –6, –5} C) {–7, –6, –5, –4} D) {–7, –6, –5}
Answer: D

29) The set of seasons in a year
A) {January, March, June, September} B) {cold, warm, hot, cool}
C) {winter, summer} D) {winter, spring, summer, fall}
Answer: D

30) The set of the days of the week
A) {Tuesday, Thursday}
B) {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Sunday}
C) {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}
D) {Saturday, Sunday}
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	$7.58
B	$6.67
C	$6.45
D	$5.86
E	$4.59
F	$3.67
G	$3.47
H	$2.99
K	$2.33
L	$1.77

The set of regions in which the average price for the new beverage is more than $5.00.
A) {A, B, C, D} B) {E, F, G, H, K, L} C) {A, B, C, D, E} D) {A, B, C}
Answer: A

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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	$7.76
B	$6.53
C	$6.46
D	$5.87
E	$4.12
F	$3.56
G	$3.03
H	$2.60
K	$2.38
L	$1.75

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

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

Answer: A

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	$7.86
B	$6.85
C	$6.11
D	$5.98
E	$4.73
F	$3.52
G	$3.29
H	$2.78
K	$2.08
L	$1.55

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

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

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

Answer: C

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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	$7.92
B	$6.62
C	$6.15
D	$5.81
E	$4.84
F	$3.82
G	$3.16
H	$2.56
K	$2.02
L	$1.50

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

A) {A, B}
B) {A, B, C, D}
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	$7.24
B	$6.68
C	$6.01
D	$5.82
E	$4.66
F	$3.64
G	$3.37
H	$2.58
K	$2.31
L	$1.90

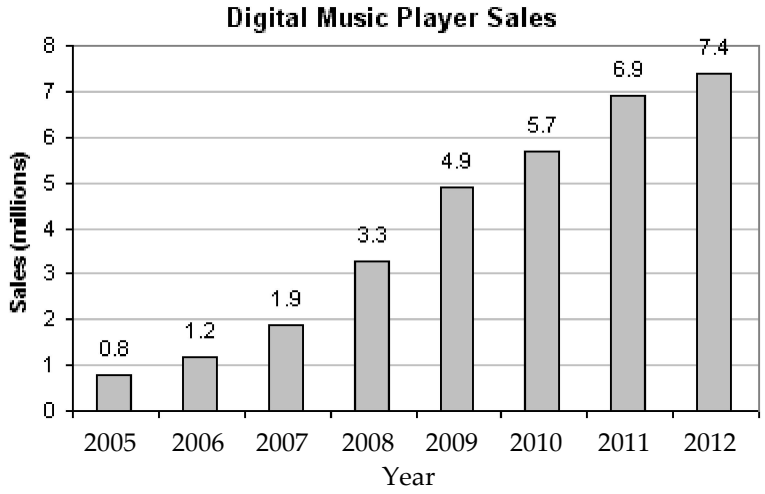
{x | x is a region in which the average price of the new beverage is at most $6.00}

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

Answer: D

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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.

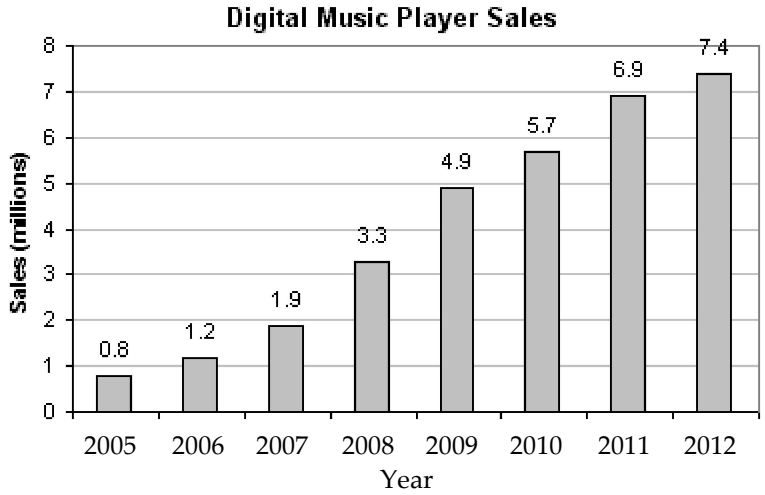


The set of years included in the graph in which digital music player sales were between 3 million and 5 million.

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

Answer: B

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 18 million.

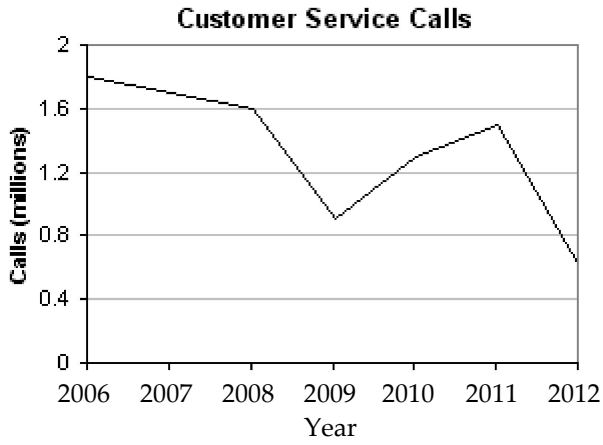
A) {0} B) { }

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

Answer: B

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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.

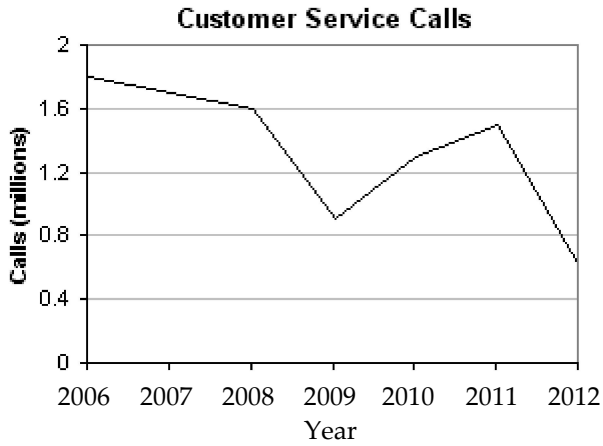


The set of years in which the number of customer service calls were below 1.1 million.

A) {2012} B) {2008, 2009, 2012} C) {2009, 2010, 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 1.1 million.

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

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

Answer: C

Write the set in set–builder notation.

40) {7}

A) {x | x is the natural number 7} B) {x is a constant}

C) {x} D) {x | x is a natural number}

Answer: A

41) {2, 4, 6, 8}

A) {2, 4, 6, 8} B) {x | x is any integer}

C) {x | x is an even natural number less than 10} D) {x | x is any even natural number}

Answer: C

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42) {16, 17, 18, 19}

A) {x | x is an integer less than 20}
B) {x | x is an integer between 16 and 19}
C) {16, 17, 18, 19}
D) {x | x is an integer between 15 and 20}

Answer: D

43) {48, 54, 60, 66,..., 108}

A) {x | x is a multiple of 6 between 42 and 114}
B) {x | x is a multiple of 6 greater than 48}
C) {x | x is a multiple of 6 between 48 and 108}
D) {x | x is a multiple of 6}

Answer: A

44) The set of all calculus books

A) {x is a calculus book}
B) {a calculus book}
C) {x | x is a calculus book}
D) {any calculus book}

Answer: C

45) The set of all cars owned by students

A) {x is a student with a car}
B) {x is a car}
C) {x | x is a car owned by a student}
D) {x | x is a student with a car}

Answer: C

46) The odd natural numbers less than 43

A) $\{x | x \in N < 43\}$
B) $\{x | x \in N \leq 43$ and x is odd$\}$
C) $\{x | x \in N \leq 41$ and x is odd$\}$
D) $\{x | x \in N < 42\}$

Answer: C

Write a description of the set.

47) S = {4, 8, 12, 16, 20, . . .}

A) Set S is the set of natural numbers greater than or equal to 4.
B) Set S is the set of integers that are greater than or equal to 4.
C) Set S is the set of natural numbers that are multiples of 4.
D) Set S is the set of integers.

Answer: C

48) D = {–2, –1, 0, 1, 2, 3, 4, . . .}

A) Set D is the set of natural numbers greater than or equal to –2.
B) Set D is the set of integers.
C) Set D is the set of integers greater than or equal to –2.
D) Set D is the set of natural numbers.

Answer: C

49) $E = \{x \mid x \in I$ and $-3 < x \leq 5\}$

A) E is the set of integers greater than –3 and less than or equal to 5.
B) E is the set of natural numbers greater than –3 and less than or equal to 5.
C) E is the set of natural numbers greater than or equal to –3 and less than 5.
D) E is the set of integers greater than or equal to –3 and less than 5.

Answer: A

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50) E = {x | x ∈ N and 2 < x ≤ 19}

A) E is the set of integers greater than 2 and less than or equal to 19.
B) E is the set of natural numbers greater than or equal to 2 and less than 19.
C) E is the set of natural numbers greater than 19 and less than or equal to 2.
D) E is the set of natural numbers greater than 2 and less than or equal to 19.

Answer: D

51) D = {January, February, March, April, May, June, July, August, . . .}

A) Set D is the set of seasons.
B) Set D is the set of time zones in America.
C) Set D is the set of days in a week.
D) Set D is the set of the months in a year.

Answer: D

52) S = {Monday, Tuesday, Wednesday, Thursday, Friday}

A) Set S is the set of the five business days in a week.
B) Set S is the set of days in a month.
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: A

53) V = {rose, daffodil, tulip, lily, orchid, . . .}

A) Set V is the set of types of fruit.
B) Set V is the set of colors.
C) Set V is the set of types of flowers.
D) Set V is the set of types of trees.

Answer: C

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

54) 11 ∈ {22, 33, 44, 55, 66}

A) False; 11 is not an element of the set.
B) False; 11 is a set.
C) False; 11 is a factor of the elements.
D) True

Answer: A

55) {3, 7, 15} = {0, 3, 7, 15}

A) False; 0 must be an element of both sets.
B) False; 0 is not a valid member of a set.
C) True
D) False; each set must have 4 elements.

Answer: A

56) 16 ∉ {15, 13, 12, . . ., 1}

A) False; 16 is a set.
B) False; 16 is smaller than the elements of the set.
C) True
D) False; 16 is an element of the set.

Answer: C

57) {6} = {x|x is an even counting number between 8 and 14}

A) False; 6 is less than 14
B) False; 6 is a set, and not an element of the set.
C) False; 6 is less than 8
D) True

Answer: C

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58) {54, 55, 54, 55} = {54, 55}
A) False; the elements are not equal.
B) False; there must be the same number of elements.
C) False; the elements cannot be repeated.
D) True
Answer: D

59) {3, 15, 28, 11, 37} = {37, 15, 11, 82, 3}
A) True
B) False; the elements are not the same.
C) False; the elements are not in the same order.
D) False; the elements must have the same sum.
Answer: B

60) {x | x is a counting number greater than 37} = {37, 38, 39, . . .}
A) False; 37 is not a counting number.
B) False; 37 is less than any element in the set.
C) True
D) False; 37 is not greater than 37.
Answer: D

61) 15 ∉ {x | x is an even counting number}
A) False; 15 is a counting number.
B) False; 15 is an element of the set.
C) False; 15 is an even counting number.
D) True
Answer: D

Find n(A) for the set.

62) A = {0, 2, 4, 6, 8}
A) n(A) = 2
B) n(A) = 5
C) n(A) = 4
D) n(A) = 8
Answer: B

63) A = {800, 801, 802, . . ., 8000}
A) n(A) = 8000
B) n(A) = 7201
C) n(A) = 4
D) n(A) = 7200
Answer: B

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

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

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

67) A = {x | x ∈ N and 10 ≤ x ≤ 25}
A) n(A) = 14
B) n(A) = 16
C) n(A) = 35
D) n(A) = 36
Answer: B

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

68) {2, 41, 14} and {41, 14, 2}

A) Both B) Neither C) Equivalent D) Equal

Answer: A

69) {L, M, N, O} and {l, m, n, o}

A) Neither B) Equal C) Both D) Equivalent

Answer: D

70) {x | x is a whole number} and {x | x is an integer}

A) Equivalent B) Neither C) Equal D) Both

Answer: A

71) {brake} and {break}

A) Neither B) Equivalent C) Both D) Equal

Answer: B

72) {5, 13} and {51, 3}

A) Neither B) Both C) Equivalent D) Equal

Answer: C

73) {4, 15} and {4, 1, 5}

A) Neither B) Both C) Equivalent D) Equal

Answer: A

74) {first, second, third} and {1, 2, 3}

A) Equivalent B) Neither C) Equal D) Both

Answer: A

75) {1/10, 2/10, 3/10} and {0.1, 0.2, 0.3}

A) Both B) Neither C) Equal D) Equivalent

Answer: A

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) Cardinal B) Ordinal

Answer: A

78) Max placed fourteenth in the cross country race.

A) Cardinal B) Ordinal

Answer: B

79) The physician prescribed five different types of pills for Aunt Martha.

A) Ordinal B) Cardinal

Answer: B

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

Answer: A

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

Answer: B

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

Answer: A

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

Answer: B

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; C is not a subset of D. B) False; the elements are the same in C and D.
C) False; D is a subset of C. D) True

Answer: D

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

Answer: B

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

Answer: C

87) $\{5\} \subseteq D$
A) False; 5 is not a subset of D. B) False; 5 is an element of the set, not a subset.
C) False; 5 is not an element of D. D) True

Answer: D

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

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

Answer: B

89) $C \subset D$

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

Answer: A

90) $C \subset A$

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

Answer: C

91) $\{\ \} \subset C$

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) False; the empty set is not a subset of any set.
D) True

Answer: D

92) $D \not\subset D$

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

Answer: A

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

93) $\{11, 12, 13\}$ ____ $\{10, 11, 12, 13\}$

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

Answer: D

94) $\varnothing$ ____ $\{5, 17, 24, 36\}$

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

Answer: B

95) $\{6, 7, 8\}$ ____ $\{6, 7, 8\}$

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

Answer: D

96) $\{0\}$ ____ $\varnothing$

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

Answer: C

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

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

Answer: D

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

A) ⊆ and ⊂ B) ⊄ C) ⊆ D) ⊂

Answer: C

99) {x | x ∈ N and x > 8} ____ {x | x ∈ N and 3 < x ≤ 8}

A) ⊄ B) ⊆ C) ⊂ D) ⊆ and ⊂

Answer: A

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

A) ⊄ B) ⊆ C) ⊂ D) ⊂ and ⊆

Answer: D

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

101) Determine the number of subsets of {4, 5, 6}

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

Answer: A

102) Determine the number of subsets of {0}

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

Answer: B

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

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

Answer: A

104) Determine the number of subsets of {1, 2, 3, ..., 6}

A) 64 B) 60 C) 16 D) 128

Answer: A

105) List all the subsets of {3}.

A) {3} B) {0, 3}, {3} C) {3}, { }, {∅} D) {3}, { }

Answer: D

106) List all the subsets of {fox, hen, sheep}.

A) {fox, hen, sheep}, {fox, hen}, {fox, sheep}, {hen, sheep}, {fox}, {hen}, {sheep}

B) {fox, hen}, {fox, sheep}, {hen, sheep}, {fox}, {hen}, {sheep}

C) {fox, hen}, {fox, sheep}, {hen, sheep}, {fox}, {hen}, {sheep}, { }

D) {fox, hen, sheep}, {fox, hen}, {fox, sheep}, {hen, sheep}, {fox}, {hen}, {sheep}, { }

Answer: D

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) 2048 C) 1012 D) 1024

Answer: D

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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 $C \neq \varnothing$, $U \neq \varnothing$, and $C \subset U$.

108) $\varnothing \subseteq C$

A) True B) False

Answer: A

109) $C \subseteq U$

A) True B) False

Answer: B

110) $U \subset \varnothing$

A) True B) False

Answer: B

111) $U \subseteq \varnothing$

A) True B) False

Answer: B

112) $\varnothing \subset \varnothing$

A) True B) False

Answer: B

113) $\varnothing \subseteq A$

A) True B) False

Answer: A

114) $\varnothing \subseteq \varnothing$

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) $D \subseteq D$

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: peanuts, caramel sauce, butterscotch chips, strawberries, and cookie dough bits. How many different variations of yogurt and toppings can be made?

A) 6 B) 64 C) 16 D) 32

Answer: D

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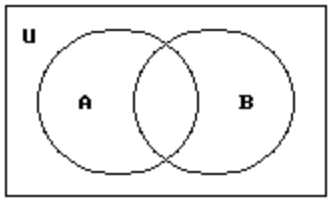
119) Joe goes to a mexican restaurant and order nachos. He can have just cheese or add any of the following: steak, green peppers, salsa or refried beans. How many different variations of nachos are possible?

A) 32 B) 8 C) 64 D) 16

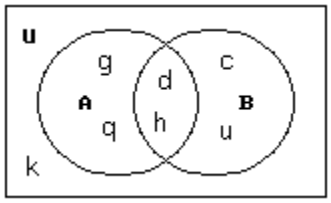
Answer: D

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

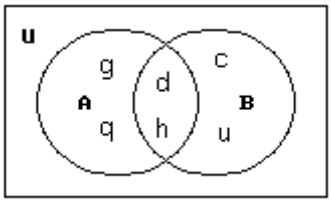
120) Let U = {c, d, g, h, k, u, q}
A = {d, h, g, q}
B = {c, d, h, u}



A)

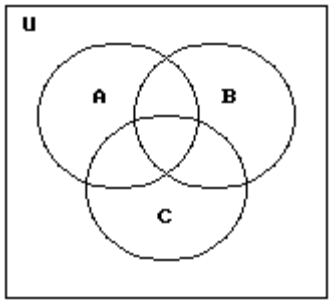


B)

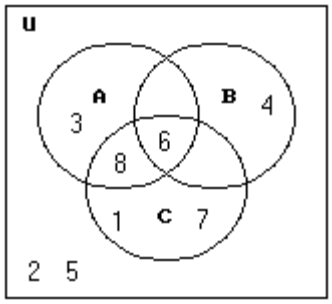


Answer: A

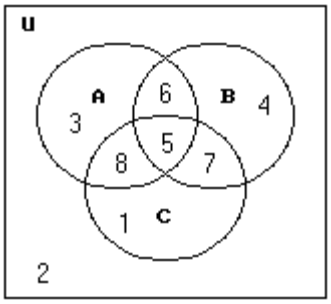
121) Let U = {1, 2, 3, 4, 5, 6, 7, 8}
A = {3, 6, 8}
B = {4, 6}
C = {1, 6, 7, 8}



A)



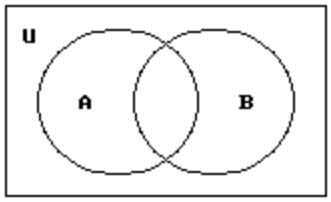
B)



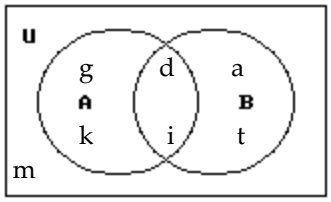
Answer: A

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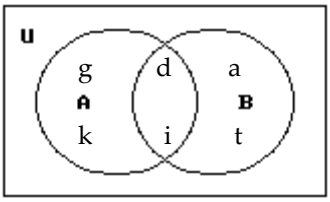
122) Let U = {a, d, i, g, m, k, t}
A = {d, i, g, k}
B = {a, d, i, t}



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

Answer: A

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 and all soda pops in cans
D) All non–diet soda pops in cans

Answer: D

125) A ∩ B ∩ D

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

Answer: A

126) (A ∪ B) ∪ D

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

Answer: C

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

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

Answer: C

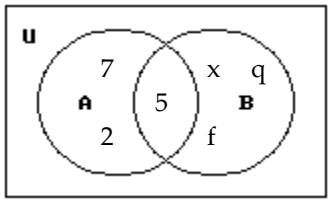
128) $(A \cup D) \cap C'$

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

Answer: D

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

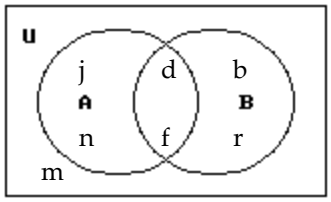
129) Find A.



A) {5}
B) {7, 2, 5, x}
C) {5, x, q, f}
D) {7, 2, 5}

Answer: D

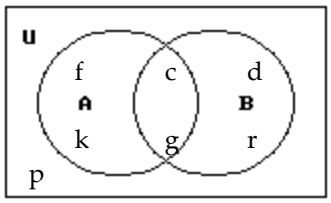
130) Find $A \cup B$.



A) {d, f}
B) {b, d, f, j, n, r}
C) {m}
D) {b, d, f, j, m, n, r}

Answer: B

131) Find $A \cap B$.

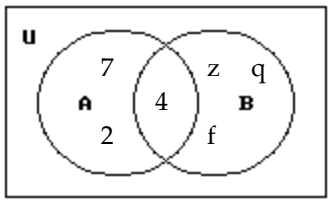


A) {d, c, g, f, k, r}
B) {p}
C) {d, c, g, f, p, k, r}
D) {c, g}

Answer: D

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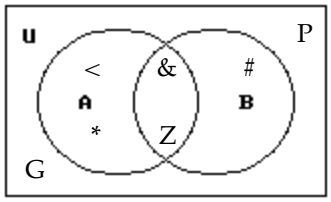
132) Find (A ∪ B)'.



A) ∅ B) {7, 2, 4, z, q, f} C) {7, 2, 4} D) {7}

Answer: A

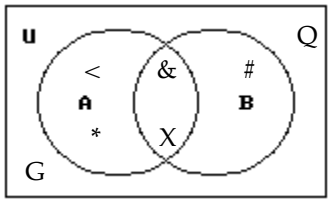
133) Find A ∩ B'.



A) {P, G, <, *} B) {Z, P, G, <, &, *} C) {P, G} D) {<, *}

Answer: D

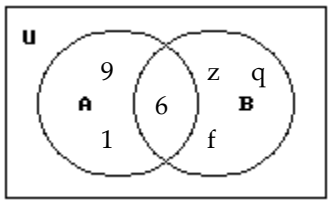
134) Find A' ∪ B.



A) {X, <, *} B) {Q, #, G} C) {X, Q, # , <, *} D) {X, Q, #, G, &}

Answer: D

135) Find A' ∩ B'.



A) {9, 1, 6, z, q, f} B) ∅ C) {9} D) {6}

Answer: B

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

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

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

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

140) A ∪ (B ∩ C)
A) {q, y, z}
B) {q, s, u, w, y, z}
C) {q, r, w, y, z}
D) {q, w, y}
Answer: B

141) A ∩ (B ∪ C)
A) {q, s, u, w, y, z}
B) {q, s, w, y}
C) {q, r, w, y, z}
D) {q, y, z}
Answer: B

142) 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

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

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

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

Answer: C

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

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

Answer: A

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

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

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

Answer: A

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

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

Answer: A

149) $B \cap (A - C)$

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

C) {q, s, u, y, z} D) {q, s, u, y}

Answer: B

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

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

Answer: A

Find the indicated product.

151) Let A = {6, 7, 8} and B = {a, b, c}, determine A × B.

A) {(a, 6), (b, 7), (c, 8)}

B) {(6, a), (6, b), (6, c), (7, a), (7, b), (7, c), 8, a), (8, b), (8, c)}

C) {(6, a), (7, b), (8, c)}

D) {(a, 6), (b, 6), (c, 6), (a, 7), (b, 7), (c, 7), (a, 8), (b, 8), (c, 8)}

Answer: B

152) Let A = {6, 7, 8} and B = {x, y, z} determine B × A.

A) {(x, 6), (x, 7), (x, 8), (y, 6), (y, 7), (y, 8), (z, 6), (z, 7), (z, 8)}

B) {(6, x), (6, y), (6, z), (7, x), (7, y), (7, z), (8, x), (8, y), (8, z)}

C) {(6, x), (7, y), (8, z)}

D) {(x, 6), (y, 7), (z, 8)

Answer: A

153) Let A = {2, 3} and B = {a, b}, determine n(A × B).

A) 2 B) 4 C) 0 D) 6

Answer: B

154) Let A = {7, 8, 9} and B = {1, 2, 3}, determine n(A × B).

A) 0 B) 9 C) 3 D) 6

Answer: B

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

Answer: D

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

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

Answer: A

157) A survey at Village Pizza showed that 53 people like sausage pizza, 29 people like chicken bacon pizza, and 14 people like both sausage pizza and chicken bacon pizza. How many people like either sausage pizza or chicken bacon pizza?

A) 96 B) 82 C) 67 D) 68

Answer: D

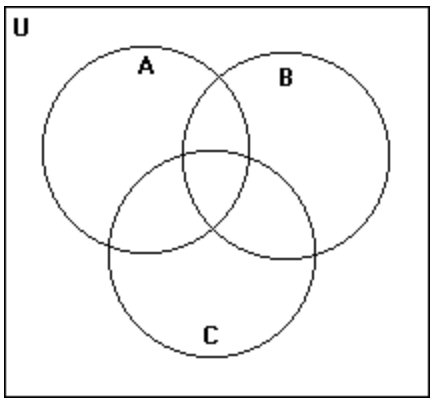
158) At Wilson High School 33 girls participate in soccer, 37 girls participate in basketball, and 13 girls participate in both soccer and basketball. How many girls participate in either soccer or basketball?

A) 13 B) 70 C) 83 D) 57

Answer: D

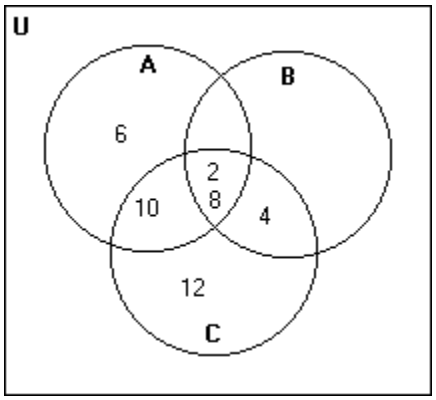
Construct a Venn diagram illustrating the following sets.

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

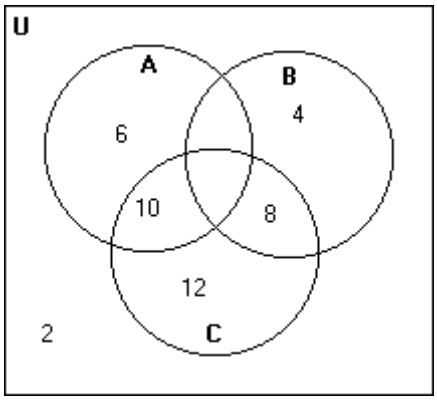


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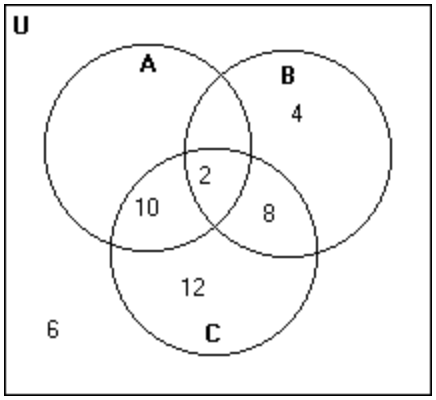
A)



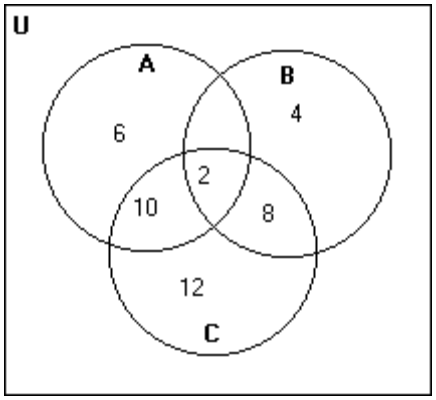
B)



C)

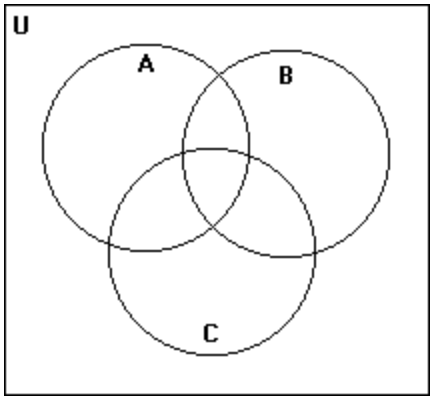


D)



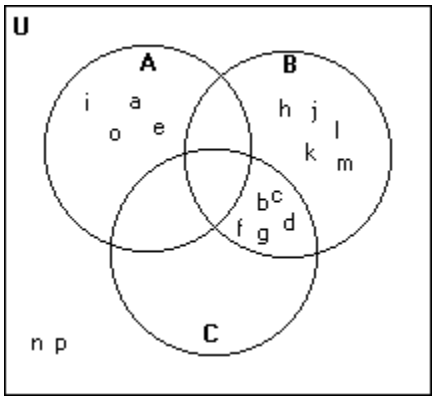
Answer: D

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}

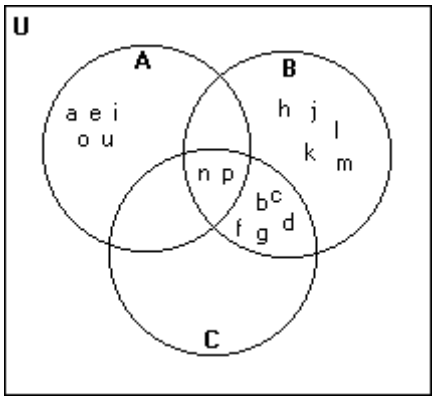


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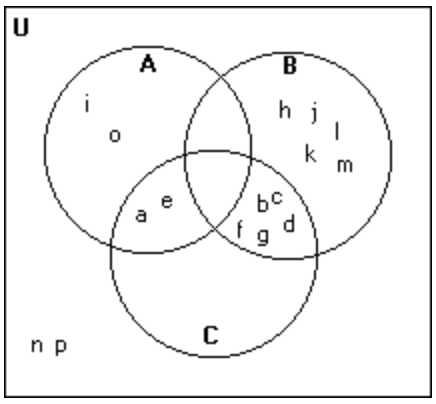
A)



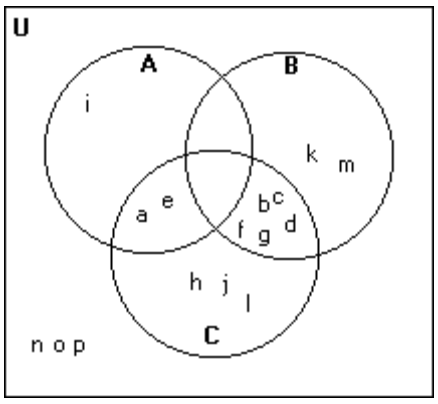
B)



C)

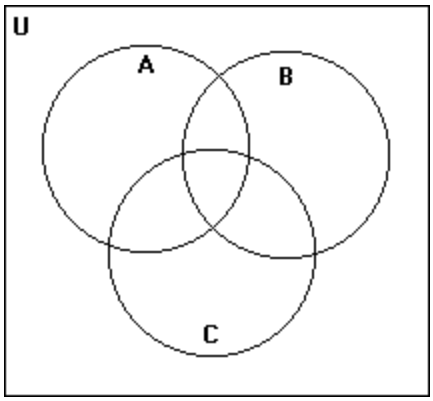


D)



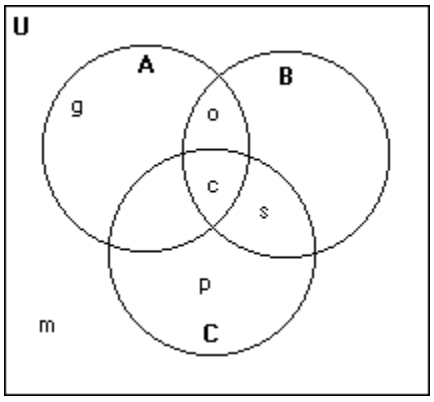
Answer: C

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)}

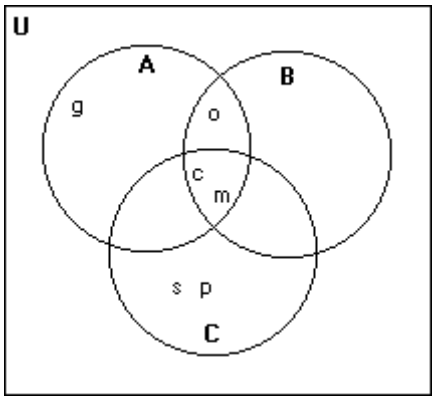


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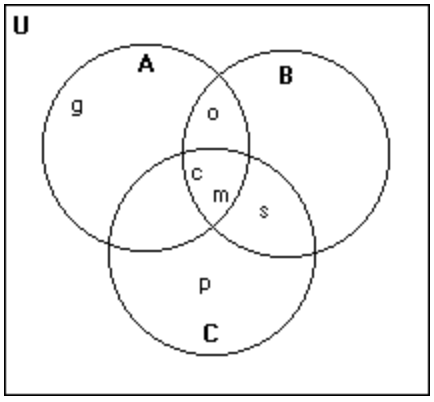
A)



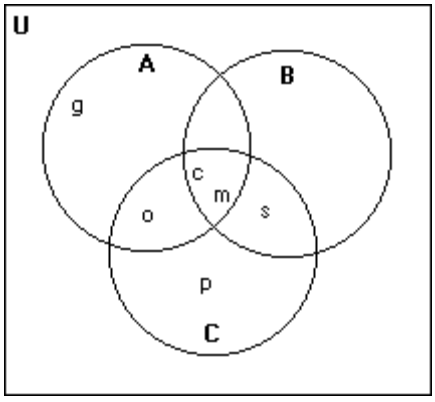
B)



C)



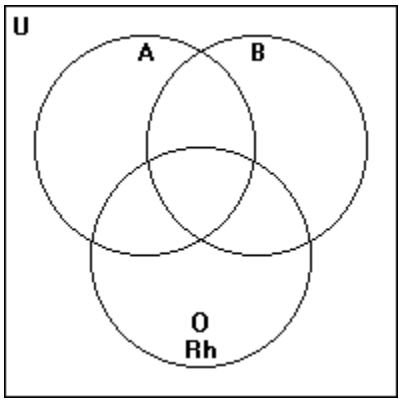
D)



Answer: C

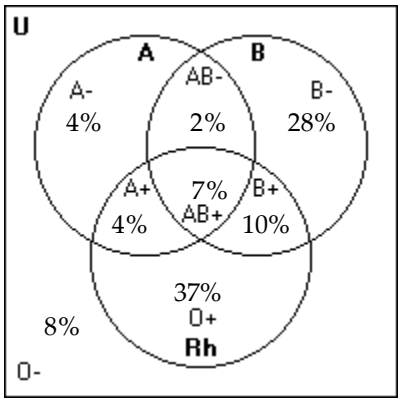
162) A hematology text gives the following information on percentages of the different types of blood in the western hemisphere.

Type	positive blood, %	Negative blood, %
A	28	4
O	37	8
B	10	4
AB	7	2

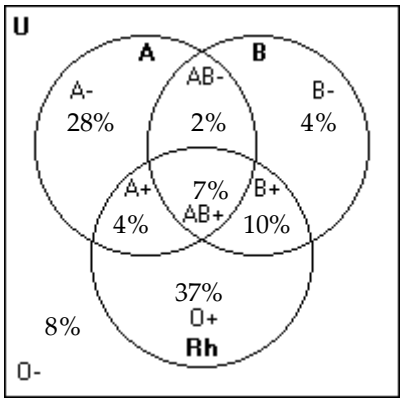


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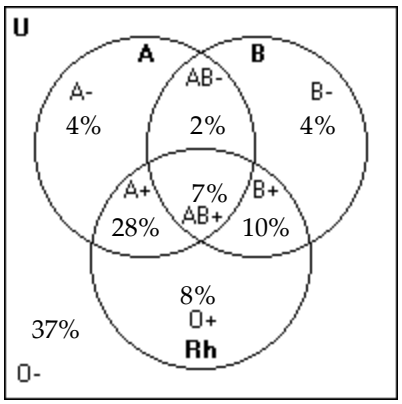
A)



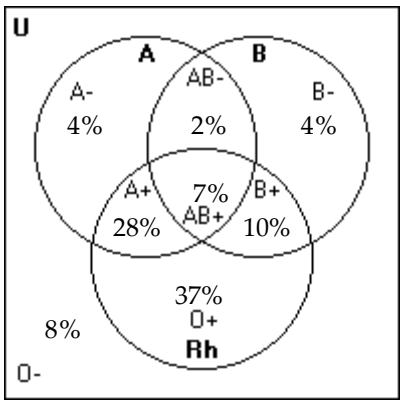
B)



C)



D)



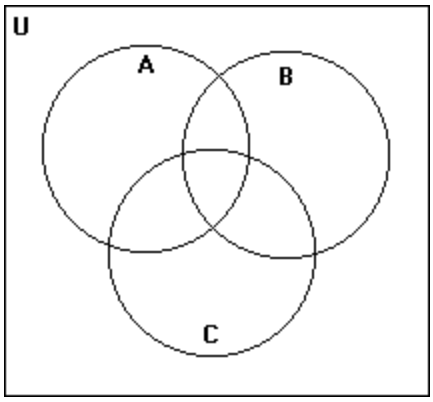
Answer: D

163) Consider the following chart which shows teams that won at least 5 medals in wine–tasting competitions. Let the vineyards shown represent the universal set.

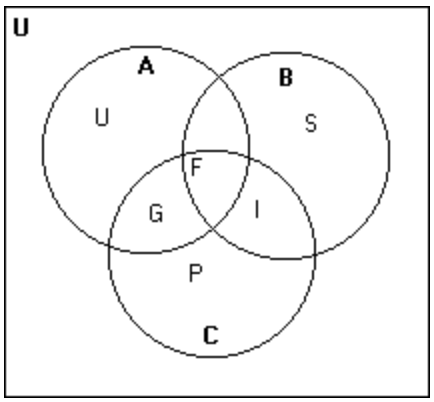
	Gold	Silver	Bronze	Total
Franklin (F)	13	12	7	32
Upper (U)	12	5	13	31
Springton (S)	7	3	12	22
Inland (I)	7	5	1	13
Parkway (P)	1	7	3	11
Greenville (G)	3	1	1	5

Let A = set of teams that won at least 31 medals.
Let B = set of teams that won at least 7 gold medals.
Let C = set of teams that won at least 5 silver medals.

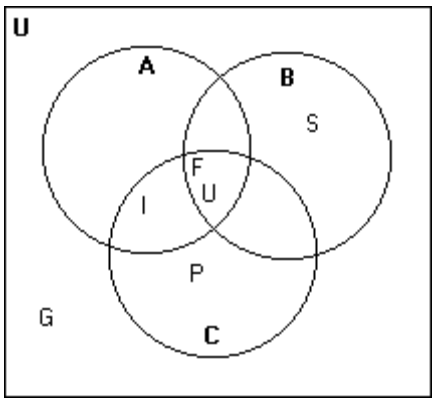
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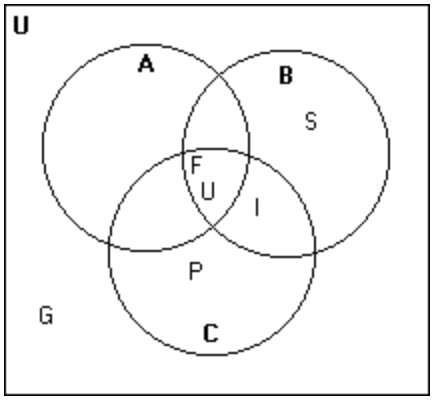
A)



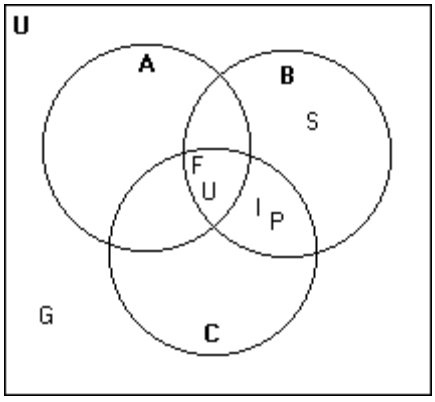
B)



C)



D)



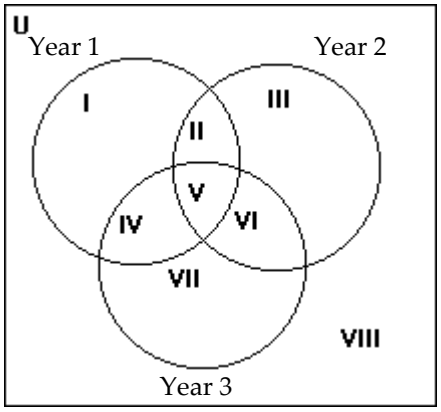
Answer: C

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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



Sloan's

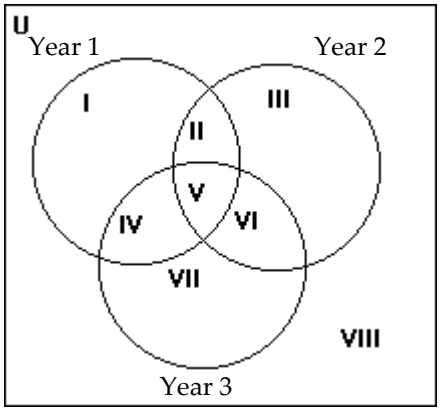
A) III B) VI C) VIII D) V

Answer: D

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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



Markette

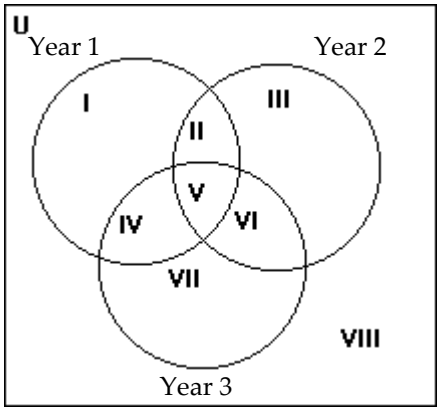
A) II B) VI C) VII D) I

Answer: B

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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



Charter

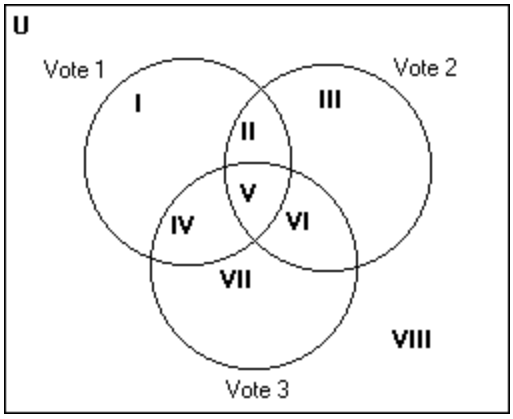
A) VI B) IV C) I D) II

Answer: C

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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



Patterson

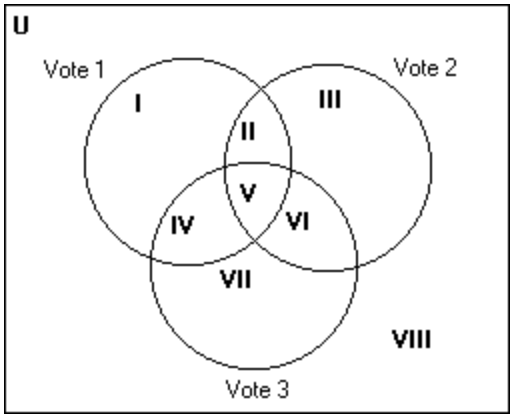
A) III B) VI C) VII D) II

Answer: C

Survey of Mathematics with Applications 10th edition Angel Test Bank

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



Szabo

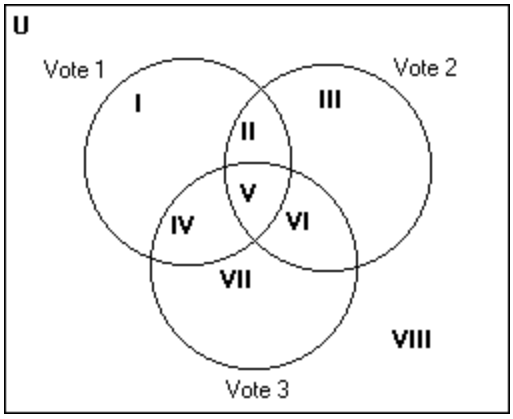
A) VI B) II C) III D) IV

Answer: D

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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

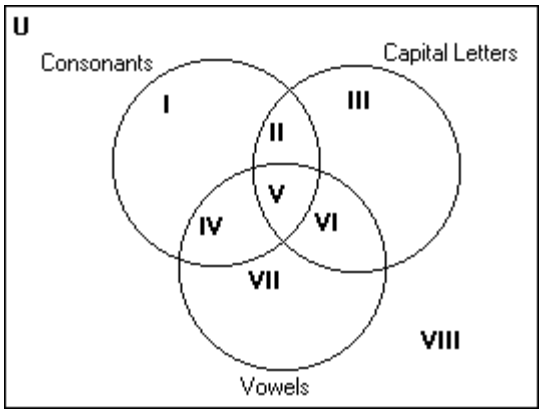


Ruiz

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

Answer: A

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



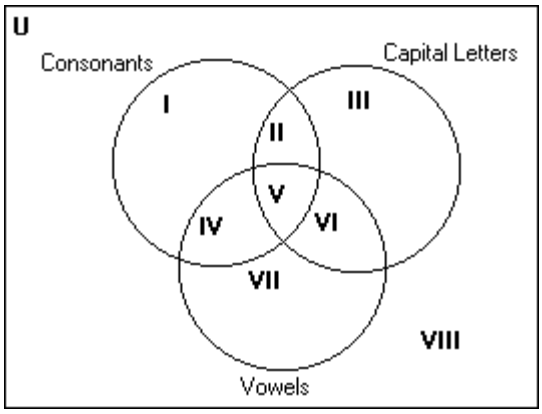
A

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

Answer: B

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

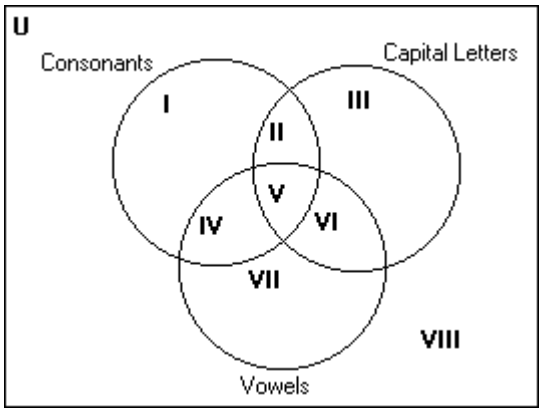


E

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

Answer: B

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



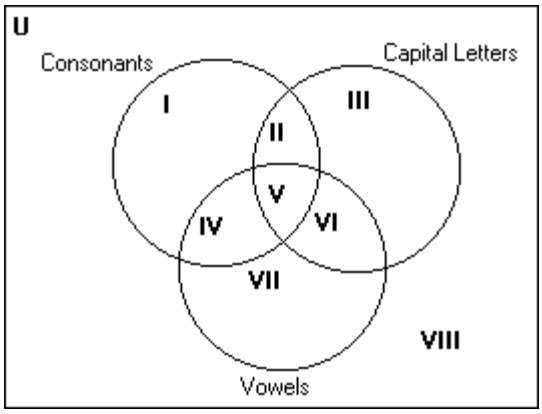
r

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

Answer: D

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

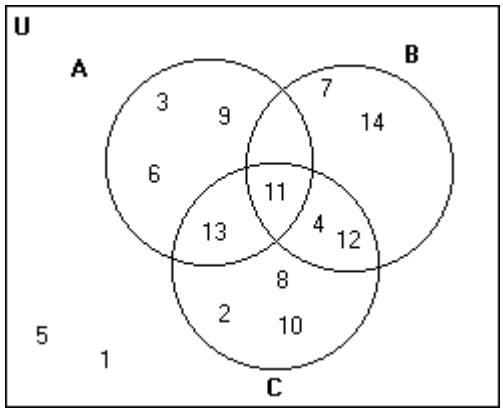


K

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

Answer: D

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



174) B

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

Answer: B

175) U

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

Answer: A

176) B ∪ C

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

Answer: D

177) A ∩ C

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

Answer: D

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

Answer: B

181) C'

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

Answer: D

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) equal
B) not equal

Answer: A

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

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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) not equal B) equal

Answer: B

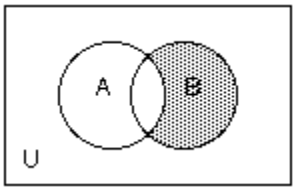
191) $(A \cap B) \cup (B \cap C)$, $B \cap (A \cap C)$

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.

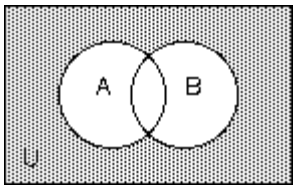
192)



A) A – B B) B ∩ A' C) A ∩ B' D) B – A'

Answer: B

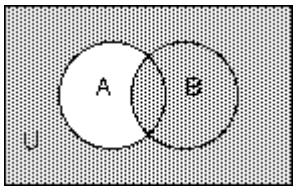
193)



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

Answer: A

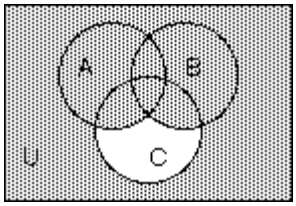
194)



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

Answer: C

195)

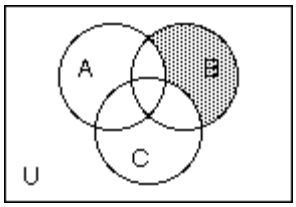


A) (A ∪ B ∪ C)' B) A ∪ B ∩ C' C) (A ∩ B) ∪ C' D) (A ∪ B) ∪ C'

Answer: D

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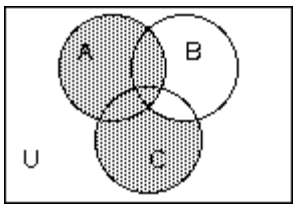
196)



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

Answer: D

197)



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

Answer: A

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) 12 B) 13 C) 17 D) 8

Answer: D

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 a cat or a dog?

A) 5 B) 15 C) 13 D) 18

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 Moore or Allen?

A) 500 B) 300 C) 400 D) 100

Answer: A

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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 500 responses with the following results:

150 were interested in an interview show and a documentary, but not reruns.
20 were interested in an interview show and reruns but not a documentary
70 were interested in reruns but not an interview show.
120 were interested in an interview show but not a documentary.
50 were interested in a documentary and reruns.
30 were interested in an interview show and reruns.
40 were interested in none of the three.

How many are interested in exactly one kind of show?

A) 230 B) 250 C) 220 D) 240

Answer: D

202) A survey of 280 families showed that

107 had a dog;
82 had a cat;
37 had a dog and a cat;
105 had neither a cat nor a dog nor a parakeet;
9 had a cat and dog and a parakeet.

How many had a parakeet only?

A) 23 B) 33 C) 38 D) 28

Answer: A

203) A survey of a group of 115 tourists was taken in St. Louis. The survey showed the following:

66 of the tourists plan to visit Gateway Arch;
50 plan to visit the zoo;
11 plan to visit the Art Museum and the zoo, but not the gateway Arch;
14 plan to visit the Art Museum and the Gateway Arch, but not the zoo;
19 plan to visit the Gateway Arch and the zoo, but not the Art Museum;
8 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) 50 B) 12 C) 101 D) 38

Answer: B

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204) A survey of 145 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) 63 B) 55 C) 10 D) 53

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) {4, 5, 6, 7, ...}

A) { 4, 5, 6, 7, ..., n + 3, ...}
↓ ↓ ↓ ↓ ↓
{ 5, 6, 7, 8, ..., n + 5, ...}

B) { 4, 5, 6, 7, ..., n + 4, ...}
↓ ↓ ↓ ↓ ↓
{ 3, 4, 5, 6, ..., n + 2, ...}

C) { 4, 5, 6, 7, ..., n + 3, ...}
↓ ↓ ↓ ↓ ↓
{ 3, 4, 5, 6, ..., n + 2, ...}

D) { 4, 5, 6, 7, ..., n + 3, ...}
↓ ↓ ↓ ↓ ↓
{ 5, 6, 7, 8, ..., n + 4, ...}

Answer: D

206) {4, 6, 8, 10, ...}

A) { 4, 6, 8, 10, ..., 2n + 2, ...}
↓ ↓ ↓ ↓ ↓
{ 6, 8, 10, 12, ..., 2n + 4, ...}

B) { 4, 6, 8, 10, ..., 2n + 3, ...}
↓ ↓ ↓ ↓ ↓
{ 6, 8, 10, 12, ..., 2n + 5, ...}

C) { 4, 6, 8, 10, ..., 2n + 6, ...}
↓ ↓ ↓ ↓ ↓
{ 6, 8, 10, 12, ..., 2n + 4, ...}

D) { 4, 6, 8, 10, ..., 2n + 2, ...}
↓ ↓ ↓ ↓ ↓
{ 5, 7, 9, 11, ..., 2n + 4, ...}

Answer: A

207) {5, 12, 19, 26, ...}

A) { 5, 12, 19, 26, ..., 7n – 2, ...}
↓ ↓ ↓ ↓ ↓
{ 12, 19, 26, 33, ..., 7n + 4, ...}

B) { 5, 12, 19, 26, ..., 7n + 2, ...}
↓ ↓ ↓ ↓ ↓
{ 12, 19, 26, 33, ..., 7n + 5, ...}

C) { 5, 12, 19, 26, ..., 7n – 12, ...}
↓ ↓ ↓ ↓ ↓
{ 12, 19, 26, 33, ..., 7n – 5, ...}

D) { 5, 12, 19, 26, ..., 7n – 2, ...}
↓ ↓ ↓ ↓ ↓
{ 12, 19, 26, 33, ..., 7n + 5, ...}

Answer: D

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208) $\left\{\frac{4}{8}, \frac{5}{8}, \frac{6}{8}, \frac{7}{8}, \ldots\right\}$

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

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

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

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

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, ...}
↓ ↓ ↓ ↓ ↓
{ 5, 10, 15, 20, ..., 6n, ...}

B) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 5, 10, 15, 20, ..., 5n, ...}

C) { 0, 1, 2, 3, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 5, 10, 15, 20, ..., 5n, ...}

D) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 5, 10, 15, 20, ..., n, ...}

Answer: B

210) {800, 801, 802, 803, ...}

A) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 800, 801, 802, 803, ..., 8 + n – 1, ...}

B) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 800, 801, 802, 803, ..., 800 + n + 1, ...}

C) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 800, 801, 802, 803, ..., 800 + n – 1, ...}

D) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 800, 801, 802, 803, ..., 800 + n, ...}

Answer: C

211) {0, 2, 4, 6, 8, ...}

A) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 0, 2, 4, 6, ..., 2n – 1, ...}

B) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 0, 2, 4, 6, ..., 2n – 2, ...}

C) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 0, 2, 4, 6, ..., 2n, ...}

D) { 1, 2, 3, 4, ..., n, ...}
↓ ↓ ↓ ↓ ↓
{ 0, 2, 4, 6, ..., 2n + 2, ...}

Answer: B

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

A) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{3, 7, 11, 15, \ldots, 3n + 2, \ldots\}$

B) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{3, 7, 11, 15, \ldots, 4n + 1, \ldots\}$

C) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{3, 7, 11, 15, \ldots, 4n - 1, \ldots\}$

D) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{3, 7, 11, 15, \ldots, 3n - 2, \ldots\}$

Answer: C

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

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

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

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

Answer: A

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

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

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

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

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: D

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

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216) {1, 8, 27, 64, ...}

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

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

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

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

Answer: A

217) {4, 16, 64, 256, ...}

A) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{4, 16, 64, 256, \ldots, n^4, \ldots\}$

B) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{4, 16, 64, 256, \ldots, 4n, \ldots\}$

C) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{4, 16, 64, 256, \ldots, 4^{2n}, \ldots\}$

D) $\{1, 2, 3, 4, \ldots, n, \ldots\}$
$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \qquad \downarrow$
$\{4, 16, 64, 256, \ldots, 4^n, \ldots\}$

Answer: D

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

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

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

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

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