Problems 1 and 2 refer to the following question: Let $A = \{1,2,3,4,5\}$ ; $B = \{1,2,3,4,5,6\}$ ; $C = \{2,4,5\}$

1.  Find the number of subsets in $A$ that contain at least one element

   [A] 5

   [B] 32

   [C] 30

   [D] 31

   [E]None of the above

2.  Which of the following is <u>not</u> correct:

   [A] $C \subseteq B$

   [B] $A$ is contained by $B$

   [C] $\{2,3\} \in A$

   [D] $A$ is a subset of $B$

   [E]None of the above

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Problems 3 - 5 refer to the following question:
   Let $U = \{a, b, c, d, e, f\}$ ; $A = \{a, e\}$ ; $B = \{b, c, d, e\}$ ; $C = \{c , f\}$

3.  Find $(A \cap B) \cup C$
   [A] $\{a, e, f\}$
   [B] $\{a, c, f\}$
   [C] $\{e, c, f\}$
   [D] $\{b, c, f\}$
   [E]None of the above

4.  Find $A \cap (B \cup C)$
   [A] $\{a, e\}$
   [B] $\{a\}$
   [C] $\{e\}$
   [D] $\{c, f\}$
   [E]None of the above

5.  Find $(B \cup C) \cap A'$
   [A] $A'$
   [B] $\{b , c\}$
   [C] $\{b, c ,d\}$
   [D] $\{c, d, f\}$
   [E]None of the above

Problems 6- 8 refer to the following question: Let $A = \{a, e\}$ ; $B = \{b, d, e\}$

6. Find $A - B$
   [A] { $a, e$}
   [B] { $b, d$}
   [C] { $e$}
   [D] { $a$}
   [E]None of the above

7. Find $A \times B$
   [A] {$(a, b), (a, d), (a, e), (e, b), (e, d), (e, e)$}
   [B] {$(b, a), (b, e), (d, a), (d, e), ( e, a), (e, e)$}
   [C] 5
   [D] 6
   [E]None of the above

8. Find $n(A \times B)$
   [A] {$(a, b), (a, d), (a, e), (e, b), (e, d), (e, e)$}
   [B] {$(b, a), (b, e), (d, a), (d, e), ( e, a), (e, e)$}
   [C] 5
   [D] 6
   [E]None of the above

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9. A universal set with $n(U) = 40$, is partitioned into three subsets $A$, $B$ and $C$. If $n(B) = 3n(A)$ and $n(C) = 2n(B)$ ; find $n(B)$.

   [A] 4
   [B] 12
   [C] 24
   [D] 6
   [E]None of the above

10. Let $A$ and $B$ be subsets of a universal set $U$, $n(U) = 50$, $n(A' \cap B') = 10$,
    $n(A' \cap B) = 15$, $n(A \cap B') = 15$. Find $n(A \cap B)$.
    [A] 5
    [B] 12
    [C] 10
    [D] 15
    [E]None of the above

11. Let $A$ and $B$ be subsets of a universal set $U$ with $n(A) = 10$, $n(B) = 15$, $n(A') = 12$, and $n(A' \cap B') = 5$. Find $n(B \cap A')$.
    [A] 7
    [B] 8
    [C] 10
    [D] 2
    [E]None of the above

12. Using the Venn diagram, if $n(U) = 140$, $n(A) = 10$, $n(C) = 28$, and $n(A \cup B \cup C)' = 100$.
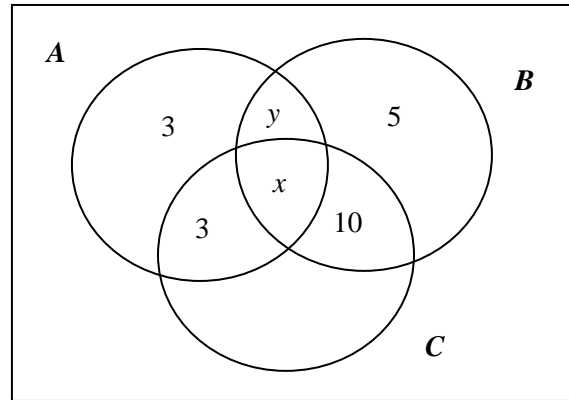Find the value of $y$.

[A] 1

[B] 2

[C] 3

[D] 4

[E]None of the above

A
B
3    y    5
x
3    10
C

13. Which of the following is a <u>true</u> statement: *(hint, use Venn diagram)*
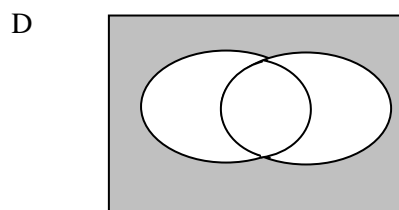
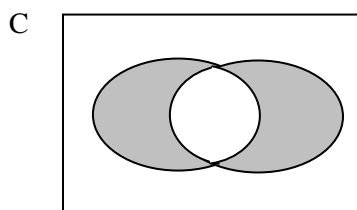[A] $(A \cap B)' = A' \cap B'$
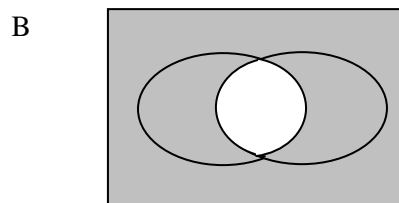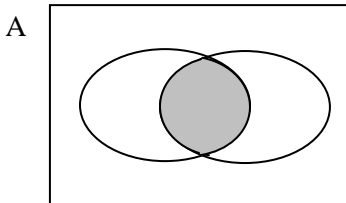
[B] $B \cap A' \subseteq A$

[C] $B' \cap A' \subseteq (A \cap B)'$
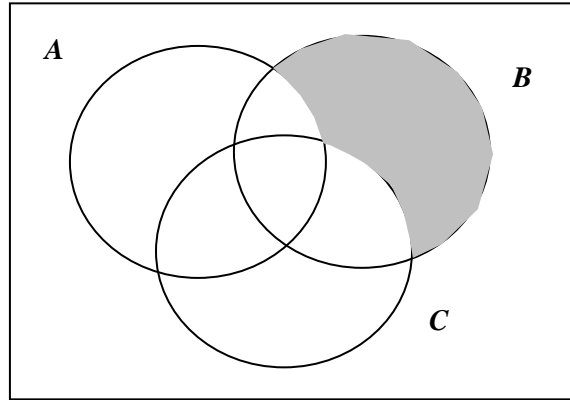
[D] $B' \cup A' \subseteq (A \cup B)'$

[E]None of the above

14. The set $A' \cup B'$ is best represented by the shaded region of graph:

A

B

C

D

15. Which of the following statement is represented by the shaded region of the Venn diagram:

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

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

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

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

[E]None of the above



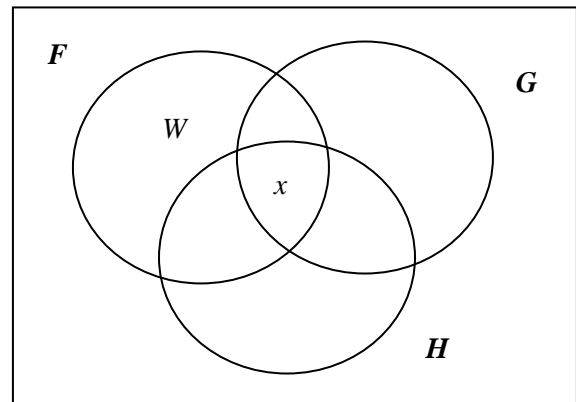*16. At a survey of 75 students, it was found that:
   20 took French   ($F$)
   40 took German   ($G$)
   30 took History   ($H$)
   6 took German and French
   6 took French and History
   9 took History and German
   4 took none of the above

   If the number of students that took all of the above is $x$, then the value of $W$ is:



[A] $8 - x$

[B] $8 + x$

[C] $10 + x$

[D] $12 + x$

[E]None of the above

17. An automobile tested by a national highway traffic safety commission was found to have 20 production defects. Of these, 11 were classified as major defects and 8 were design defects; 4 were neither major nor design defects. How many have design defects only?

[A] 8
[B] 3
[C] 5
[D] 4
[E]None of the above

18. At a survey 110 people, it was found that:
    100 listen to rock          (R)
    30 listen to classic         (C)
    35 listen to jazz            (J)
    30 listen to rock and jazz
    30 listen to rock and classic
    20 listen to all three
     5  listen to none of the above

    How many listen to jazz only?

    [A] 0

    [B] 10

    [C] 5

    [D] 20

    [E]None of the above


19. A survey of an automobile dealership for repair produced the following data:

    36 had brake repairs            10 had brakes and exhaust repairs
    30 had exhaust repairs           8 had brakes and transmission repairs
    22 had transmission repairs     12 had exhaust and transmission repair
    if two cars had all three repairs performed, how many had only exhaust repairs

    [A] 4

    [B] 6

    [C] 8

    [D] 10

    [E]None of the above


20. In a survey of 100 people, 38 were college males, 36 were college female, 18 were college male smokers, 11 were female college smokers and 8 were neither college students nor smokers. Find the total number of smokers that are none college students.

    [A] 18

    [B] 11

    [C] 47

    [D] 8

    [E]None of the above