

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

Decide whether the argument is an example of inductive or deductive reasoning.

- 1) Fresh fruit costs more in winter. This is January. Therefore these fresh strawberries will cost more.
A) Deductive B) Inductive
- 2) $17 + 11 = 28$, $41 + 23 = 64$, $11 + 13 = 24$. Therefore, the sum of two prime numbers is even.
A) Inductive B) Deductive
- 3) All U.S. Presidents have come from the original 48 states. Therefore, no U.S. President can be from Alaska.
A) Deductive B) Inductive
- 4) $|-p| = p$, therefore $|-73| = 73$
A) Inductive B) Deductive
- 5) If $(-p)^2 = p^2$, then $(-9)^2 = 81$
A) Inductive B) Deductive

Determine the most probable next term in the sequence.

- 6) 35, 29, 23, 17, 11
A) 5 B) 2 C) 0 D) 6
- 7) 6, -12, 24, -48, 96
A) 192 B) 144 C) -144 D) -192
- 8) 1, 4, 1, 4, 4, 1, 4, 4, 4, 1, 4, 4, 4, 4, 1, 4, 4, 4, 4, 4, 4
A) $\frac{1}{4}$ B) 14 C) 4 D) 1

Use inductive reasoning to predict the next equation.

- 9) $(4 \times 1) \times (2 \times 1) = 8$
 $(4 \times 10) \times (2 \times 2) = 160$
 $(4 \times 100) \times (2 \times 3) = 2400$
- A) $(4 \times 1000) \times (2 \times 4) = 28,000$ B) $(4 \times 1000) \times (2 \times 4) = 36,000$
C) $(4 \times 1000) \times (2 \times 4) = 3200$ D) $(4 \times 1000) \times (2 \times 4) = 32,000$

Use the method of Gauss to find the sum.

- 10) $1 + 2 + 3 + \dots + 650$
A) 422,500 B) 211,575 C) 211,250 D) 105,625
- 11) $2 + 4 + 6 + \dots + 600$
A) 362,404 B) 90,300 C) 22,500 D) 90,000
- 12) $4 + 8 + 12 + \dots + 300$
A) 1406.25 B) 90,000 C) 11,400 D) 11,250

Find a pattern and use it to solve the problem.

13) Find the next term: W, T, F, S, S

- A) M B) W C) F D) T

14) Find the next term: 1, 1, 2, 3, 5, 8, 13

- A) 21 B) 16 C) 18 D) 15

15) Find the next term: 2, 3, 5, 7, 11, 13

- A) 17 B) 19 C) 15 D) 16

16) Find the next term: 6, 12, 18, 30

- A) 66 B) 42 C) 60 D) 36

17) Find the next term: T, F, S, E, T, T, F

- A) E B) T C) S D) F

18) Find the next term: 20, 4, 16, 6, 10, 8

- A) 6 B) 0 C) 18 D) 2

Determine if the sequence is an arithmetic sequence, a geometric sequence, or neither. If it is either arithmetic or geometric, give the next term in the sequence.

19) 9, 29, 49, 69, 89, . . .

- A) geometric; 109 B) arithmetic; 109 C) neither

20) 5, 8, 13, 20, 29, . . .

- A) geometric; 40 B) neither C) arithmetic; 40

21) 5, 10, 15, 25, 40, . . .

- A) arithmetic; 65 B) neither C) geometric; 65

22) 5, 15, 45, 135, 405, . . .

- A) geometric; 1215 B) arithmetic; 1215 C) neither

Use the method of successive differences to determine the next term in the sequence.

23) 9, 25, 43, 63, 85, . . .

- A) 107 B) 111 C) 110 D) 109

24) 2, 19, 55, 112, 192, 297, . . .

- A) 431 B) 429 C) 448 D) 427

25) 5, 24, 91, 263, 619, 1260, . . .

- A) 2331 B) 2299 C) 2309 D) 2287

Use the indicated formula to find the sum.

26) Use $S = \frac{n(n+1)}{2}$ to find the sum of $1 + 2 + 3 + \dots + 300$.

- A) 45,000 B) 45,150 C) 44,850 D) 4515

- 27) Use $S = n^2$ to find the sum of $1 + 3 + 5 + \dots + 701$.
A) 123,201 B) 122,500 C) 123,200 D) 123,202

Determine the indicated term in the given sequence.

- 28) The 6th term of $2, 8, 32, \dots$
A) 32,768 B) 1024 C) 2048 D) 512
- 29) The 5th term of $1, \frac{1}{2}, \frac{1}{4}, \dots$
A) $\frac{1}{8}$ B) $\frac{1}{2}$ C) $\frac{1}{16}$ D) $\frac{1}{64}$

Use logic to solve the problem.

- 30) How much dirt is there in a hole 9 feet wide by 2 feet long by 5 feet deep?
A) 90 ft^3 B) 18 ft^3 C) 45 ft^3 D) None
- 31) In India, water lilies grow extremely fast. In one pond, a lily grew so fast that each day it doubled the area it covered. In 26 days it covered the pond. How long would it take 2 such lilies to cover the pond?
A) 13 B) 6 C) 25 D) 26

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

- 32) Farmer Higgs owns 6 white pigs, 5 brown pigs, and one black pig. How many of Higgs' pigs can say that it is the same color as another pig on Higgs' farm?
- 33) Dick and Andy find a long drainage pipe in a vacant lot. It is big enough so that each boy can just manage to squeeze into it and crawl from one end to the other. If Dick and Andy go into the pipe from opposite ends, is it possible for each boy to crawl the entire length of the pipe and come out the other end?
- 34) Why are 1,989 pennies worth almost twenty dollars?
- 35) If it takes 6 minutes to hard-boil 3 goose eggs when dropped into boiling water, how long will it take to hard-boil 6 goose eggs?

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

- 36) If the hometown baseball team scored 2 runs every inning played, and the visiting team scored 1 run every inning played, what was the final score?
A) Home: 16 B) Home: 0 C) Home: 18 D) Home: 18
Visitors: 9 Visitors: 0 Visitors: 9 Visitors: 8
- 37) During vacation time, two students met on a train. One asked the other how old he was. He replied, "The day before yesterday I was 15, and next year I will have my 18th birthday." On what date of the year did the two students meet?
A) Feb 28 B) Feb 29 C) Jan 1 D) Dec 31

Use problem solving strategies to solve the problem.

- 38) A mouse is at the bottom of a 10-foot-tall clock. Every hour he climbs up 3 feet. But when the clock strikes at the hour, he falls back 1 foot. If the mouse starts climbing at 8 a.m., at what time to the nearest minute will it reach the top of the clock?
- A) 1:00 p.m. B) 1:10 p.m. C) 12:30 p.m. D) 12:40 p.m.
- 39) What's the easiest way to heat a pan of water for 9 minutes when you have only a 6-minute hour-glass timer and a 21-minute hour-glass timer?
- A) Start the 6-min timer. When it's halfway through start heating the water. When it runs out turn it over and heat the water until it runs out again.
- B) Start both timers. When the 6-min one runs out, turn it over. When it runs out again, start heating the water until the 21-min timer runs out.
- C) Start both timers. When the 6-min timer runs out, start heating the water. Continue until the 21-min timer runs out.
- D) Can't be done.

Solve the problem.

- 40) A cell has at least 3 and at most 47 nuclei. How many cells must a scientist view under his microscope to be certain that at least two cells have the same number of nuclei?
- A) 47 cells B) 45 cells C) 46 cells D) 44 cells
- 41) When 15 gallons of gasoline are put into a car's tank, the indicator goes from $\frac{1}{8}$ of a tank to $\frac{3}{4}$. What is the total capacity of the gasoline tank?
- A) 18 gallons B) 24 gallons C) 30 gallons D) 36 gallons
- 42) Ethan was asked by his teacher to subtract 15 from a certain number and then divide the result by 5. Instead, he subtracted 5 and then divided the result by 15, giving an answer of 30. What would his answer have been if he had worked the problem correctly?
- A) 89 B) 88 C) 44 D) 91

Complete the magic (addition) square. A magic square has the property that the sum of the numbers in any row, column, or diagonal is the same.

- 43) Use each number 16, 17, 18, 19, 20, 21, 22, 23, and 24 once.

19		
18	20	
23	16	21

A)

19	22	24
18	20	17
23	16	21

B)

19	24	17
18	20	22
23	16	21

C)

19	24	22
18	20	17
23	16	21

D)

19	22	17
18	20	24
23	16	21

Use your calculator to perform the indicated operations. Give as many digits in your answer as shown on your calculator display.

- 44) $3.1 + (9 - 7) \times 14.3$
A) 72.93 B) 124.80 C) 31.70 D) 15.40
- 45) 1.7^3
A) 1.19348319 B) 4.913 C) 5.1 D) 0.56666667
- 46) $\sqrt{1787.5984}$
A) 42.28 B) 11.84 C) 3575.1968 D) 893.7992
- 47) $5 \cdot \pi$
A) 15 B) 15.70796327 C) 306.0196848 D) 1.591549431

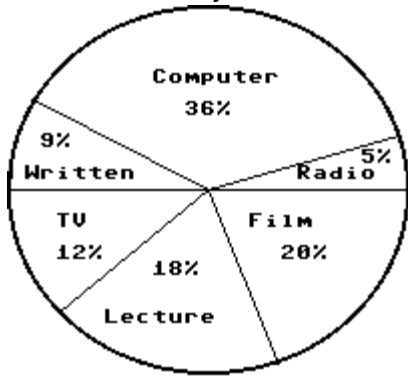
Use your calculator to perform each calculation and observe the answers. Use inductive reasoning to determine which statement is true.

- 48) $\sqrt[3]{-7}$; $\sqrt[5]{-10}$; $\sqrt[7]{-200}$; $\sqrt[9]{-0.28}$
A) An odd root of a negative number can be either positive or negative.
B) An odd root of a negative number is negative.
C) An odd root of a negative number is positive.
D) An odd root of a negative number is undefined.
- 49) $(-27)^2$; $(-3)^4$; $(-0.3)^6$; $(-1.68)^8$
A) Raising a negative number to an even power gives an error message on a calculator.
B) Raising a negative number to an even power can give either a positive or negative result.
C) Raising a negative number to an even power gives a negative result.
D) Raising a negative number to an even power gives a positive result
- 50) 71^1 ; $(-3)^1$; 0.789^1 ; $(-192)^1$; 0^1
A) Raising a number to a power of 1 leaves the number unchanged
B) Raising a number to a power of 1 gives a result of 0.
C) Raising a number to a power of 1 gives a result of 1.
D) Raising a number to a power of 1 changes the sign of the number.

Give the appropriate counting number answer to the problem.

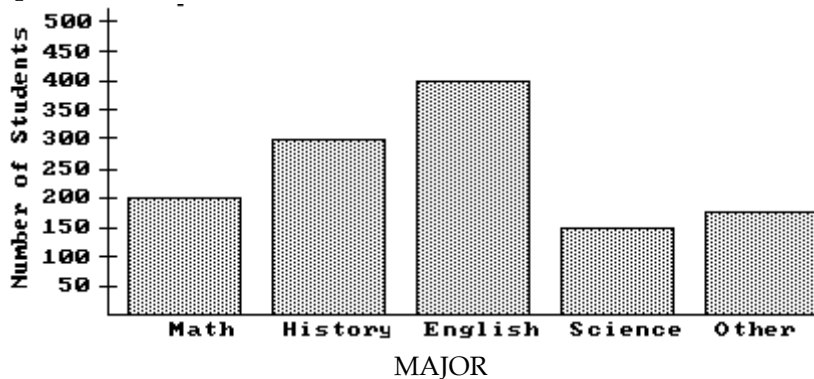
- 51) David's company has to ship 4259 boxes of sprinklers. If a truck can hold 550 boxes, how many trucks does he need to ship all the boxes?
A) 8 B) 7 C) 6 D) 9
- 52) A particular freight elevator can safely carry 1061 pounds. How many 109-pound bundles of wood can be safely carried by this elevator?
A) 7 B) 4 C) 5 D) 9
- 53) Jane runs 23 miles a day. Without finding the exact answer, estimate the total number of miles Jane runs in 56 days.
A) 1200 B) 1800 C) 1000 D) 3000

In a school survey, students showed these preferences for instructional materials. Answer the question.



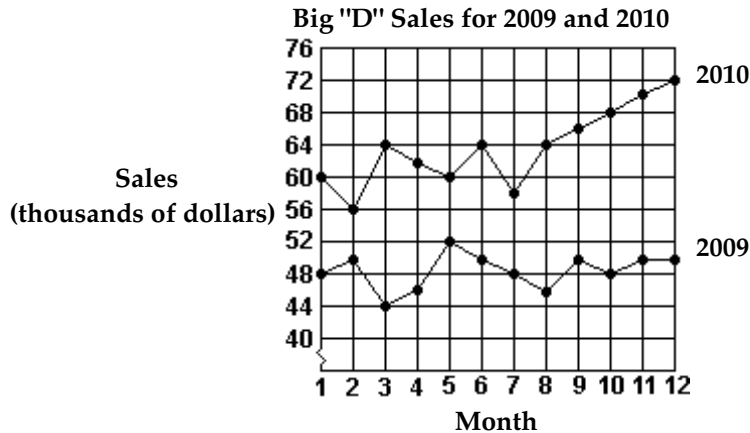
- 54) About how many students would you expect to prefer computers in a school of 350 students?
 A) About 36 students
 B) About 126 students
 C) About 70 students
 D) About 63 students
- 55) About how many students would you expect to prefer lectures in a school of 900 students?
 A) About 18 students
 B) About 180 students
 C) About 324 students
 D) About 162 students

The bar graph below shows the number of students by major in the College of Arts and Sciences. Answer the question.



- 56) How many students are in the College of Arts and Sciences?
 A) 1,050
 B) 1,250
 C) 1,225
 D) 1,325
- 57) How many more English majors are there than history majors?
 A) 150
 B) 500
 C) 200
 D) 100
- 58) Which two majors are the most popular?
 A) Math and science
 B) Math and history
 C) English and history
 D) Science and other
- 59) Which two majors show the greatest difference in numbers of students?
 A) History and English
 B) English and science
 C) Science and other
 D) Math and science

Use this graph to answer the question.



- 60) Which month in 2009 had the lowest sales?
 A) Month 2 B) Month 6 C) Month 8 D) Month 3

- 61) Which month in 2010 had the highest sales?
 A) Month 3 B) Month 6 C) Month 12 D) Month 5

List the elements in the set.

- 62) $\{x \mid x \text{ is a whole number between 3 and 7}\}$
 A) $\{4, 5, 6, 7\}$ B) $\{3, 4, 5, 6\}$ C) $\{4, 5, 6\}$ D) $\{3, 4, 5, 6, 7\}$
- 63) $\{x \mid x \text{ is a negative multiple of 9}\}$
 A) $\{9, 18, 27, \dots\}$ B) $\{-9, -81, -729, \dots\}$ C) $\{-9, -18, -27, \dots\}$ D) $\{0, -9, -18, \dots\}$
- 64) The set of all whole numbers greater than 2 and less than 6
 A) $\{3, 4, 5, 6\}$ B) $\{2, 3, 4, 5\}$ C) $\{2, 3, 4, 5, 6\}$ D) $\{3, 4, 5\}$
- 65) $\{x \mid x \text{ is a counting number less than } -1\}$
 A) $\{0, 1, 2, \dots\}$ B) \emptyset C) $\{\dots, -4, -3, -2\}$ D) $\{-2, -3, -4, \dots\}$
- 66) The set of the days of the week
 A) $\{\text{Tuesday, Thursday}\}$
 B) $\{\text{Saturday, Sunday}\}$
 C) $\{\text{Friday, Monday, Saturday, Sunday, Thursday, Tuesday, Wednesday}\}$
 D) $\{\text{Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Sunday}\}$

Write the set in set-builder notation.

- 67) $\{12, 15, 18, 21, \dots, 42\}$
 A) $\{x \mid x \text{ is a multiple of 3 greater than 12}\}$ B) $\{x \mid x \text{ is a multiple of 3 between 12 and 42}\}$
 C) $\{x \mid x \text{ is a multiple of 3}\}$ D) $\{x \mid x \text{ is a multiple of 3 between 9 and 45}\}$

- 68) The set of all calculus books
 A) $\{x \mid x \text{ is a calculus book}\}$
 C) $\{\text{any calculus book}\}$
 B) $\{\text{a calculus book}\}$
 D) $\{x \text{ is a calculus book}\}$

- 69) The set of all cars owned by students
 A) $\{x \text{ is a car}\}$
 C) $\{x \mid x \text{ is a car owned by a student}\}$
 B) $\{x \text{ is a student with a car}\}$
 D) $\{x \mid x \text{ is a student with a car}\}$

Identify the set as finite or infinite.

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

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

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

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

Find $n(A)$ for the set.

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

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

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

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

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

Determine whether or not the set is well defined.

- 79) $\{x \mid x \text{ is a football team that has won the Super Bowl}\}$
 A) Well defined
 B) Not well defined

- 80) $\{x \mid x \text{ is a mystery book in the library}\}$
 A) Not well defined
 B) Well defined

- 81) $\{x \mid x \text{ is a stock on the AmEx today}\}$
 A) Well defined B) Not well defined
- 82) $\{x \mid x \text{ is an expensive boat on the Great Lakes}\}$
 A) Well defined B) Not well defined
- 83) $\{x \mid x \text{ is a four-year college in Utah}\}$
 A) Well defined B) Not well defined

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

- 84) $0 _ \{-2, 2, 4, 18, 28\}$
 A) \in B) \notin
- 85) $\{7\} _ \{\{4\}, \{5\}, \{6\}, \{7\}, \{8\}\}$
 A) \in B) \notin
- 86) $a _ \{A, B, C, \dots, Z\}$
 A) \notin B) \in

Tell whether the statement is true or false.

- 87) $\{2, 16, 26, 9, 32\} = \{32, 16, 9, 62, 2\}$
 A) True B) False
- 88) $\{x \mid x \text{ is a counting number greater than } 36\} = \{36, 37, 38, \dots\}$
 A) True B) False
- 89) $11 \notin \{x \mid x \text{ is an even counting number}\}$
 A) True B) False
- 90) $k \notin \{p, a, k, h, v\}$
 A) True B) False
- 91) $\{s, q, y, o, d\} = \{o, d, q, s, y\}$
 A) True B) False

Write true or false for the following statement.

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

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

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

- 92) Every element of B is also an element of C.
 A) True B) False
- 93) $A = \{x \mid x \text{ is an odd counting number greater than 1 and less than 15}\}$
 A) True B) False
- 94) $0 \in A$
 A) True B) False

- 95) Every element of C is also an element of A.
 A) True B) False
- 96) $\{x \mid x \text{ is an odd counting number less than } 15\} = A$
 A) True B) False

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

- 97) $\{7, 9, 11\}$ $\underline{\quad}$ $\{x \mid x \text{ is an odd counting number}\}$
 A) \subseteq B) $\not\subseteq$
- 98) $\{k, p, d\}$ $\underline{\quad}$ $\{k, k, p, p, d, d\}$
 A) $\not\subseteq$ B) \subseteq
- 99) $\{x \mid x \text{ is a counting number larger than } 5\}$ $\underline{\quad}$ $\{7, 8, 9, \dots\}$
 A) $\not\subseteq$ B) \subseteq

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

- 100) $\{0\}$ $\underline{\quad}$ \emptyset
 A) Both \subset and \subseteq B) \subseteq C) Neither D) \subset
- 101) $\{a, b\}$ $\underline{\quad}$ $\{z, a, y, b, x, c\}$
 A) Both \subset and \subseteq B) \subset C) Neither D) \subseteq
- 102) $\{s, r, t\}$ $\underline{\quad}$ $\{s, r, t\}$
 A) Neither B) Both \subseteq and \subset C) \subset D) \subseteq

Determine whether the statement is true or false.

Let $A = \{1, 3, 5, 7\}$
 $B = \{5, 6, 7, 8\}$
 $C = \{5, 8\}$
 $D = \{2, 5, 8\}$
 $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$

- 103) $\{5\} \subseteq D$
 A) True B) False
- 104) $\{0\} \subseteq U$
 A) True B) False
- 105) $\{8, 5, 2\} \subset D$
 A) True B) False
- 106) $C \not\subseteq B$
 A) True B) False
- 107) $C \not\subseteq A$
 A) True B) False

Find the number of subsets of the set.

- 108) $\{0\}$
A) 0 B) 2 C) 1 D) 4
- 109) $\{x \mid x \text{ is an even number between 19 and 37}\}$
A) 512 B) 8 C) 68 D) 256
- 110) $\{\text{math, English, history, science, art}\}$
A) 32 B) 24 C) 28 D) 16
- 111) $\{x \mid x \text{ is a day of the week}\}$
A) 124 B) 128 C) 256 D) 127
- 112) $\{1, 2, 3, \dots, 9\}$
A) 512 B) 508 C) 16 D) 1024

Find the number of proper subsets of the set.

- 113) $\{0\}$
A) 4 B) 0 C) 1 D) 2
- 114) $\{5, 6, 7\}$
A) 6 B) 5 C) 7 D) 2
- 115) $\{\text{poetry, drama, speech, art, film}\}$
A) 31 B) 16 C) 24 D) 32
- 116) $\{x \mid x \text{ is a day of the week}\}$
A) 128 B) 127 C) 64 D) 256
- 117) $\{1, 2, 3, \dots, 6\}$
A) 64 B) 58 C) 127 D) 63

Let $U = \{1, 2, 4, 5, a, b, c, d, e\}$. Find the complement of the set.

- 118) $S = \emptyset$
A) \emptyset B) $\{0\}$ C) \emptyset' D) U
- 119) $T = U$
A) T B) $\{U - T\}$ C) U D) \emptyset
- 120) $P = \{e, a, c, 4, 5\}$
A) $\{1, 2, 3, b, d\}$ B) $\{1, 2, b, d\}$ C) $\{b, d, 1, 2, 3\}$ D) $\{1, 2, b, c, d\}$

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 in Alabama, Arkansas, and Louisiana, respectively. Find each of the following sets.

- 121) The set of crops in U .
- A) $\{s, p, c, h, w, s, r, t, h, w, s, n, r, c, t\}$ B) $\{s, p, c, h, w, r, t, n, c\}$
 C) $\{s, p, c, w, r, t, n\}$ D) $\{c, h, n, p, r, s, t, w\}$
- 122) The set of crops in both A and K
- A) $\{c, h, s, t, w\}$ B) $\{c, h, p, r, s, t, w\}$ C) $\{c, p, r, t\}$ D) $\{h, s, w\}$
- 123) The set of crops common to A , K , and L
- A) $\{n, p\}$ B) $\{c, h, n, p, r, s, t, w\}$
 C) $\{s\}$ D) $\{n, p, s\}$

Solve the problem.

- 124) 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) $\{m\}, \{n\}$
- 125) 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) $\{e, f\}, \{e, g\}, \{e, j\}, \{f, g\}, \{f, j\}, \{g, j\}, \{f, e\}, \{g, e\}$ B) $\{e, f\}, \{e, g\}, \{f, g\}, \{g, j\}$
 C) $\{e, f\}, \{e, g\}, \{e, j\}, \{f, j\}, \{g, j\}$ D) $\{e, f\}, \{e, g\}, \{e, j\}, \{f, g\}, \{f, j\}, \{g, j\}$

List the elements in the set .

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

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

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

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

- 126) $A \cup C$
- A) $\{q, s, u, v, w, x, y, z\}$ B) $\{w, y\}$
 C) $\{q, s, u, w, y, v, w, x, y, z\}$ D) $\{q, s, u, v, w, y, z\}$
- 127) $B \cap C$
- A) $\{y, z\}$ B) $\{q, s, v, w, x, y, z\}$ C) $\{w, y, z\}$ D) $\{y\}$
- 128) $(A \cup B)'$
- A) $\{t, v, x\}$ B) $\{s, u, w\}$
 C) $\{r, s, t, u, v, w, x, z\}$ D) $\{r, t, v, x\}$

- 129) $(A \cap B)'$
 A) $\{t, v, x\}$ B) $\{r, t, u, v, w, x, z\}$
 C) $\{s, u, w\}$ D) $\{q, s, t, u, v, w, x, y\}$
- 130) $A' \cup B$
 A) $\{q, s, t, u, v, w, x, y\}$ B) $\{q, r, s, t, v, x, y, z\}$
 C) $\{r, s, t, u, v, w, x, z\}$ D) $\{s, u, w\}$
- 131) $A \cup (B \cap C)$
 A) $\{q, s, u, w, y, z\}$ B) $\{q, y, z\}$ C) $\{q, w, y\}$ D) $\{q, r, w, y, z\}$
- 132) $A \cap (B \cup C)$
 A) $\{q, s, u, w, y, z\}$ B) $\{q, s, w, y\}$ C) $\{q, y, z\}$ D) $\{q, r, w, y, z\}$
- 133) $B \cap (A - C)$
 A) $\{q, r, s, t, u, v, w, x, y\}$ B) $\{q, s, u, y\}$
 C) $\{q, s\}$ D) $\{q, s, u, y, z\}$
- 134) $(A \cap B') \cup (B \cap A')$
 A) $\{u, w, y, z\}$ B) $\{q, s, y\}$ C) $\{u, w, z\}$ D) $\{q, s, u, w, y, z\}$

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.

- 135) $A' \cap C$
 A) All 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 non-diet soda pops in cans
- 136) $(A \cup D) \cap C'$
 A) All non-diet, non-caffeine-free soda pops not in cans
 B) All diet soda pops not in cans or all caffeine-free soda pops not in cans
 C) All non-cola soda pops not in cans
 D) All diet, caffeine-free soda pops not in cans
- 137) $(A - D) \cap B$
 A) All diet caffeine-free cola soda pops
 B) All diet soda pops that contain caffeine and all cola soda pops
 C) All diet cola soda pops that contain caffeine
 D) All non-diet, caffeine-free cola soda pops
- 138) $(B \cap C') \cup (C \cap B')$
 A) All non-cola soda pops not in cans
 B) All cola soda pops and all soda pops in cans
 C) All cola soda pops in cans and all non-cola soda pops not in cans
 D) All cola soda pops not in cans or all non-cola soda pops in cans

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.

139) If $B \subseteq A$, $n(B) = n(A - B)$.

A) True

B) False

140) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

A) True

B) False

141) $n(A \cap B) = n(A) - n(B)$

A) True

B) False

142) $n(A \cup B) + n(A \cap B) = n(A) + n(B)$

A) True

B) False

Tell whether the statement is true or false.

143) $(2, 7) = (7, 2)$

A) True

B) False

144) $(5 - 8, 4 - 15) = (-3, -11)$

A) True

B) False

145) $(16 + 10, 19 + 10) = (16, 19)$

A) True

B) False

Find the Cartesian product.

146) $A = \{i, a\}$

$B = \{t, d, m\}$

Find $A \times B$.

A) $\{(i, t), (t, a), (i, d), (d, a), (i, m), (m, a)\}$

B) $\{(t, i), (t, a), (d, i), (d, a), (m, i), (m, a)\}$

C) $\{(i, t), (i, d), (i, m), (a, t), (a, d), (a, m)\}$

D) $\{(i, t), (a, t), (i, d), (a, d)\}$

147) $A = \{4, 3, 6, 7\}$

$B = \{0, 1\}$

Find $B \times A$.

A) $\{(4, 0), (4, 1), (3, 0), (3, 1)\}$

B) $\{0, 1, 4, 3, 6, 7\}$

C) $\{(4, 0), (3, 0), (6, 0), (7, 0), (4, 1), (3, 1), (6, 1), (7, 1)\}$

D) $\{(0, 4), (0, 3), (0, 6), (0, 7), (1, 4), (1, 3), (1, 6), (1, 7)\}$

Find the indicated cardinal number.

148) Find $n(F)$, given that $n(B \times F) = 18$ and $B = \{1, 3\}$.

A) 36

B) 54

C) 6

D) 9

149) Find $n(G)$, given that $n(D \times G) = 20$ and $D = \{7, 8, 9, 10\}$.

A) 5

B) 9

C) 24

D) 4

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

A) 47

B) 280

C) 54

D) 33

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

A) 10

B) 33

C) 3

D) 27

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

A) 20

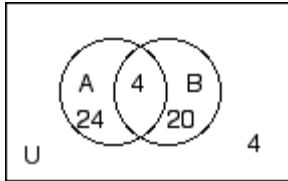
B) 2

C) 11

D) 24

Find the cardinal number of the set.

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



Find $n(A \cup B)$.

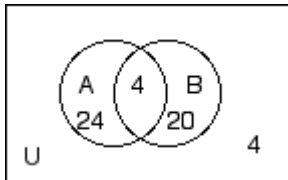
A) 48

B) 52

C) 24

D) 4

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



Find $n(A \cap B)$.

A) 20

B) 4

C) 28

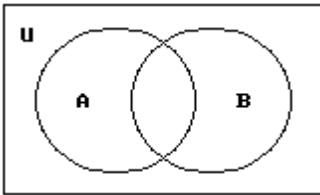
D) 24

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

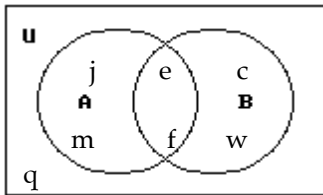
155) Let $U = \{c, e, f, j, q, m, w\}$

$A = \{e, f, j, m\}$

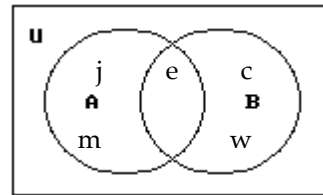
$B = \{c, e, f, w\}$



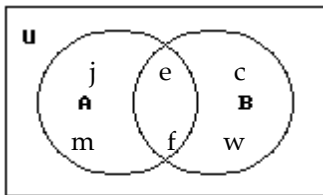
A)



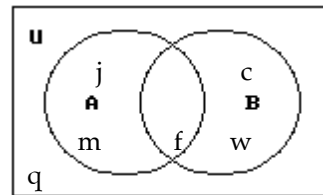
B)



C)

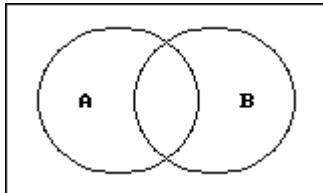


D)

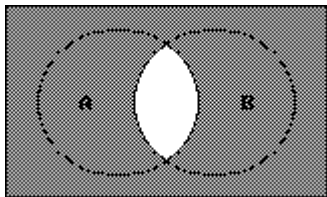


Which shaded the regions represent each set.

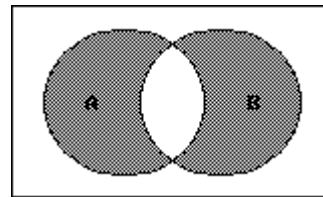
156) $A' \cap B'$; $A' \cup B'$; $(A \cup B)'$; $(A \cap B)'$; $(A \cap B) \cup (A \cup B)'$; $(A \cup B) \cap (A \cap B)'$



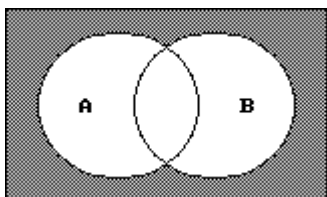
A)



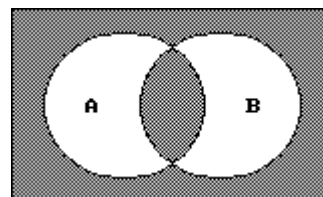
B)



C)

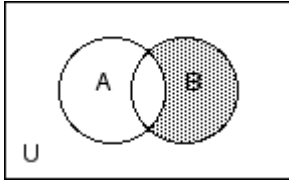


D)



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

157)



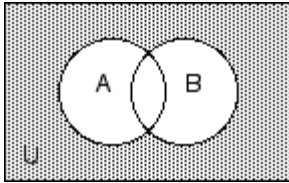
A) $B - A'$

B) $B \cap A'$

C) $A \cap B'$

D) $A - B$

158)



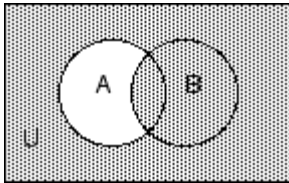
A) $(A \cap B)'$

B) $A - B$

C) $A \cup B$

D) $A' \cap B'$

159)



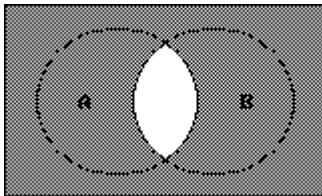
A) $(A \cap B)'$

B) $A' \cup B$

C) $B - A$

D) $A' \cap B$

160)



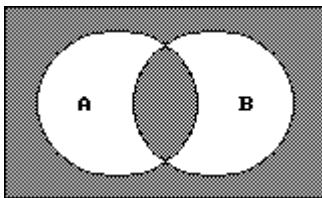
A) $A' \cap B'$

B) $A \cap B$

C) $(A \cap B)'$

D) $(A \cup B)'$

161)



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

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

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

D) $A' \cap B'$

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

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

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

A) 10

B) 12

C) 13

D) 11

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

A) 69

B) 68

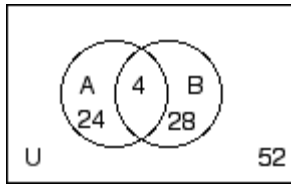
C) 48

D) 70

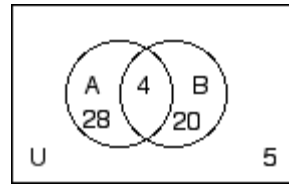
Draw an appropriate Venn diagram and use the given information to fill in the number of elements in each region.

164) $n(U) = 52$, $n(A) = 28$, $n(A \cap B) = 4$, $n(B) = 28$

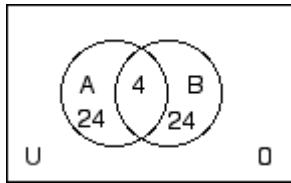
A)



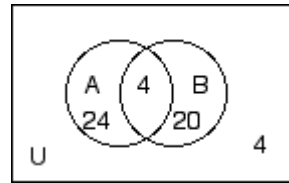
B)



C)



D)



Solve the problem.

165) 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?

A) 27

B) 15

C) 22

D) 10