

Mathematical Ideas 14th edition Miller Test Bank

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Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**List the elements in the set.**

- 1) $\{x \mid x \text{ is a whole number between 3 and 7}\}$ 1) _____
 A) $\{3, 4, 5, 6\}$ B) $\{4, 5, 6, 7\}$ C) $\{4, 5, 6\}$ D) $\{3, 4, 5, 6, 7\}$
- 2) $\{x \mid x \text{ is an integer between } -7 \text{ and } -3\}$ 2) _____
 A) $\{-7, -6, -5, -4, -3\}$ B) $\{-6, -5, -4, -3\}$
 C) $\{-6, -5, -4\}$ D) $\{-7, -6, -5, -4\}$
- 3) $\{x \mid x \text{ is a negative multiple of 9}\}$ 3) _____
 A) $\{9, 18, 27, \dots\}$ B) $\{-9, -18, -27, \dots\}$
 C) $\{-9, -81, -729, \dots\}$ D) $\{0, -9, -18, \dots\}$
- 4) $\{x \mid x \text{ is an integer greater than } -6\}$ 4) _____
 A) $\{-5, -4, -3, \dots\}$ B) $\{-5, -4, -3, -2\}$ C) $\{-7, -8, -9\}$ D) $\{-7, -8, -9, \dots\}$
- 5) The set of all whole numbers greater than 2 and less than 6 5) _____
 A) $\{3, 4, 5, 6\}$ B) $\{2, 3, 4, 5, 6\}$ C) $\{2, 3, 4, 5\}$ D) $\{3, 4, 5\}$
- 6) $\{x \mid x \text{ is a counting number multiple of 4}\}$ 6) _____
 A) $\{0, 4, 8, 12, \dots\}$ B) $\emptyset$ C) $\{4, 8, 12, \dots\}$ D) $\{8, 12, 16, \dots\}$
- 7) $\{x \mid x \text{ is a counting number less than } -1\}$ 7) _____
 A) $\{-2, -3, -4, \dots\}$ B) $\{0, 1, 2, \dots\}$ C) $\{\dots, -4, -3, -2\}$ D) $\emptyset$
- 8) The set of all positive integer powers of 3. 8) _____
 A) $\{3, 9, 27, 81, 243, \dots\}$ B) $\{1, 3, 9, 27, 81, 243, \dots\}$
 C) $\{3, 6, 9, 12, 15, \dots\}$ D) $\{1, 8, 27, 64, 125, \dots\}$
- 9) $\{x \mid x \text{ is an even integer smaller than 8}\}$ 9) _____
 A) $\{\dots, -6, -4, -2, 2, 4, 6\}$ B) $\{2, 4, 6\}$
 C) $\{0, 2, 4, 6\}$ D) $\{\dots, -6, -4, -2, 0, 2, 4, 6\}$
- 10) The set of the days of the week 10) _____
 A) $\{\text{Saturday, Sunday}\}$
 B) $\{\text{Tuesday, Thursday}\}$
 C) $\{\text{Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Sunday}\}$
 D) $\{\text{Friday, Monday, Saturday, Sunday, Thursday, Tuesday, Wednesday}\}$

Write the set in set-builder notation.

- 11) $\{2\}$ 11) _____
 A) $\{x\}$ B) $\{x \mid x \text{ is the natural number } 2\}$
 C) $\{x \mid x \text{ is a natural number}\}$ D) $\{x \text{ is a constant}\}$

- 12) $\{2, 4, 6, 8\}$ 12) _____
 A) $\{x \mid x \text{ is any even natural number}\}$
 B) $\{x \mid x \text{ is an even natural number less than } 10\}$
 C) $\{x \mid x \text{ is any even integer less than } 10\}$
 D) $\{2, 4, 6, 8\}$
- 13) $\{16, 17, 18, 19\}$ 13) _____
 A) $\{x \mid x \text{ is an integer between } 16 \text{ and } 19\}$ B) $\{16, 17, 18, 19\}$
 C) $\{x \mid x \text{ is an integer between } 15 \text{ and } 20\}$ D) $\{x \mid x \text{ is an integer less than } 20\}$
- 14) $\{-6, -5, -4, -3, \dots\}$ 14) _____
 A) $\{x \mid x \text{ is an integer greater than } -7\}$ B) $\{x \mid x \text{ is any integer}\}$
 C) $\{x \mid x \text{ is an integer between } -7 \text{ and } -2\}$ D) $\{-6, -5, -4, -3\}$
- 15) $\{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$ 15) _____
 A) $\{x \mid x \text{ is a natural number}\}$ B) $\{-3, -2, -1, 0, 1, 2, 3\}$
 C) $\{x \mid x \text{ is an integer}\}$ D) $\{x \mid x \text{ is any integer greater than } -3\}$
- 16) $\{12, 15, 18, 21, \dots, 42\}$ 16) _____
 A) $\{x \mid x \text{ is a multiple of } 3 \text{ between } 9 \text{ and } 45\}$
 B) $\{x \mid x \text{ is a multiple of } 3 \text{ greater than } 12\}$
 C) $\{x \mid x \text{ is a multiple of } 3\}$
 D) $\{x \mid x \text{ is a multiple of } 3 \text{ between } 12 \text{ and } 42\}$
- 17) $\{-3, -1, 1, 3, 5, \dots\}$ 17) _____
 A) $\{x \mid x \text{ is an odd integer greater than } -4\}$
 B) $\{x \mid x \text{ is an odd integer}\}$
 C) $\{x \mid x \text{ is an integer greater than } -4\}$
 D) $\{x \mid x \text{ is an odd integer between } -4 \text{ and } 6\}$
- 18) $\{2, 4, 8, 16, 32, \dots\}$ 18) _____
 A) $\{x \mid x \text{ is a positive integer power of } 2\}$
 B) $\{x \mid x \text{ is a positive multiple of } 2\}$
 C) $\{x \mid x \text{ is an integer power of } 2\}$
 D) $\{x \mid x \text{ is a positive multiple of } 4\}$
- 19) The set of all calculus books 19) _____
 A) $\{x \mid x \text{ is a calculus book}\}$ B) $\{x \text{ is a calculus book}\}$
 C) $\{\text{a calculus book}\}$ D) $\{\text{any calculus book}\}$
- 20) The set of all cars owned by students 20) _____
 A) $\{x \text{ is a student with a car}\}$ B) $\{x \text{ is a car}\}$
 C) $\{x \mid x \text{ is a student with a car}\}$ D) $\{x \mid x \text{ is a car owned by a student}\}$

Identify the set as finite or infinite.

- 21) $\{9, 10, 11, \dots, 36\}$ 21) _____
 A) Finite B) Infinite

22) $\left\{1, \frac{1}{4}, \frac{1}{16}, \frac{1}{64}, \dots\right\}$ 22) _____
 A) Infinite B) Finite

23) $\{x \mid x \text{ is a counting number larger than } 136\}$ 23) _____
 A) Infinite B) Finite

24) $\{x \mid x \text{ is an odd counting number}\}$ 24) _____
 A) Infinite B) Finite

25) $\{x \mid x \text{ is a 12-headed lizard}\}$ 25) _____
 A) Infinite B) Finite

26) $\{x \mid x \text{ is a fraction between } 63 \text{ and } 64\}$ 26) _____
 A) Finite B) Infinite

27) $\{x \mid x \text{ is a prime number}\}$ 27) _____
 A) Infinite B) Finite

28) $\left\{1, \frac{3}{7}, \frac{9}{49}, \frac{27}{343}, \dots, \frac{243}{16807}\right\}$ 28) _____
 A) Infinite B) Finite

Find $n(A)$ for the set.

29) $A = \{0, 2, 4, 6, 8\}$ 29) _____
 A) $n(A) = 5$ B) $n(A) = 2$ C) $n(A) = 4$ D) $n(A) = 8$

30) $A = \{700, 701, 702, \dots, 7000\}$ 30) _____
 A) $n(A) = 6300$ B) $n(A) = 7000$ C) $n(A) = 4$ D) $n(A) = 6301$

31) $A = \{x \mid x \text{ is a month in the year}\}$ 31) _____
 A) $n(A) = 52$ B) $n(A) = 24$ C) $n(A) = 1$ D) $n(A) = 12$

32) $A = \{x \mid x \text{ is a number on a clock face}\}$ 32) _____
 A) $n(A) = 12$ B) $n(A) = 3$ C) $n(A) = 6$ D) $n(A) = 24$

33) $A = \{x \mid x \text{ is a second in a minute}\}$ 33) _____
 A) $n(A) = \text{Infinite}$ B) $n(A) = 60$ C) $n(A) = 12$ D) $n(A) = 120$

34) $A = \{1, 1, 2, 2, \dots, 5, 5\}$ 34) _____
 A) $n(A) = 10$ B) $n(A) = 3$ C) $n(A) = 5$ D) $n(A) = 6$

35) $A = \{-8, -7, -6, \dots, 0\}$ 35) _____
 A) $n(A) = 9$ B) $n(A) = 8$ C) $n(A) = 1$ D) $n(A) = 4$

36) $A = \left\{\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots, \frac{1}{29}, \frac{1}{30}\right\}$ 36) _____
 A) $n(A) = 31$ B) $n(A) = \text{Infinite}$ C) $n(A) = 29$ D) $n(A) = 30$

- 37) $A = \left\{ \frac{1}{2}, -\frac{1}{2}, \frac{2}{3}, -\frac{2}{3}, \frac{3}{4}, -\frac{3}{4}, \dots, \frac{19}{20}, -\frac{19}{20} \right\}$ 37) _____
 A) $n(A) = 38$ B) $n(A) = \text{Infinite}$ C) $n(A) = 40$ D) $n(A) = 19$

Determine whether or not the set is well defined.

- 38) $\{x \mid x \text{ is a tennis player who has won at Wimbledon}\}$ 38) _____
 A) Not well defined B) Well defined
- 39) $\{x \mid x \text{ is a low-fat ice cream}\}$ 39) _____
 A) Well defined B) Not well defined
- 40) $\{x \mid x \text{ is a football team that has won the Super Bowl}\}$ 40) _____
 A) Well defined B) Not well defined
- 41) $\{x \mid x \text{ is a mystery book in the library}\}$ 41) _____
 A) Not well defined B) Well defined
- 42) $\{x \mid x \text{ is a stock on the AmEx today}\}$ 42) _____
 A) Not well defined B) Well defined
- 43) $\{x \mid x \text{ is an expensive boat on the Great Lakes}\}$ 43) _____
 A) Not well defined B) Well defined
- 44) $\{x \mid x \text{ is a four-year college in Utah}\}$ 44) _____
 A) Not well defined B) Well defined

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

- 45) $-5 \underline{\hspace{1cm}} \{5, 7, 9, \dots, 17\}$ 45) _____
 A) $\in$ B) $\notin$
- 46) $0 \underline{\hspace{1cm}} \{-2, 2, 4, 18, 28\}$ 46) _____
 A) $\in$ B) $\notin$
- 47) $\{7\} \underline{\hspace{1cm}} \{\{4\}, \{5\}, \{6\}, \{7\}, \{8\}\}$ 47) _____
 A) $\notin$ B) $\in$
- 48) $4 \underline{\hspace{1cm}} \{10, 9, 8, 7\}$ 48) _____
 A) $\notin$ B) $\in$
- 49) $8 \underline{\hspace{1cm}} \{5, 10, 4, 8, 19\}$ 49) _____
 A) $\in$ B) $\notin$
- 50) $11 \underline{\hspace{1cm}} \{9, 10, 11, 12\}$ 50) _____
 A) $\notin$ B) $\in$
- 51) $a \underline{\hspace{1cm}} \{A, B, C, \dots, Z\}$ 51) _____
 A) $\in$ B) $\notin$

52) $7 \underline{\quad} \{2, 3, 4, \dots, 7\}$
 A) $\notin$

B) $\in$

52) _____

53) $\{-5\} \underline{\quad} \{-4 - 3, -3 - 3, -2 - 3, -1 - 3\}$
 A) $\in$

B) $\notin$

53) _____

54) $0 \underline{\quad} \{1 + 5, -1 + 5, -3 + 5, -5 + 5\}$
 A) $\in$

B) $\notin$

54) _____

Tell whether the statement is true or false.

55) $10 \in \{20, 30, 40, 50, 60\}$
 A) True

B) False

55) _____

56) $\{2, 10, 15\} = \{0, 2, 10, 15\}$
 A) True

B) False

56) _____

57) $17 \notin \{16, 14, 13, \dots, 1\}$
 A) True

B) False

57) _____

58) $\{8\} = \{x \mid x \text{ is an even counting number between 10 and 16}\}$
 A) True

B) False

58) _____

59) $\{54, 55, 54, 55\} = \{54, 55\}$
 A) True

B) False

59) _____

60) $\{2, 16, 26, 9, 32\} = \{32, 16, 9, 62, 2\}$
 A) True

B) False

60) _____

61) $\{x \mid x \text{ is a counting number greater than 36}\} = \{36, 37, 38, \dots\}$
 A) True

B) False

61) _____

62) $11 \notin \{x \mid x \text{ is an even counting number}\}$
 A) True

B) False

62) _____

63) $k \notin \{p, a, k, h, v\}$
 A) True

B) False

63) _____

64) $\{s, q, y, o, d\} = \{o, d, q, s, y\}$
 A) True

B) False

64) _____

Write true or false for the following statement.

Let $A = \{3, 5, 7, 9, 11, 13\}$

$B = \{3, 5, 9, 11\}$

$C = \{5, 9, 13\}$

65) $5 \notin C$
 A) True

B) False

65) _____

- 66) $9 \in B$ 66) _____
 A) True B) False
- 67) Every element of B is also an element of C. 67) _____
 A) True B) False
- 68) $A = \{x \mid x \text{ is an odd counting number greater than 1 and less than 15}\}$ 68) _____
 A) True B) False
- 69) $0 \in A$ 69) _____
 A) True B) False
- 70) Every element of C is also an element of A. 70) _____
 A) True B) False
- 71) $\{x \mid x \text{ is an odd counting number less than 15}\} = A$ 71) _____
 A) True B) False
- 72) $\{13\} \in B$ 72) _____
 A) True B) False

Use $\subseteq$ or $\not\subseteq$ in the blank to make a true statement.

- 73) $\{4, 6, 8\}$ ____ $\{3, 4, 5, 6, 8\}$ 73) _____
 A) $\not\subseteq$ B) $\subseteq$
- 74) $\{3, 31, 36\}$ ____ $\{16, 31, 36, 46\}$ 74) _____
 A) $\not\subseteq$ B) $\subseteq$
- 75) $\{a, c, g, i\}$ ____ $\{a, c, g, i, k\}$ 75) _____
 A) $\not\subseteq$ B) $\subseteq$
- 76) $\emptyset$ ____ $\emptyset$ 76) _____
 A) $\not\subseteq$ B) $\subseteq$
- 77) $\{7, 9, 11\}$ ____ $\{x \mid x \text{ is an odd counting number}\}$ 77) _____
 A) $\subseteq$ B) $\not\subseteq$
- 78) $\{k, p, d\}$ ____ $\{k, k, p, p, d, d\}$ 78) _____
 A) $\subseteq$ B) $\not\subseteq$
- 79) $\{x \mid x \text{ is a counting number larger than 5}\}$ ____ $\{7, 8, 9, \dots\}$ 79) _____
 A) $\not\subseteq$ B) $\subseteq$

Decide whether $\subset$, $\subsetneq$, both, or neither can be placed in the blank to make a true statement.

- 80) $\{4, 5, 6\}$ ____ $\{3, 4, 5, 6\}$ 80) _____
 A) $\subset$ B) Neither C) Both $\subset$ and $\subsetneq$ D) $\subsetneq$
- 81) $\emptyset$ ____ $\{4, 19, 28, 43\}$ 81) _____
 A) Neither B) $\subset$ C) Both $\subset$ and $\subsetneq$ D) $\subsetneq$

- 82) $\{4, 5, 6\} \underline{\hspace{1cm}} \{4, 5, 6\}$ 82) _____
 A) Both $\subset$ and $\subseteq$ B) $\subseteq$ C) Neither D) $\subset$
- 83) $\{0\} \underline{\hspace{1cm}} \emptyset$ 83) _____
 A) Neither B) $\subseteq$ C) Both $\subset$ and $\subseteq$ D) $\subset$
- 84) $\{a, b\} \underline{\hspace{1cm}} \{z, a, y, b, x, c\}$ 84) _____
 A) Both $\subset$ and $\subseteq$ B) $\subseteq$ C) $\subset$ D) Neither
- 85) $\{s, r, t\} \underline{\hspace{1cm}} \{s, r, t\}$ 85) _____
 A) $\subseteq$ B) Neither C) Both $\subseteq$ and $\subset$ D) $\subset$

Determine whether the statement is true or false.

Let $A = \{1, 3, 5, 7\}$

$B = \{5, 6, 7, 8\}$

$C = \{5, 8\}$

$D = \{2, 5, 8\}$

$U = \{1, 2, 3, 4, 5, 6, 7, 8\}$

- 86) $C \subset D$ 86) _____
 A) True B) False
- 87) $\emptyset \subseteq A$ 87) _____
 A) True B) False
- 88) $\{6, 5, 8, 7\} \subseteq B$ 88) _____
 A) True B) False
- 89) $D \subseteq B$ 89) _____
 A) True B) False
- 90) $A \neq \{7, 5, 3, 1\}$ 90) _____
 A) True B) False
- 91) $\{5\} \subseteq D$ 91) _____
 A) True B) False
- 92) $\{0\} \subseteq U$ 92) _____
 A) True B) False
- 93) $\{8, 5, 2\} \subset D$ 93) _____
 A) True B) False
- 94) $C \not\subseteq B$ 94) _____
 A) True B) False
- 95) $C \not\subseteq A$ 95) _____
 A) True B) False

96) {7, 8, 9}				96) _____
A) 7	B) 3	C) 8	D) 6	
97) {x x is an even number between 19 and 37}				97) _____
A) 8	B) 512	C) 68	D) 256	
98) {0}				98) _____
A) 0	B) 1	C) 4	D) 2	
99) {mom, dad, son, daughter}				99) _____
A) 8	B) 16	C) 14	D) 12	
100) {math, English, history, science, art}				100) _____
A) 32	B) 16	C) 24	D) 28	
101) {x x is a day of the week}				101) _____
A) 256	B) 127	C) 128	D) 124	
102) {1, 2, 3, ..., 9}				102) _____
A) 512	B) 16	C) 1024	D) 508	

103) {5, 6, 7}	A) 5	B) 2	C) 6	D) 7	103) _____
104) {x x is an even number between 17 and 29}	A) 63	B) 32	C) 28	D) 64	104) _____
105) {0}	A) 1	B) 0	C) 2	D) 4	105) _____
106) {car, boat, truck, train}	A) 15	B) 8	C) 14	D) 16	106) _____
107) {poetry, drama, speech, art, film}	A) 32	B) 16	C) 31	D) 24	107) _____
108) {x x is a day of the week}	A) 128	B) 64	C) 256	D) 127	108) _____
109) {1, 2, 3, ..., 6}	A) 127	B) 58	C) 63	D) 64	109) _____

110) $A = \{2, 4, b, d\}$ 110) _____
 A) $\{1, 3, 5, a, c, e\}$ B) $\{1, 5, a, e\}$
 C) $\{1, 2, 4, 5, a, b, c, d, e\}$ D) $\{1, 5, a, c, e\}$

- 111) $S = \{1, 5, e, d, a\}$ 111) _____
 A) $\{2, 3, 4, b, c\}$ B) $\{2, 3, 4, a, b, c\}$ C) $\{1, 2, 4, b, c\}$ D) $\{2, 4, b, c\}$
- 112) $S = \{1, 2, 4, 5, a, b, c, e\}$ 112) _____
 A) $\emptyset$ B) $\{d\}$ C) $\{u\}$ D) $\{3, d\}$
- 113) $Q = \{a, b, c, d\}$ 113) _____
 A) $\{1, 2, 4, 5, e\}$ B) $\{e\}$ C) $\{1, 2, 4, 5\}$ D) $\{1, 2, 3, 4, 5, e\}$
- 114) $G = \{a\}$ 114) _____
 A) $\{u, v\}$ B) $\{1, 2, 3, 4, 5, b, c, d, e\}$
 C) $\{1, 2, 5, b, c, d, e\}$ D) $\{1, 2, 4, 5, b, c, d, e\}$
- 115) $S = \emptyset$ 115) _____
 A) $\emptyset'$ B) $\emptyset$ C) $\{0\}$ D) U
- 116) $P = \{a, b, d, e, 1, 2, 4, 5\}$ 116) _____
 A) $\emptyset$ B) U C) $\{c, 3\}$ D) $\{c\}$
- 117) $C = \{1, 2, 5, b, d\}$ 117) _____
 A) $\{3, 4, a, c, e\}$ B) $\{4, a, b, c, e\}$ C) $\{4, a, c, e\}$ D) $\{3, 4, a, b, c, e\}$
- 118) $T = U$ 118) _____
 A) $\{U - T\}$ B) T C) $\emptyset$ D) U
- 119) $P = \{e, a, c, 4, 5\}$ 119) _____
 A) $\{b, d, 1, 2, 3\}$ B) $\{1, 2, b, c, d\}$ C) $\{1, 2, 3, b, d\}$ D) $\{1, 2, b, d\}$

The lists below show five agricultural crops in Alabama, Arkansas, and Louisiana.

<u>Alabama</u>	<u>Arkansas</u>	<u>Louisiana</u>
soybeans (s)	soybeans (s)	soybeans (s)
peanuts (p)	rice (r)	sugarcane (n)
corn (c)	cotton (t)	rice (r)
hay (h)	hay (h)	corn (c)
wheat (w)	wheat (w)	cotton (t)

Let U be the smallest possible universal set that includes all of the crops listed, and let A , K and L be the sets of five crops Alabama, Arkansas, and Louisiana, respectively. Find each of the following sets.

- 120) The set of crops in U . 120) _____
 A) $\{s, p, c, w, r, t, n\}$ B) $\{c, h, n, p, r, s, t, w\}$
 C) $\{s, p, c, h, w, s, r, t, h, w, s, n, r, c, t\}$ D) $\{s, p, c, h, w, r, t, n, c\}$
- 121) The set of crops in A' . 121) _____
 A) $\{n, r, t\}$ B) $\{r, t\}$
 C) $\{h, n, r, t\}$ D) $\{c, h, n, r, s, t, w\}$
- 122) The set of crops in both A and K 122) _____
 A) $\{h, s, w\}$ B) $\{c, p, r, t\}$
 C) $\{c, h, s, t, w\}$ D) $\{c, h, p, r, s, t, w\}$

- 123) The set of crops in both L and K
 A) {c, n, r, s, t} B) {c, h, n, r, s, t, w}
 C) {c, h, n, w} D) {r, s, t} 123) _____
- 124) The set of crops in both L and K'
 A) {h, w} B) {r, s, t} C) {c, n, p} D) {c, n} 124) _____
- 125) The set of crops in both A and L'
 A) {n, r, t} B) {c, s} C) {h, p, w} D) {h, n, t, w} 125) _____
- 126) The set of crops in both A' and K'
 A) {c, n, p, r, t} B) $\emptyset$ C) {n} D) {c, p, r, t} 126) _____
- 127) The set of crops common to A, K, and L
 A) {n, p} B) {n, p, s}
 C) {s} D) {c, h, n, p, r, s, t, w} 127) _____
- 128) The set of crops in either A or L or both
 A) {c, n, p} B) {h, n, p, r, t, w}
 C) {c, h, n, p, r, s, t, w} D) {c, s} 128) _____
- 129) The set of crops in either A' or L or both
 A) {h, p, w} B) {c, n, r, s, t} C) {n, r, t} D) {h, n, p, r, t, w} 129) _____

Solve the problem.

- 130) List all possible subsets of the set {m, n}.
 A) {m}, {n}, $\emptyset$ B) {m}, {n}, {m, n}
 C) {m}, {n}, {m, n}, $\emptyset$ D) {m}, {n} 130) _____
- 131) List all possible proper subsets of the set {2, 6, 7}.
 A) {2}, {6}, {7}, {2, 6}, {2, 7}, {6, 7}, {2, 6, 7} B) $\emptyset$, {2}, {6}, {7}, {2, 6}, {2, 7}, {6, 7}, {2, 6, 7}
 C) {2}, {6}, {7}, {2, 6}, {2, 7}, {6, 7} D) $\emptyset$, {2}, {6}, {7}, {2, 6}, {2, 7}, {6, 7} 131) _____
- 132) A committee is to be formed. Possible candidates for the committee are Eric, Frances, Greg, and Jose. Denoting these four people by e, f, g, j, list all possible committees of two people (ie list all possible subsets of size two).
 A) {e, f}, {e, g}, {e, j}, {f, g}, {f, j}, {g, j}
 B) {e, f}, {e, g}, {f, g}, {g, j}
 C) {e, f}, {e, g}, {e, j}, {f, g}, {f, j}, {g, j}, {f, e}, {g, e}
 D) {e, f}, {e, g}, {e, j}, {f, j}, {g, j} 132) _____
- 133) A committee is to be formed. Possible candidates for the committee are Eric, Frances, Greg, and Jose. Denoting these four people by e, f, g, j, list all possible committees if the committee is to contain at least two people and may contain up to four people.
 A) {e, f}, {e, g}, {e, j}, {f, g}, {f, j}, {g, j}, {e, f, g}, {e, f, j}, {f, g, j}, {e, f, g, j}
 B) {e, f}, {e, g}, {e, j}, {f, j}, {e, f, g}, {e, f, j}, {e, g, j}, {f, g, j}, {e, f, g, j}
 C) {e, f}, {e, g}, {e, j}, {f, g}, {f, j}, {g, j}, {e, f, g}, {e, f, j}, {e, g, j}, {f, g, j}
 D) {e, f}, {e, g}, {e, j}, {f, g}, {f, j}, {g, j}, {e, f, g}, {e, f, j}, {e, g, j}, {f, g, j}, {e, f, g, j} 133) _____

- 134) An adventure travel company has reservations from four people (Lee, Maria, Nancy, and Pablo) for its white water rafting trip on June 1st. However the company knows that any of these people may fail to show up on the day of the trip. Denoting these four people by l, m, n, p, list all possibilities for the group of people who show up on June 1st for the rafting trip (ie list all possible subsets of {l, m, n, p}). 134) _____
- A) $\emptyset$, {l}, {m}, {n}, {p}, {l, m}, {l, n}, {l, p}, {m, n}, {m, p}, {n, p}, {l, m, n}, {l, m, p}, {l, n, p}, {m, n, p}, {l, m, n, p}
- B) {l}, {m}, {n}, {p}, {l, m}, {l, n}, {l, p}, {m, n}, {m, p}, {n, p}, {l, m, n}, {l, m, p}, {l, n, p}, {m, n, p}, {m, n, l}, {l, m, n, p}
- C) $\emptyset$, {l}, {m}, {n}, {p}, {l, m}, {l, n}, {m, n}, {m, p}, {n, p}, {l, m, n}, {l, m, p}, {l, n, p}, {m, n, p}
- D) {l}, {m}, {n}, {p}, {l, m}, {l, n}, {l, p}, {m, n}, {m, p}, {n, p}, {l, m, n}, {l, m, p}, {l, n, p}, {m, n, p}, {l, m, n, p}
- 135) A committee is to be formed. Possible candidates for the committee are Anne, Daniel, Raul, Sarah, and Teresa. Denoting these five people by a, d, r, s, t, list all possible committees of three people (ie list all possible subsets of size three). 135) _____
- A) {a, d, r}, {a, d, s}, {a, d, t}, {a, r, s}, {d, r, s}, {d, r, t}, {d, s, t}, {r, s, t}
- B) {a, d, r}, {a, d, s}, {a, d, t}, {a, r, s}, {a, r, t}, {a, s, t}, {d, r, t}, {d, s, t}, {r, s, t}
- C) {a, d, r}, {a, d, s}, {a, d, t}, {a, r, s}, {a, r, t}, {a, s, t}, {d, r, s}, {d, r, t}, {d, s, t}, {r, s, t}
- D) {a, d, r}, {a, d, s}, {a, d, t}, {a, r, s}, {a, r, t}, {a, s, t}, {d, r, s}, {d, r, t}, {d, s, t}, {r, s, t}, {d, a, r}, {s, t, d}

List the elements in the set .

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

$A = \{q, s, u, w, y\}$

$B = \{q, s, y, z\}$

$C = \{v, w, x, y, z\}$.

- 136) $A \cup C$ 136) _____
- A) {q, s, u, v, w, y, z} B) {q, s, u, v, w, x, y, z}
- C) {q, s, u, w, y, v, w, x, y, z} D) {w, y}
- 137) $B \cap C$ 137) _____
- A) {w, y, z} B) {y, z}
- C) {y} D) {q, s, v, w, x, y, z}
- 138) $A \cap B'$ 138) _____
- A) {q, s, t, u, v, w, x, y} B) {t, v, x}
- C) {r, s, t, u, v, w, x, z} D) {u, w}
- 139) $(A \cup B)'$ 139) _____
- A) {s, u, w} B) {t, v, x}
- C) {r, t, v, x} D) {r, s, t, u, v, w, x, z}
- 140) $(A \cap B)'$ 140) _____
- A) {t, v, x} B) {s, u, w}
- C) {q, s, t, u, v, w, x, y} D) {r, t, u, v, w, x, z}
- 141) $A' \cup B$ 141) _____
- A) {r, s, t, u, v, w, x, z} B) {s, u, w}
- C) {q, s, t, u, v, w, x, y} D) {q, r, s, t, v, x, y, z}

- 142) $C' \cup A'$ _____
 A) {q, s, u, v, w, x, y, z} B) {s, t}
 C) {q, r, s, t, u, v, x, z} D) {w, y}
- 143) $C' \cap A'$ _____
 A) {w, y} B) {r, t}
 C) {q, r, s, t, u, v, x, z} D) {q, s, u, v, w, x, y, z}
- 144) $C - A$ _____
 A) {v, x, z} B) {w, y} C) {q, s, u} D) {q, s, u, v, x, z}
- 145) $A' - C$ _____
 A) {q, s, u, v, x, z} B) {v, x, z} C) {r, t} D) {q, s, u}
- 146) $A \cup (B \cap C)$ _____
 A) {q, w, y} B) {q, y, z} C) {q, s, u, w, y, z} D) {q, r, w, y, z}
- 147) $A \cap (B \cup C)$ _____
 A) {q, y, z} B) {q, s, u, w, y, z} C) {q, r, w, y, z} D) {q, s, w, y}
- 148) $(A' \cup C) \cap B'$ _____
 A) {r, t, u, v, w, s, y, z} B) {r, t, v, w, x}
 C) {y, z} D) {v, x}
- 149) $(B' \cap C)' \cup A$ _____
 A) {q, r, s, t, u, v, w, x, y} B) {q, s, u, y}
 C) {q, r, s, t, u, w, y, z} D) {q, s, u, v, w, x, y}
- 150) $(A \cup B')' \cap C'$ _____
 A) $\emptyset$ B) {v, w, x, y} C) {q, r, s, t, u} D) {q, r, s, t, u, z}
- 151) $B \cap (A - C)$ _____
 A) {q, s, u, y} B) {q, r, s, t, u, v, w, x, y}
 C) {q, s, u, y, z} D) {q, s}
- 152) $(A \cap B') \cup (B \cap A')$ _____
 A) {q, s, u, w, y, z} B) {q, s, y} C) {u, w, z} D) {u, w, y, z}

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

- 153) $A \cap B$ _____
 A) All diet and all cola soda pops B) All diet cola soda pops
 C) All soda pops D) All diet or all cola soda pops
- 154) $A' \cap C$ _____
 A) All non-diet soda pops in cans
 B) All diet soda pops and all soda pops in cans
 C) All non-diet soda pops and all soda pops in cans
 D) All diet soda pops in cans

- 155) $A \cap B \cap D$ 155) _____
 A) All soda pops not in cans
 B) All diet and all cola and all caffeine-free soda pops
 C) All diet, caffeine-free cola pops in cans
 D) All diet, caffeine-free cola soda pops
- 156) $(A \cup B) \cup D$ 156) _____
 A) All diet, caffeine-free cola soda pops
 B) All soda pops not in cans
 C) All soda pops
 D) All diet or all cola or all caffeine-free soda pops
- 157) $(A \cap B) \cap C'$ 157) _____
 A) All non-diet, non-cola soda pops not in cans
 B) All cola soda pops not in cans
 C) All diet and all cola soda pops not in cans
 D) All diet cola soda pops not in cans
- 158) $(A \cup D) \cap C'$ 158) _____
 A) All diet, caffeine-free soda pops not in cans
 B) All non-diet, non-caffeine-free soda pops not in cans
 C) All diet soda pops not in cans or all caffeine-free soda pops not in cans
 D) All non-cola soda pops not in cans
- 159) $(A' \cap B') \cup C$ 159) _____
 A) All non-diet non-cola soda pops and all soda pops not in cans
 B) All non-diet soda pops and all non-cola soda pops in cans
 C) All non-diet non-cola soda pops or all soda pops in cans
 D) All non-diet non-cola soda pops in cans
- 160) $(A - D) \cap B$ 160) _____
 A) All diet soda pops that contain caffeine and all cola soda pops
 B) All diet cola soda pops that contain caffeine
 C) All non-diet, caffeine-free cola soda pops
 D) All diet caffeine-free cola soda pops
- 161) $(B \cap C') \cup (C \cap B')$ 161) _____
 A) All non-cola soda pops not in cans
 B) All cola soda pops not in cans or all non-cola soda pops in cans
 C) All cola soda pops and all soda pops in cans
 D) All cola soda pops in cans and all non-cola soda pops not in cans

The lists below show five agricultural crops in Alabama, Arkansas, and Louisiana.

<u>Alabama</u>	<u>Arkansas</u>	<u>Louisiana</u>
soybeans (s)	soybeans (s)	soybeans (s)
peanuts (p)	rice (r)	sugarcane (n)
corn (c)	cotton (t)	rice (r)
hay (h)	hay (h)	corn (c)
wheat (w)	wheat (w)	cotton (t)

Let U be the smallest possible universal set that includes all of the crops listed, and let A , K and L be the sets of five crops Alabama, Arkansas, and Louisiana, respectively. Find each of the following sets.

- 162) $A \cap K$ 162) _____
 A) {h, s, w} B) {c, h, s, t, w}
 C) {c, h, p, r, s, t, w} D) {c, p, r, t}
- 163) $L \cap K$ 163) _____
 A) {c, h, n, r, s, t, w} B) {c, n, r, s, t}
 C) {c, h, n, w} D) {r, s, t}
- 164) $K' \cap L$ 164) _____
 A) {c, n, p} B) {r, s, t} C) {h, w} D) {c, n}
- 165) $L' \cap A$ 165) _____
 A) {h, n, t, w} B) {n, r, t} C) {c, s} D) {h, p, w}
- 166) $A' \cap K'$ 166) _____
 A) {c, p, r, t} B) $\emptyset$ C) {n} D) {c, n, p, r, t}
- 167) $A \cap K \cap L$ 167) _____
 A) {n, p} B) {n, p, s}
 C) {s} D) {c, h, n, p, r, s, t, w}
- 168) $A \cup L$ 168) _____
 A) {c, h, n, p, r, s, t, w} B) {h, n, p, r, t, w}
 C) {c, n, p} D) {c, s}
- 169) $K \cup L$ 169) _____
 A) {c, h, n, r, s, t, w} B) {r, s, t}
 C) {c, h, n, w} D) {n, r, t}
- 170) $A' \cup L$ 170) _____
 A) {h, n, p, r, t, w} B) {c, n, r, s, t} C) {n, r, t} D) {h, p, w}
- 171) $L' \cup K'$ 171) _____
 A) {r, s, t} B) {c, h, n, p, w} C) {c, h, p, s, w} D) {p}

Let A and B be sets with cardinal numbers, $n(A) = a$ and $n(B) = b$, respectively. Decide whether the statement is true or false.

- 172) $n(A \cup B) = n(A) - n(B)$ 172) _____
 A) True B) False

- 173) $n(A - B) = n(B - A)$ 173) _____
 A) True B) False
- 174) If $B \subseteq A$, $n(B) = n(A - B)$. 174) _____
 A) True B) False
- 175) If $B \subseteq A$, $n(B) = n(A) - n(A - B)$. 175) _____
 A) True B) False
- 176) $n(A \cap B) = n(B \cap A)$ 176) _____
 A) True B) False
- 177) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ 177) _____
 A) True B) False
- 178) $n(A \cap B) = n(A) - n(B)$ 178) _____
 A) True B) False
- 179) $n(A \cup B) + n(A \cap B) = n(A) + n(B)$ 179) _____
 A) True B) False
- Tell whether the statement is true or false.**
- 180) $\{3, 9, 15\} = \{0, 3, 9, 15\}$ 180) _____
 A) True B) False
- 181) $\{52, 53, 52, 53\} = \{52, 53\}$ 181) _____
 A) True B) False
- 182) $\{6, 16, 24, 8, 33\} = \{33, 16, 8, 42, 6\}$ 182) _____
 A) True B) False
- 183) $(2, 7) = (7, 2)$ 183) _____
 A) True B) False
- 184) $(5 - 8, 4 - 15) = (-3, -11)$ 184) _____
 A) True B) False
- 185) $(16 + 10, 19 + 10) = (16, 19)$ 185) _____
 A) True B) False
- 186) $\{(3, 1), (0, 6), (-4, -2)\} = \{(-4, -2), (3, 1), (6, 0)\}$ 186) _____
 A) True B) False

Find the Cartesian product.

- 187) $A = \{8, 4, 11\}$ 187) _____
 $B = \{14, 15\}$
Find $A \times B$.
A) $\{(8, 14), (4, 11), (11, 14)\}$
B) $\{(8, 14), (4, 15)\}$
C) $\{(14, 8), (14, 4), (14, 11), (15, 8), (15, 4), (15, 11)\}$
D) $\{(8, 14), (8, 15), (4, 14), (4, 15), (11, 14), (11, 15)\}$
- 188) $A = \{i, a\}$ 188) _____
 $B = \{t, d, m\}$
Find $A \times B$.
A) $\{(i, t), (t, a), (i, d), (d, a), (i, m), (m, a)\}$ B) $\{(i, t), (i, d), (i, m), (a, t), (a, d), (a, m)\}$
C) $\{(t, i), (t, a), (d, i), (d, a), (m, i), (m, a)\}$ D) $\{(i, t), (a, t), (i, d), (a, d)\}$
- 189) $A = \{0\}$ 189) _____
 $B = \{19, 29, 39\}$
Find $B \times A$.
A) $\{0\}$ B) $\{0, 0, 0\}$
C) $\{(19, 0), (29, 0), (39, 0)\}$ D) $\{(0, 19), (0, 29), (0, 39)\}$
- 190) $A = \{4, 3, 6, 7\}$ 190) _____
 $B = \{0, 1\}$
Find $B \times A$.
A) $\{(4, 0), (3, 0), (6, 0), (7, 0), (4, 1), (3, 1), (6, 1), (7, 1)\}$
B) $\{(0, 4), (0, 3), (0, 6), (0, 7), (1, 4), (1, 3), (1, 6), (1, 7)\}$
C) $\{(4, 0), (4, 1), (3, 0), (3, 1)\}$
D) $\{0, 1, 4, 3, 6, 7\}$

Find the indicated cardinal number.

- 191) Find $n(A \times B)$ given that $A = \{2\}$ and $B = \{1, 3\}$. 191) _____
A) 4 B) 3 C) 1 D) 2
- 192) Find $n(A \times C)$ given that $A = \{2\}$ and $C = \{4, 5, 6\}$. 192) _____
A) 4 B) 3 C) 1 D) 2
- 193) Find $n(D \times B)$ given that $B = \{1, 3\}$ and $D = \{7, 8, 9, 10\}$. 193) _____
A) 12 B) 16 C) 8 D) 7
- 194) Find $n(C \times D)$ given that $C = \{4, 5, 6\}$ and $D = \{7, 8, 9, 10\}$. 194) _____
A) 27 B) 12 C) 81 D) 7
- 195) Find $n(E)$, given that $n(C \times E) = 18$ and $C = \{4, 5, 6\}$. 195) _____
A) 3 B) 54 C) 6 D) 9
- 196) Find $n(F)$, given that $n(B \times F) = 18$ and $B = \{1, 3\}$. 196) _____
A) 6 B) 36 C) 54 D) 9
- 197) Find $n(G)$, given that $n(D \times G) = 20$ and $D = \{7, 8, 9, 10\}$. 197) _____
A) 24 B) 4 C) 9 D) 5

198) Find $n(A \times B)$ given that $n(A) = 40$ and $n(B) = 7$.

A) 280

B) 33

C) 47

D) 54

198) _____

199) Find $n(B)$ given that $n(A \times B) = 30$ and $n(A) = 3$.

A) 27

B) 3

C) 10

D) 33

199) _____

200) Find $n(A)$ given that $n(A \times B) = 22$ and $n(B) = 2$.

A) 20

B) 11

C) 2

D) 24

200) _____

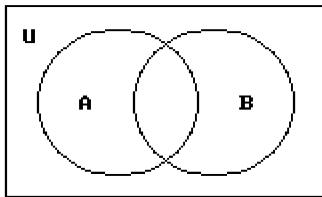
For the given sets, construct a Venn diagram and place the elements in the proper region.

201) Let $U = \{c, d, g, h, k, u, q\}$

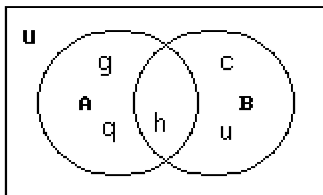
$A = \{d, h, g, q\}$

$B = \{c, d, h, u\}$

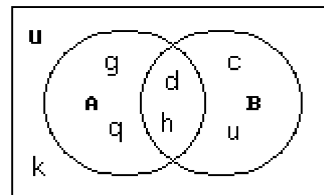
201) _____



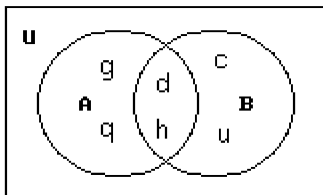
A)



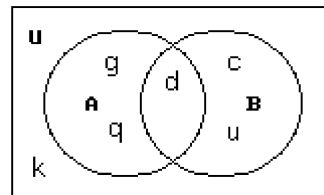
B)



C)



D)



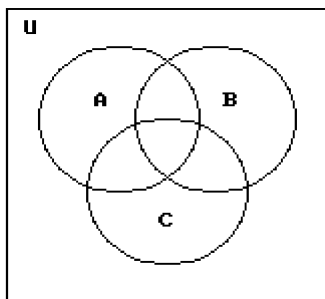
202) Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$

$A = \{3, 6, 8\}$

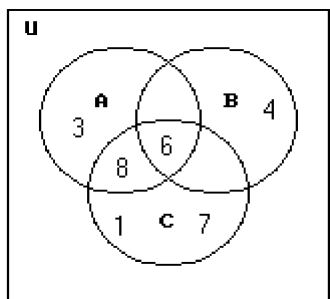
$B = \{4, 6\}$

$C = \{1, 6, 7, 8\}$

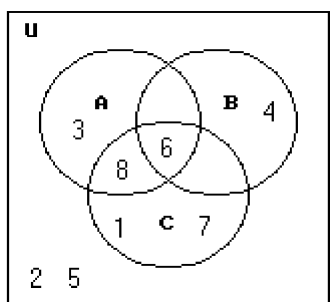
202) _____



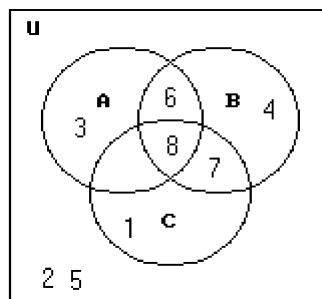
A)



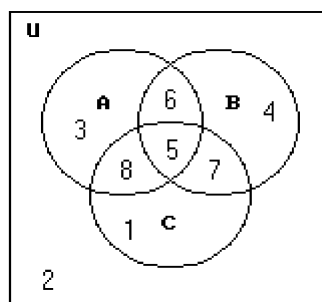
C)



B)

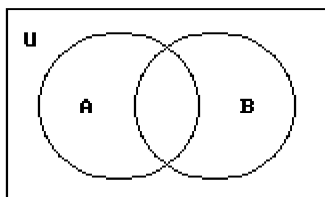


D)



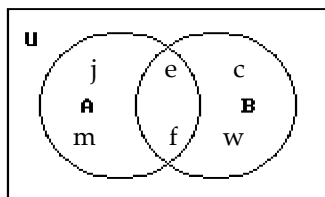
203) Let $U = \{c, e, f, j, q, m, w\}$
 $A = \{e, f, j, m\}$
 $B = \{c, e, f, w\}$

203) _____

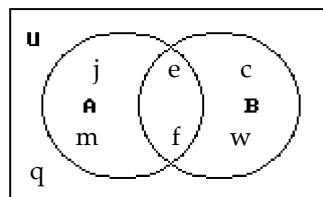


A)

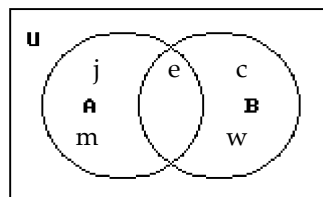
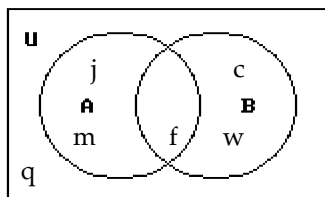
B)



C)

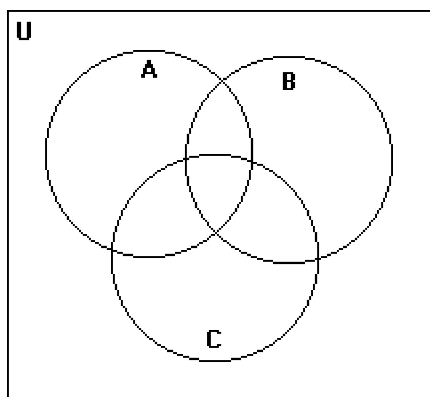


D)

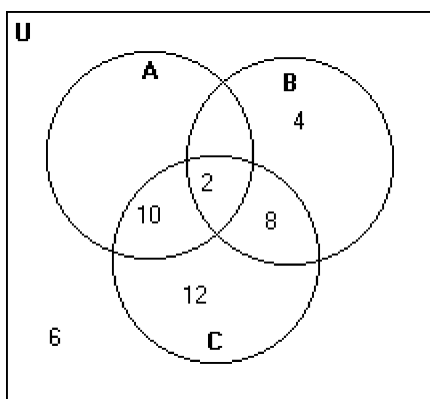


204) $U = \{2, 4, 6, 8, 10, 12\}$
 $A = \{2, 6, 10\}$
 $B = \{2, 4, 8\}$
 $C = \{2, 8, 10, 12\}$

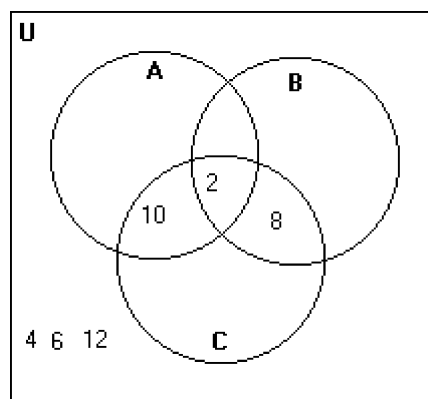
204) _____



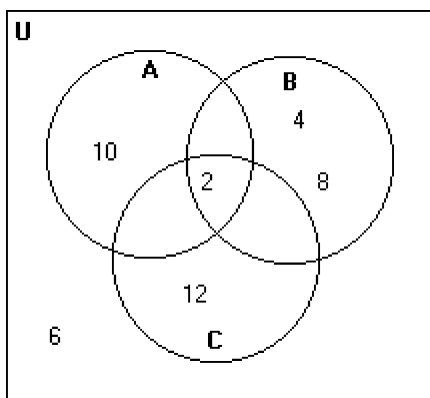
A)



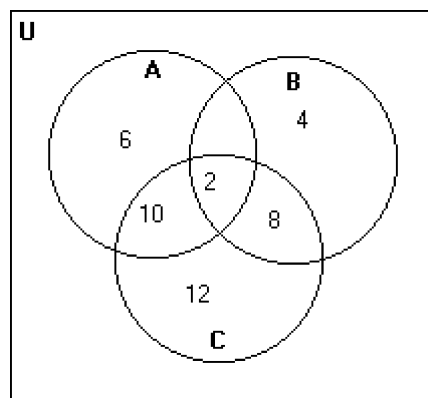
B)



C)

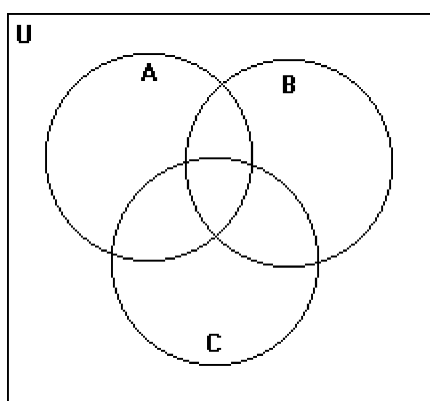


D)

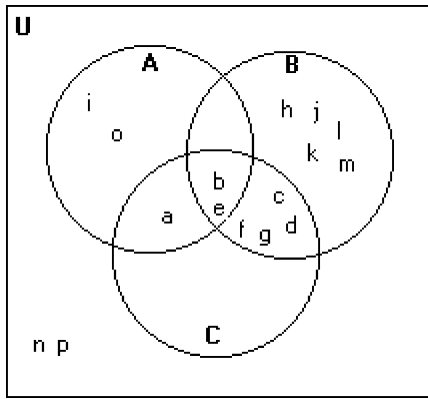


- 205) $U = \{a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p\}$
 $A = \{a, e, i, o\}$
 $B = \{b, c, d, f, g, h, j, k, l, m\}$
 $C = \{a, b, c, d, e, f, g\}$

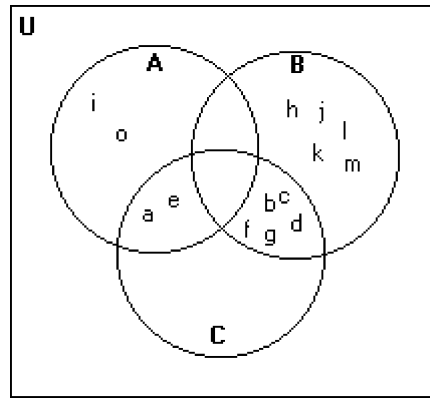
205) _____



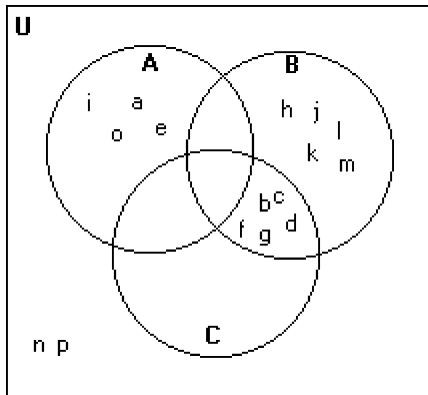
A)



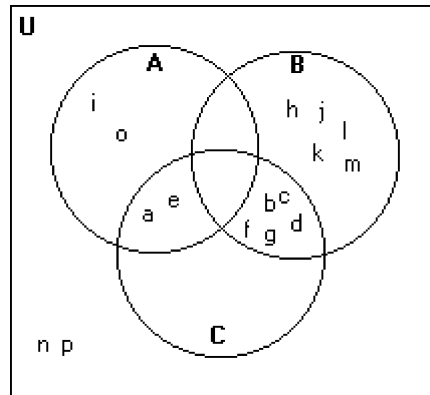
B)



C)



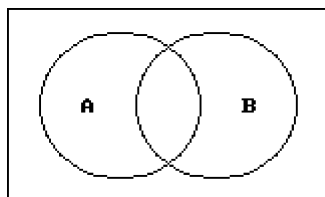
D)



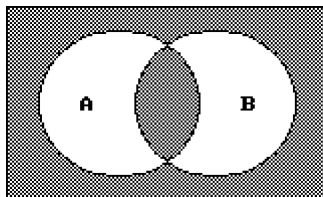
Shade the regions representing the set.

206) $A' \cap B'$

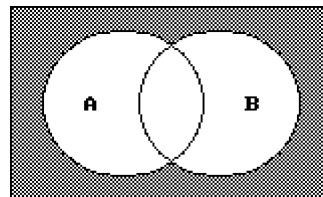
206) _____



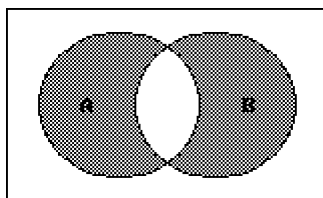
A)



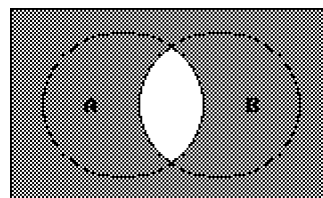
B)



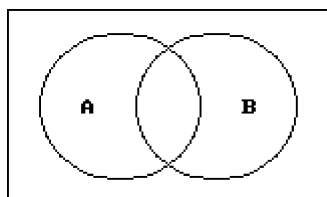
C)



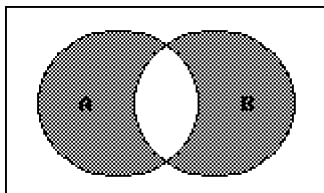
D)



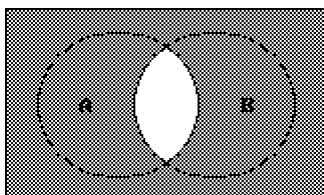
207) $A' \cup B'$



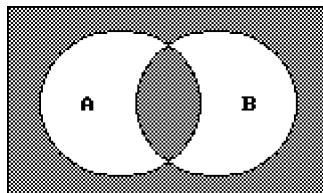
A)



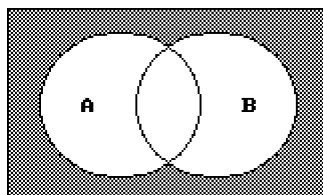
C)



B)

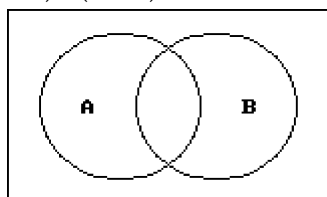


D)

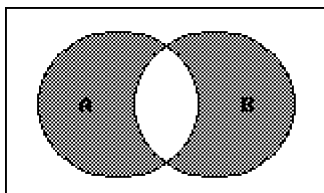


207) _____

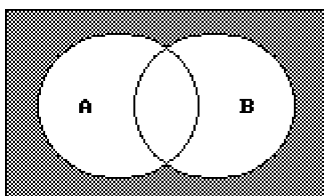
208) $(A \cup B) \cap (A \cap B)'$



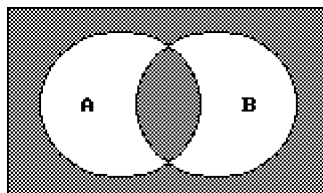
A)



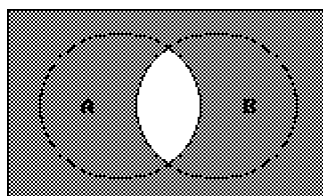
C)



B)



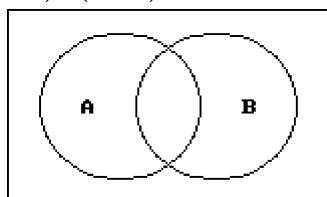
D)



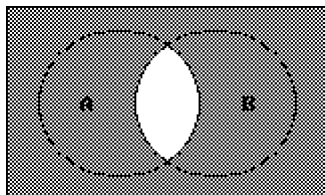
208) _____

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

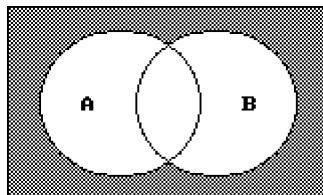
209) _____



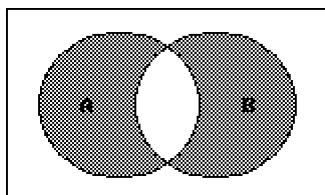
A)



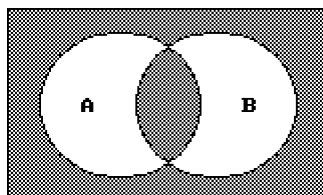
B)



C)

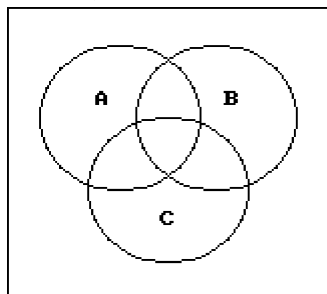


D)

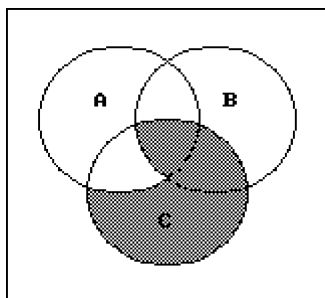


210) $(A \cap B \cap C)'$

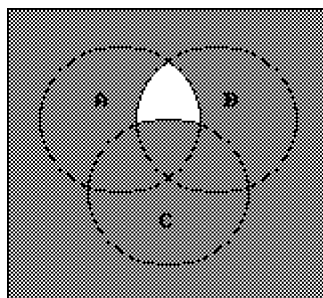
210) _____



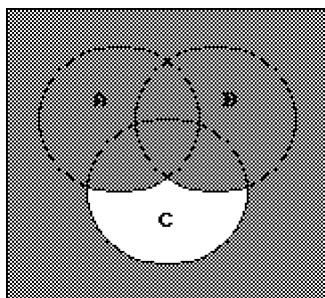
A)



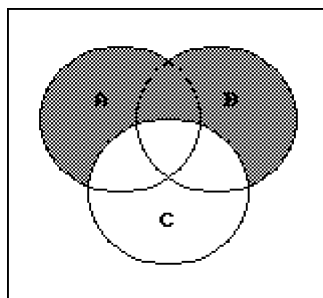
B)



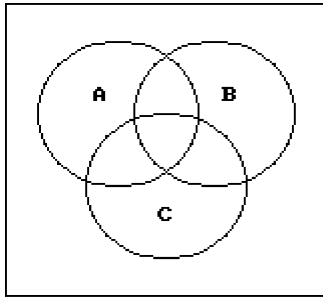
C)



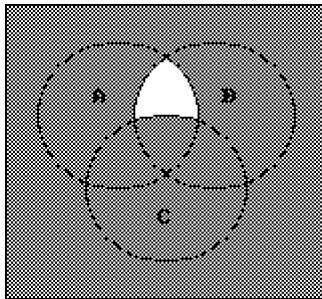
D)



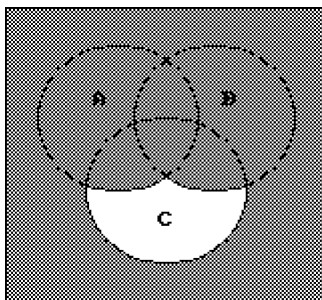
211) $(A \cup B \cup C)'$



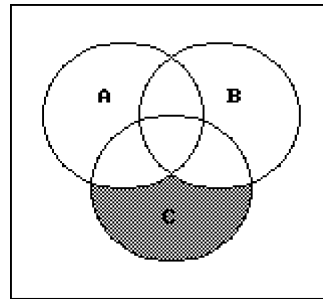
A)



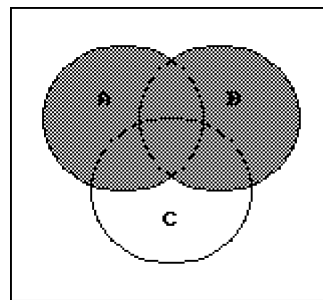
C)



B)



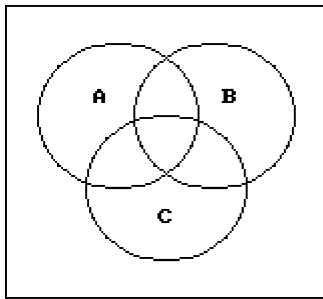
D)



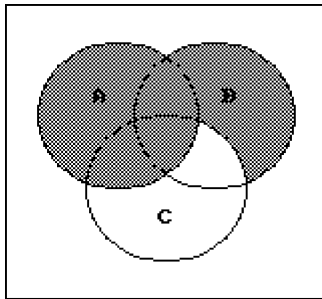
211) _____

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

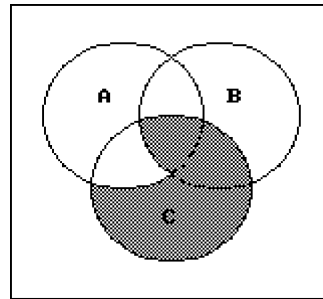
212) _____



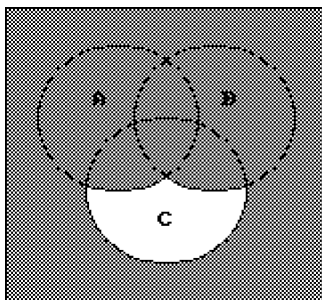
A)



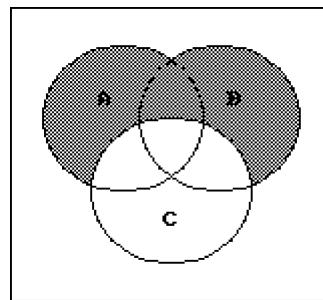
B)



C)

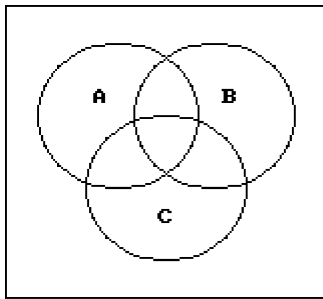


D)

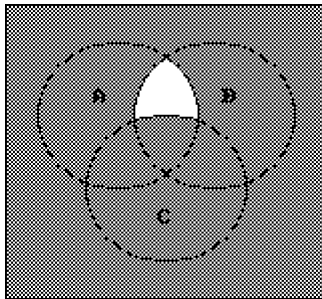


213) $(A' \cup B) \cap C$

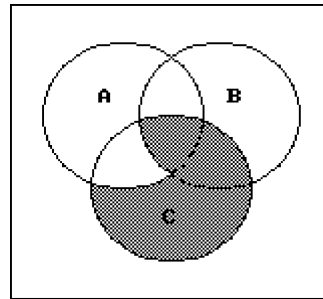
213) _____



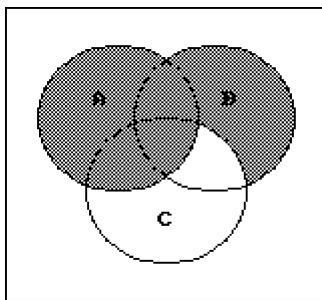
A)



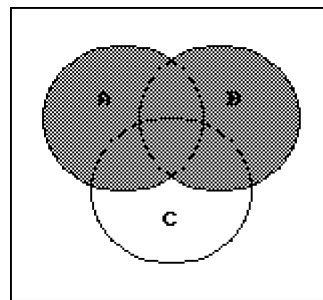
B)



C)

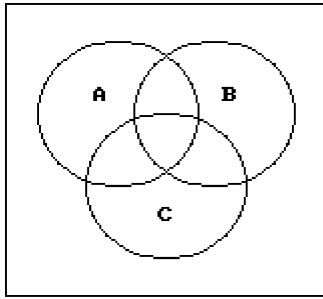


D)

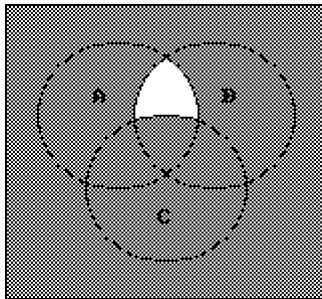


214) $A \cup (B \cap C')$

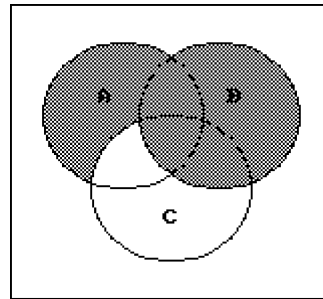
214) _____



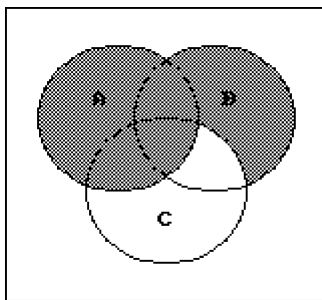
A)



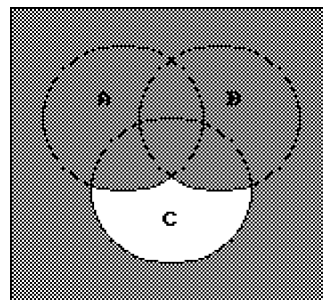
B)



C)

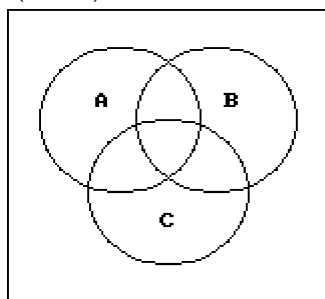


D)

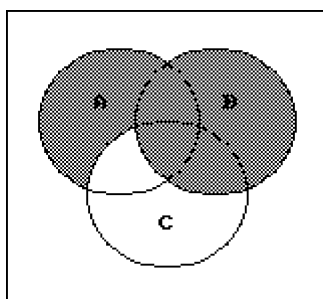


215) $B \cup (A \cap C')$

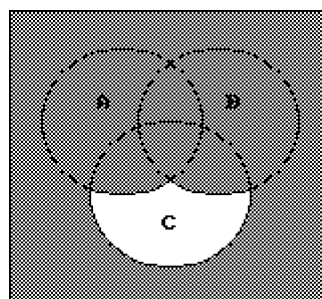
215) _____



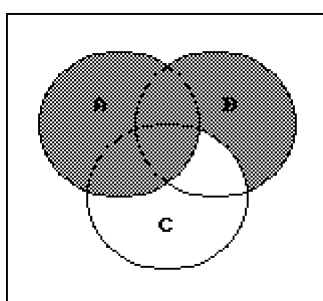
A)



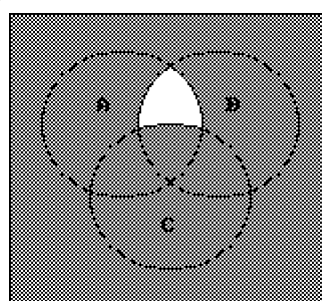
B)



C)



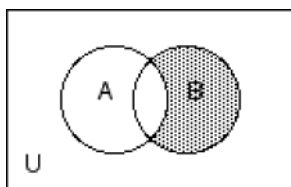
D)



Write a description of the shaded region using the symbols A, B, C, $\cup$, $\cap$, $\sim$, and ' as needed.

216)

216) _____



A) $B - A'$

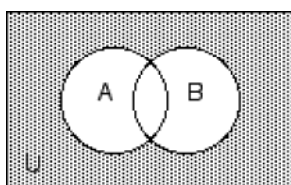
B) $A \cap B'$

C) $A - B$

D) $B \cap A'$

217)

217) _____



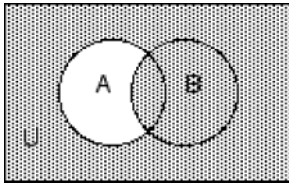
A) $A' \cap B'$

B) $(A \cap B)'$

C) $A - B$

D) $A \cup B$

218)



A) $(A \cap B)'$

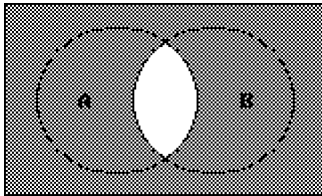
B) $B - A$

C) $A' \cap B$

D) $A' \cup B$

218) _____

219)



A) $A \cap B$

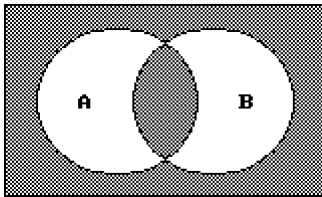
B) $(A \cap B)'$

C) $A' \cap B'$

D) $(A \cup B)'$

219) _____

220)



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

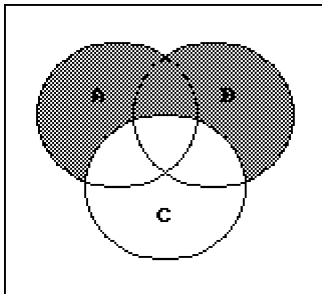
C) $A' \cap B'$

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

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

220) _____

221)



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

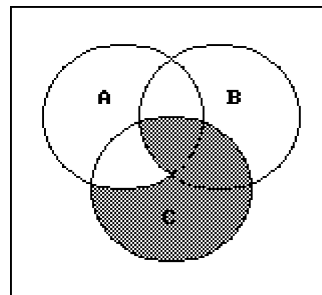
B) $(A \cap B) \cap C'$

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

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

221) _____

222)



A) $A' \cap C$

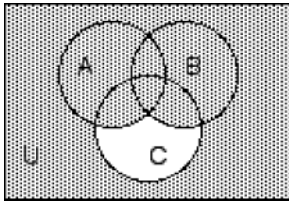
B) $(A' \cup B) \cap C$

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

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

222) _____

223)



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

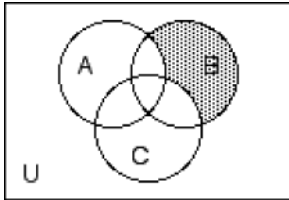
B) $A \cup B \cap C'$

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

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

223) _____

224)



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

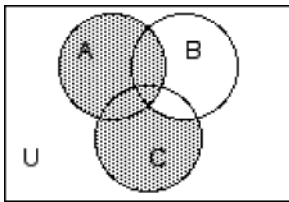
B) $A' \cap C' \cap B$

C) $(B - A) \cup C$

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

224) _____

225)



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

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

C) $A \cup C$

D) $A \cup C - B$

225) _____

Decide whether the given statement is always true or not always true.

226) $A \cap A' = \emptyset$

A) Always true

B) Not always true

226) _____

227) $(A \cup B) \subseteq A$

A) Always true

B) Not always true

227) _____

228) $(A \cap B) \subseteq B$

A) Not always true

B) Always true

228) _____

229) $(A \cap B)' = A' \cup B'$

A) Always true

B) Not always true

229) _____

230) $(A \cup B)' = A' \cup B'$

A) Not always true

B) Always true

230) _____

231) If $A \subseteq B$, then $A \cup B = A$

A) Always true

B) Not always true

231) _____

232) If $B \subseteq A$, then $A \cap B = A$

A) Always true

B) Not always true

232) _____

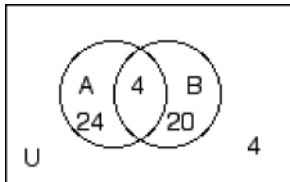
- 233) $A - A' = A$ 233) _____
 A) Not always true B) Always true
- 234) $A \cup (B \cap C)' = A \cup (B' \cup C')$ 234) _____
 A) Always true B) Not always true
- 235) $A \cap (B \cup C) = (A \cap B) \cup C$ 235) _____
 A) Not always true B) Always true

Describe the conditions under which the statement is true.

- 236) $A \cap B = A$ 236) _____
 A) $B \subseteq A$ B) $B = \emptyset$ C) Always true D) $A \subseteq B$
- 237) $A \cup \emptyset = U$ 237) _____
 A) $A = \emptyset$ B) $A \neq \emptyset$ C) $A = U$ D) Always true
- 238) $A \cup B = B$ 238) _____
 A) $A \subseteq B$ B) $A = \emptyset$ C) Always true D) $B \subseteq A$
- 239) $A \cap A' = A$ 239) _____
 A) $A = U$ B) Always true C) $A \neq \emptyset$ D) $A = \emptyset$
- 240) $A \cap B' = A$ 240) _____
 A) $B \subseteq A$ B) Always true C) $A \cap B = \emptyset$ D) $B = \emptyset$
- 241) $A \cup B = A$ 241) _____
 A) Always true B) $B \subseteq A$ C) $A \subseteq B$ D) $B = \emptyset$

Find the cardinal number of the set.

- 242) The numbers in the Venn Diagram below represent cardinalities. 242) _____

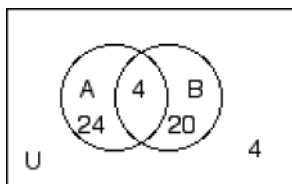


Find $n(A \cup B)$.

- A) 52 B) 48 C) 24 D) 4

243) The numbers in the Venn Diagram below represent cardinalities.

243) _____



Find $n(A \cap B')$.

A) 4

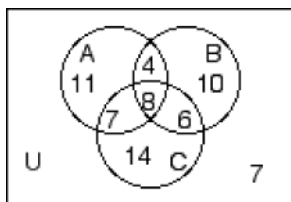
B) 28

C) 20

D) 24

244) The numbers in the Venn Diagram below represent cardinalities.

244) _____



Find $n(A' \cap B' \cap C)$

A) 14

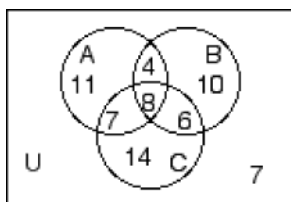
B) 21

C) 27

D) 13

245) The numbers in the Venn Diagram below represent cardinalities.

245) _____



Find $n(A \cap B' \cap C)$

A) 6

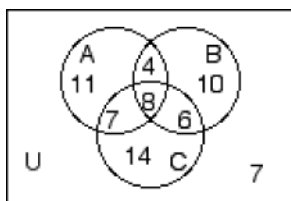
B) 11

C) 15

D) 7

246) The numbers in the Venn Diagram below represent cardinalities.

246) _____



Find $n(B \cup C)$

A) 60

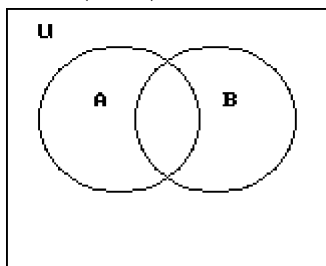
B) 14

C) 42

D) 49

247) Given: $n(U) = 60$
 $n(A) = 30$
 $n(B) = 16$
 $n(A \cap B) = 6$
Find $n(A \cup B)'$.

247) _____



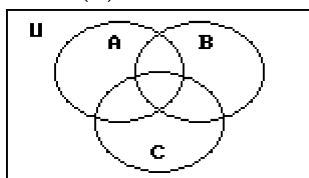
- A) 40 B) 46 C) 20 D) 14

248) Given:

248) _____

$n(U) = 213$
 $n(A) = 72$
 $n(B) = 92$
 $n(A \cap B) = 31$
 $n(A \cap C) = 34$
 $n(A \cap B \cap C) = 16$
 $n(A' \cap B \cap C') = 45$
 $n(A' \cap B' \cap C') = 54$

Find $n(C)$.



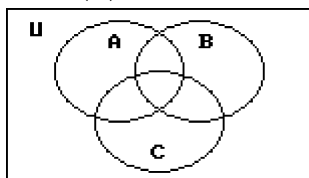
- A) 42 B) 26 C) 44 D) 76

249) Given:

249) _____

$n(A) = 60$
 $n(B) = 68$
 $n(C) = 62$
 $n(A \cap B) = 12$
 $n(A \cap C) = 14$
 $n(B \cap C) = 8$
 $n(A \cap B \cap C) = 6$
 $n(A' \cap B' \cap C') = 121$

Find $n(U)$

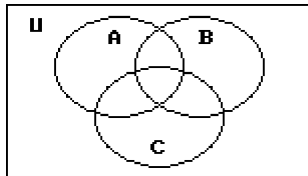


- A) 222 B) 162 C) 293 D) 283

- 250) Given: $n(A \cup B \cup C) = 165$
 $n(A \cap B \cap C) = 22$
 $n(A \cap B) = 46$
 $n(A \cap C) = 43$
 $n(B \cap C) = 41$
 $n(A) = 111$
 $n(B) = 82$
 $n(C) = 80$

250) _____

Find $n(A' \cap B \cap C)$



- A) 20 B) 19 C) 18 D) 21

Find the cardinal number of the indicated set. Use the cardinal number formula.

- 251) If $n(A) = 4$, $n(B) = 9$ and $n(A \cap B) = 2$, what is $n(A \cup B)$?

251) _____

- A) 11 B) 12 C) 10 D) 13

- 252) If $n(A) = 40$, $n(B) = 117$ and $n(A \cup B) = 137$, what is $n(A \cap B)$?

252) _____

- A) 10 B) 60 C) 22 D) 20

- 253) If $n(B) = 60$, $n(A \cap B) = 11$, and $n(A \cup B) = 105$, find $n(A)$.

253) _____

- A) 56 B) 54 C) 45 D) 58

- 254) If $n(A) = 25$, $n(A \cup B) = 73$, and $n(A \cap B) = 21$, find $n(B)$.

254) _____

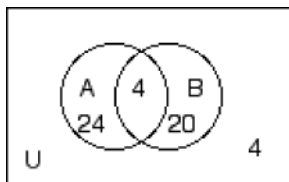
- A) 48 B) 70 C) 68 D) 69

Draw an appropriate Venn diagram and use the given information to fill in the number of elements in each region.

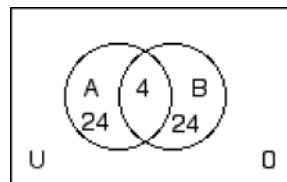
- 255) $n(U) = 52$, $n(A) = 28$, $n(A \cap B) = 4$, $n(B') = 28$

255) _____

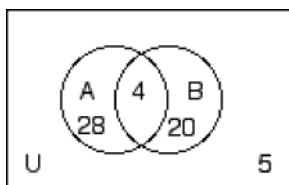
A)



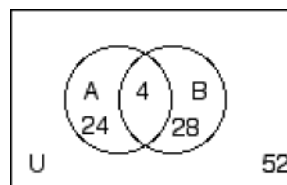
B)



C)



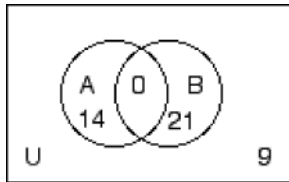
D)



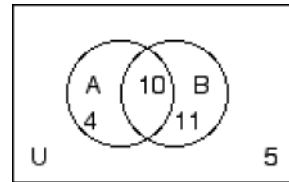
256) $n(A) = 14$, $n(B) = 21$, $n(A \cup B) = 25$, $n(B') = 9$

256) _____

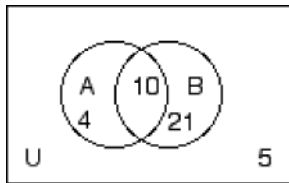
A)



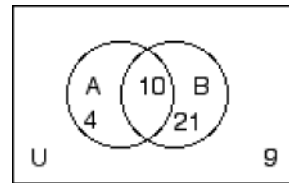
B)



C)



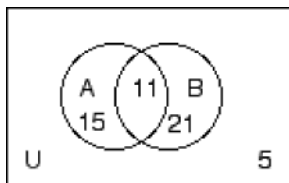
D)



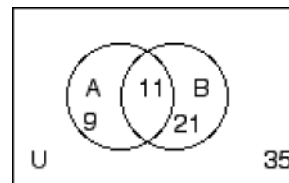
257) $n(A') = 26$, $n(B) = 32$, $n(A \cap B) = 11$, $n(A' \cup B') = 35$

257) _____

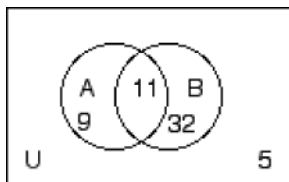
A)



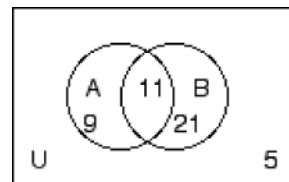
B)



C)



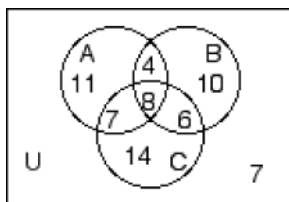
D)



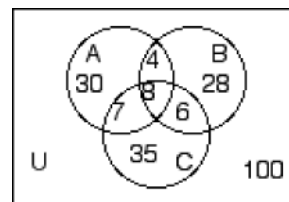
258) $n(A) = 30$, $n(B) = 28$, $n(C) = 35$, $n(A \cap B) = 12$, $n(A \cap C) = 15$, $n(B \cap C) = 14$, $n(U) = 67$

258) _____

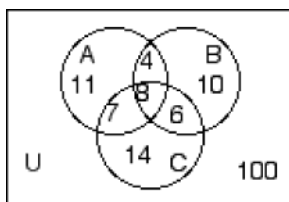
A)



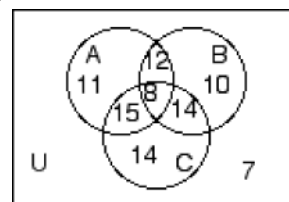
B)



C)



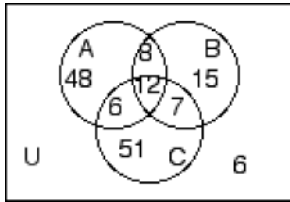
D)



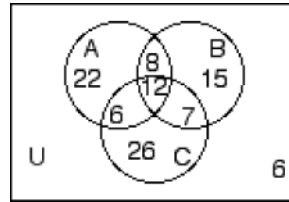
259) $n(A) = 48$, $n(B') = 60$, $n(C) = 51$, $n(A \cap B) = 20$, $n(B \cap C) = 19$, $n(A \cap C) = 18$,
 $n(A \cap B \cap C) = 12$, $n(A \cup B) = 70$

259) _____

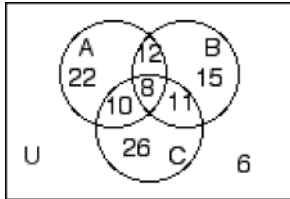
A)



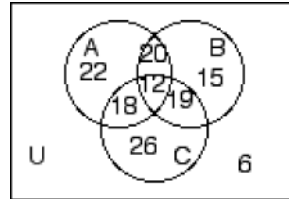
B)



C)



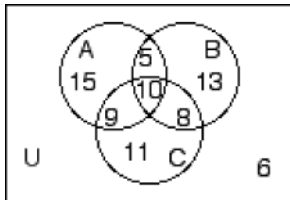
D)



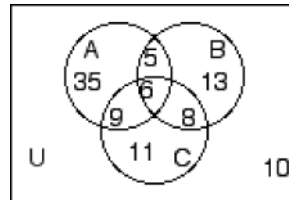
260) $n(A) = 35$, $n(A \cap B') = 24$, $n(A \cap C) = 15$, $n(B \cap C) = 14$, $n(A' \cap B' \cap C') = 10$, $n(A \cap B \cap C) = 6$,
 $n(B \cup C) = 52$, $n(B \cap C') = 18$

260) _____

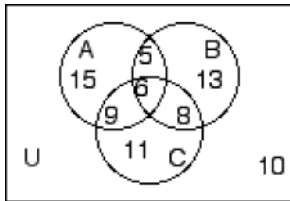
A)



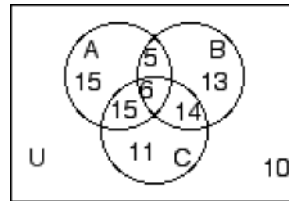
B)



C)



D)



Solve the problem.

261) 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 no cats?

261) _____

A) 27

B) 10

C) 22

D) 15

262) 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?

262) _____

A) 100

B) 300

C) 400

D) 500

- 263) A local television station sent out questionnaires to determine if viewers would rather see a documentary, an interview show, or reruns of a game show. There were 900 responses with the following results: 263) _____
- 270 were interested in an interview show and a documentary, but not reruns.
 - 36 were interested in an interview show and reruns but not a documentary.
 - 126 were interested in reruns but not an interview show.
 - 216 were interested in an interview show but not a documentary.
 - 90 were interested in a documentary and reruns.
 - 54 were interested in an interview show and reruns.
 - 72 were interested in none of the three.
- How many are interested in exactly one kind of show?
- A) 432 B) 412 C) 422 D) 442
- 264) A survey of 260 families showed that 264) _____
- 99 had a dog;
 - 76 had a cat;
 - 34 had a dog and a cat;
 - 98 had neither a cat nor a dog nor a parakeet;
 - 8 had a cat, a dog, and a parakeet.
- How many had a parakeet only?
- A) 26 B) 36 C) 31 D) 21
- 265) A survey of a group of 113 tourists was taken in St. Louis. The survey showed the following: 265) _____
- 63 of the tourists plan to visit Gateway Arch;
 - 49 plan to visit the zoo;
 - 10 plan to visit the Art Museum and the zoo, but not the gateway Arch;
 - 12 plan to visit the Art Museum and the Gateway Arch, but not the zoo;
 - 17 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;
 - 15 plan to visit none of the three places.
- How many plan to visit the Art Museum only?
- A) 36 B) 98 C) 49 D) 12
- 266) In a survey of 280 people, a travel company asked people about places they plan to visit in the next 266) _____
- years. The results were as follows:
- 48 plan to visit Europe
 - 58 plan to visit Latin America
 - 34 plan to visit Asia
 - 14 plan to visit Europe and Latin America
 - 12 plan to visit Latin America and Asia
 - 11 plan to visit Europe and Asia
 - 4 plan to visit all three
- How many people plan to visit exactly two of these places?
- A) 37 B) 29 C) 25 D) 18

- 267) A survey of 125 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) 33 B) 10 C) 35 D) 43

Answer Key

Testname: UNTITLED2

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

Answer Key

Testname: UNTITLED2

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

Answer Key

Testname: UNTITLED2

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

Answer Key

Testname: UNTITLED2

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

Answer Key

Testname: UNTITLED2

- 201) B
- 202) C
- 203) B
- 204) D
- 205) D
- 206) B
- 207) C
- 208) A
- 209) D
- 210) B
- 211) B
- 212) D
- 213) B
- 214) C
- 215) A
- 216) D
- 217) A
- 218) D
- 219) B
- 220) B
- 221) A
- 222) B
- 223) D
- 224) B
- 225) B
- 226) A
- 227) B
- 228) B
- 229) A
- 230) A
- 231) B
- 232) B
- 233) B
- 234) A
- 235) A
- 236) D
- 237) C
- 238) A
- 239) D
- 240) C
- 241) B
- 242) B
- 243) D
- 244) A
- 245) D
- 246) D
- 247) C
- 248) D
- 249) D
- 250) B

Answer Key

Testname: UNTITLED2

- 251) A
- 252) D
- 253) A
- 254) D
- 255) A
- 256) B
- 257) D
- 258) A
- 259) B
- 260) C
- 261) C
- 262) D
- 263) A
- 264) D
- 265) D
- 266) C
- 267) A