Write the following set in builder notation form

$\{7, 12, 17, 22, 27, 32, 37, 42, 47, 52\}$

○ A) $\{x | x = 6n + 2; n,$ an integer between 1 and 10 inclusive$\}$
○ B) $\{x | x = 5n + 2; n,$ an integer between 1 and 10 inclusive$\}$
○ C) $\{x | x = 9n + 2; n,$ an integer between 1 and 10 inclusive$\}$
○ D) $\{x | x = 10n + 2; n,$ an integer between 1 and 10 inclusive$\}$
○ E) $\{x | x = 4n + 2; n,$ an integer between 1 and 10 inclusive$\}$

2.

List the elements of the given set in roster notation.

$\left\{ x | 7 - x = 9, x, \text{ an integer} \right\}$

○ A) $\{-2\}$
○ B) $\{-2, 2\}$
○ C) $\{-2, 16\}$
○ D) $\{2\}$

3.

List all subsets of the set

$\{8, 1, 3\}$

○ A) $\varnothing, \{8\}, \{1\}, \{3\}, \{8, 1\}, \{8, 3\}, \{1, 3\}$
○ B) $\varnothing, \{8\}, \{1\}, \{3\}, \{8, 1\}, \{8, 3\}, \{1, 3\}, \{8, 1, 3\}$
○ C) $\{8\}, \{1\}, \{3\}, \{8, 1\}, \{8, 3\}, \{1, 3\}$
○ D) $\{8, 1, 3\}, \{8, 3, 1\}, \{1, 8, 3\}, \{1, 3, 8\}, \{3, 8, 1\}, \{3, 1, 8\}$

4.

Find the smallest possible set (that is, the set with the least number of elements) that contains the given sets as subsets.

$\{6, 1, 3\}, \{a, e\}$

○ A) $\{6, 1, 3\}$
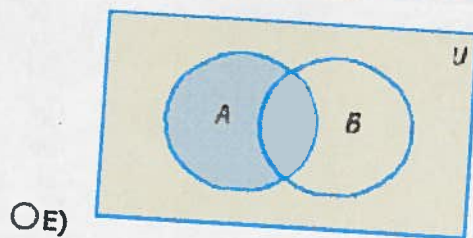○ B) $\{6, 1, 3, a, e\}$
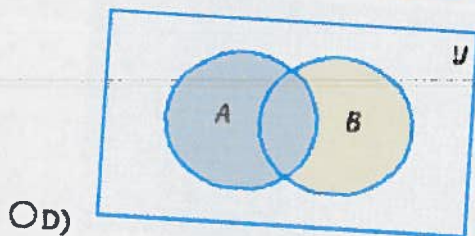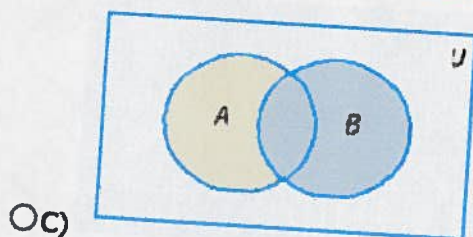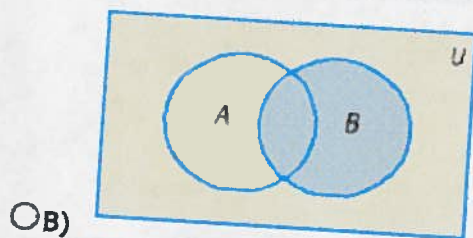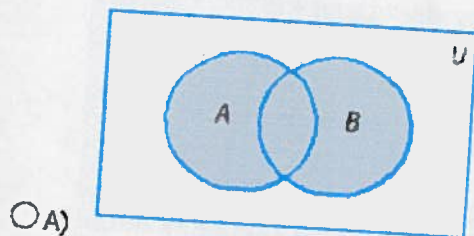○ C) $\{10, a, e\}$
○ D) $\{a, e\}$

5.

Find the smallest possible set (that is, the set with the least number of elements) that contains the given sets as subsets.

$\left\{ \text{Volkswagen, GM, Nissan} \right\}, \left\{ \text{Porche, Volvo, Chrysler} \right\}$

A) $\{$ Volkswagen, GM, Nissan, Porche, Volvo, Chrysler $\}$

B) $\{$ Porche, Volvo, Chrysler $\}$

C) $\{$ Volkswagen, GM, Nissan $\}$
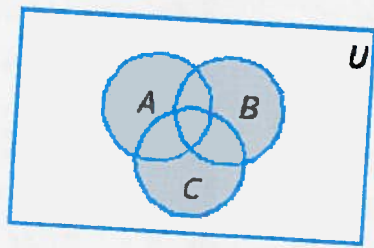
D) $\varnothing$

6.

Use Venn diagrams to illustrate the statement.

$A \subset A \cup B$

A)

B)

C)

D)

E)

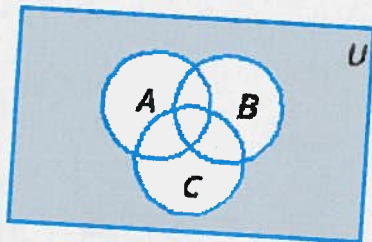**7.**

Shade the portion of the accompanying figure that represents the set.

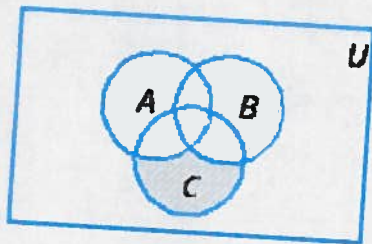$(A \cup B)^c \cap C$

A)

B)

C)
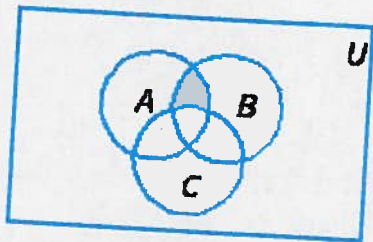
○ D)
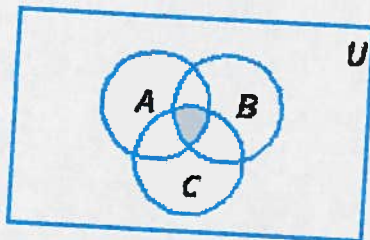
○ E)

8.

Determine whether the given pair of sets is disjoint.

$\{2, 3, 4, 5\}$ $\{4, 5, 6, 7\}$

○ A) Disjoint
○ B) Not disjoint

9.

Let $A = \{2, 4, 6, 8\}$ and $B = \{2, 3, 5, 7, 9\}$. Compute $n(A)$.

○ A) 4
○ B) 14
○ C) 8
○ D) 17
○ E) 5
○ F) 1

10. In a survey of 122 consumers conducted in a shopping mall, 82 consumers indicated that they buy brand A of a certain product, 71 buy brand B, and 46 buy both brands. How many consumers participating in the survey buy only brand A?

○ A) 35 consumers
○ B) 17 consumers
○ C) 87 consumers
○ D) 36 consumers
○ E) 51 consumers
○ F) 56 consumers

11.

In a poll conducted among 180 active investors, it was found that 100 use discount brokers, 122 use full-service brokers, and 54 use both discount and full-service brokers. How many investors use only discount brokers?

- A) 68
- B) 58
- C) 46
- D) 36
- E) 56

12. On a certain day, the Wilton County Jail had 183 prisoners. Of these, 127 were accused of felonies, and 117 were accused of misdemeanors. How many prisoners were accused of both a felony and a misdemeanor?
- A) 89 prisoners
- B) 61 prisoners
- C) 64 prisoners
- D) 73 prisoners
- E) 68 prisoners
- F) 87 prisoners

13.
If

$n(A) = 12$

,

$n(A \cap B) = 8$

, and

$n(A \cup B) = 18$

, what is

$n(B)$

?

- A) 4
- B) 16
- C) 14
- D) 2
- E) 6
- F) 12

14.

Let A and B be subsets of a universal set U and suppose $n(U) = 210$, $n(A) = 100$, $n(B) = 60$, and $n(A \cap B) = 30$.

Compute $n(A^c \cap B^c)$.

- A) 80
- B) 100
- C) 90
- D) 200

○ E) 150
○ F) 180

15.

Let A and B be subsets of a universal set U and suppose $n(U) = 190$, $n(A) = 100$, $n(B) = 70$, and $n(A \cap B) = 50$.

Compute $n(A^c)$.

○ A) 40
○ B) 90
○ C) 30
○ D) 20
○ E) 170
○ F) 10

16. A survey of 900 subscribers to the Los Angeles Times revealed that 700 people subscribe to the daily morning edition and 400 subscribe to both the daily and the Sunday editions. How many subscribe to the Sunday edition?

○ A) 500 people
○ B) 700 people
○ C) 600 people
○ D) 300 people
○ E) 900 people
○ F) 100 people

17. Three different types of monthly commuter passes are offered by a city's local transit authority for three different groups of passengers. How many different kinds of passes must be possible?

○ A) 9 possible passes
○ B) 18 possible passes
○ C) 15 possible passes
○ D) 6 possible passes
○ E) 12 possible passes
○ F) 11 possible passes

18. In a card game, a 2-card hand consisting of an ace and either a face card of diamond or a 10 is called a "win". If a standard 52-card deck is used, determine how many winning hands can be dealt. (A "face card" is a jack, queen, or king.)

○ A) 48
○ B) 28
○ C) 20
○ D) 16
○ E) 40

19. An opinion poll is to be conducted among cable TV viewers. Four multiple-choice questions, each with three possible answers, will be asked. In how many different ways can a viewer complete the poll if exactly one response is given to each question?

○ A) 115 different ways
○ B) 81 different ways
○ C) 108 different ways
○ D) 136 different ways
○ E) 82 different ways
○ F) 6 different ways

20. A warranty identification number for a certain product consists of a letter of the alphabet followed by a four-digit number. How many possible identification numbers are there if the first digit of the four-digit number must be nonzero?
    - A) 234,000 numbers
    - B) 307,000 numbers
    - C) 99,000 numbers
    - D) 6,000 numbers
    - E) 414,000 numbers
    - F) 432,000 numbers

21. An exam consists of six true-or-false questions. Assuming that every question is answered, in how many different ways can a student complete the exam? In how many ways may the exam be completed if a penalty is imposed for each incorrect answer, so that a student may leave some questions unanswered?
    - A) 108; 72
    - B) 92; 1,439
    - C) 64; 729
    - D) 66; 225
    - E) 15; 1,316
    - F) 72; 536

22. A Social Security number has seven digits. How many Social Security numbers are possible?
    - A) 10,000,000
    - B) 5040
    - C) 720
    - D) 9,999,999
    - E) 6,000,000

23. In a survey conducted by a union, members were asked to rate the importance of the following issues: (1) job security, (2) increased fringe benefits, and (3) improved working conditions. Six different responses were allowed for each issue. Among completed surveys, how many different responses to this survey were possible?
    - A) 192
    - B) 205
    - C) 216
    - D) 221
    - E) 198

24. The 2010 BMW 335i Coupe is offered with a choice of 9 exterior colors (7 metallic and 2 standard), 5 interior colors, and 4 trims. How many combinations involving color and trim are available for the model?
    - A) 180
    - B) 18
    - C) 29
    - D) 117

25. How many international direct-dialing numbers are possible if each number consists of a four-digit area code (the first digit of which must be nonzero) and an eight-digit telephone number (the first digit must be nonzero)?
    - A) 648,000,000,000
    - B) 486,000,000,000
    - C) 810,000,000,000
    - D) 891,000,000,000
    - E) 1,215,000,000,000