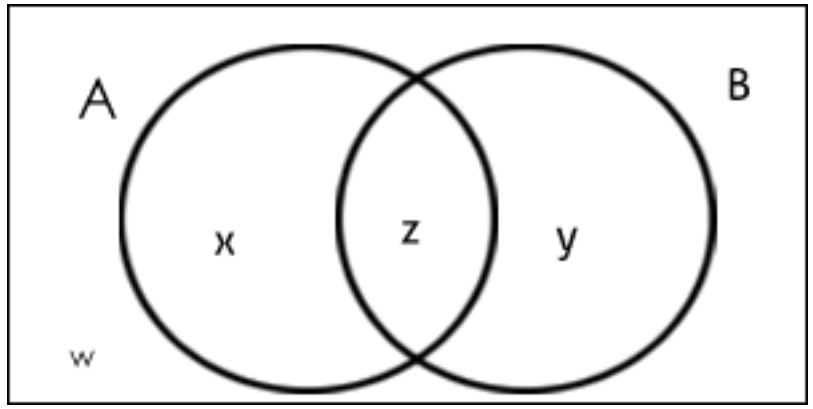
Explore | Expand | Enrich

VENN DIAGRAMS

INTRODUCTION

- Venn diagram, also known as Euler-Venn diagram is a simple representation of sets by diagrams.
- A Venn diagram uses overlapping circles or other shapes to illustrate the logical relationships between two or more sets of items.
- Venn diagram, also known as Euler-Venn diagram is a simple representation of sets by diagrams. The usual depiction makes use of a rectangle as the universal set and circles for the sets under consideration.

For Example:



INTRODUCTION

- Some of the basic terms we should know in venn diagrams
- $n (A \cup B) = n(A) + n (B) - n (A \cap B)$
  $n (A \cup B \cup C) = n(A) + n (B) + n (C) - n (A \cap B) - n (B \cap C) - n (C \cap A) + n (A \cap B \cap C)$
  Where,
- $n(A)$ = number of elements in set A.
- $n(B)$ = number of elements in set B.
- $n(C)$ = number of elements in set C.
- $n (A \cup B)$ = number of elements in both set A and set B.
- $n(A \cap B)$ = number of elements common in set A and set B.
  In the case of three elements,
- $n(A \cup B \cup C)$= number of elements in set A,set B and set C.
- $n (A \cap B \cap C)$=number of elements common in all the three.

Question: 01

In a survey of 500 students of a college, it was found that 49% liked watching football, 53% liked watching hockey and 62% liked watching basketball. Also, 27% liked watching football and hockey both, 29% liked watching basketball and hockey both and 28% liked watching football and basket ball both. 5% liked watching none of these games.

How many students like watching all the three games?

A. 55

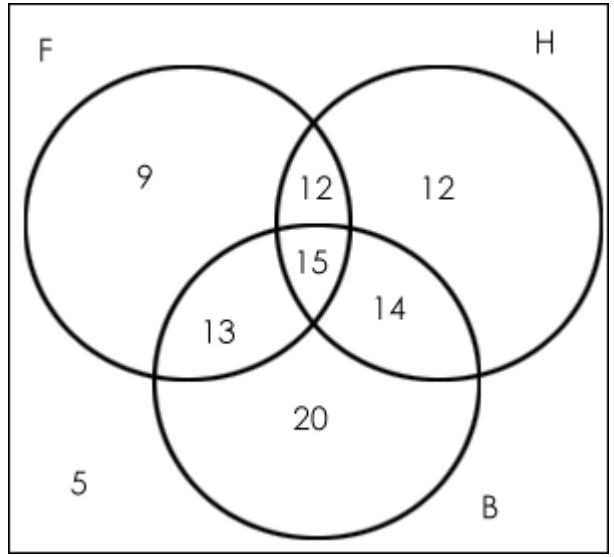
B. 40

C. 75

D. 60

Explanation: 01

n(F) = percentage of students who like watching football = 49%
n(H) = percentage of students who like watching hockey = 53%
n(B)= percentage of students who like watching basketball = 62%
n (F ∩ H) = 27% ; n (B ∩ H) = 29% ; n(F ∩ B) = 28%
Since 5% like watching none of the given games so, n (F ∪ H ∪ B) = 95%.
Now applying the basic formula,
95% = 49% + 53% + 62% -27% - 29% - 28% + n (F ∩ H ∩ B)
Solving, you get n (F ∩ H ∩ B) = 15%.



Number of students who like watching all the three games = 15 % of 500 = 75.

Question: 02

In a survey of 500 students of a college, it was found that 49% liked watching football, 53% liked watching hockey and 62% liked watching basketball. Also, 27% liked watching football and hockey both, 29% liked watching basketball and hockey both and 28% liked watching football and basket ball both. 5% liked watching none of these games.

Find the ratio of number of students who like watching only football to those who like watching only hockey?

A. 3:4

B. 2:3

C. 1:2

D. 3:2

Explanation: 02

n(F) = percentage of students who like watching football = 49%
n(H) = percentage of students who like watching hockey = 53%
n(B)= percentage of students who like watching basketball = 62%
n (F ∩ H) = 27% ; n (B ∩ H) = 29% ; n(F ∩ B) = 28%
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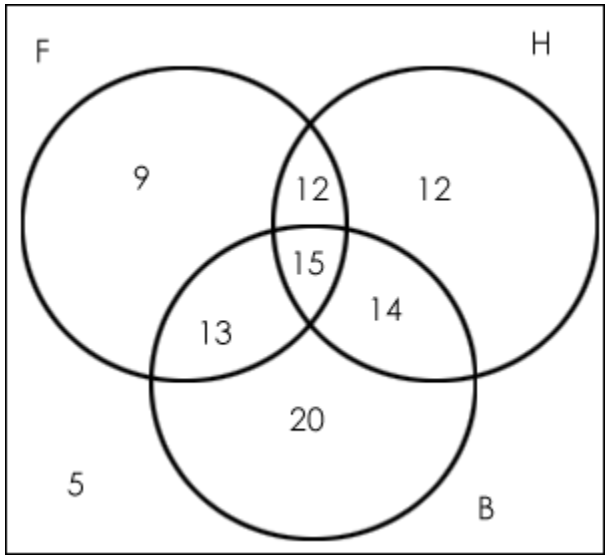


Ratio of the number of students who like only football to those who like only hockey = (9% of 500)/(12% of 500) = 9/12 = 3:4.

Question: 03

In a survey of 500 students of a college, it was found that 49% liked watching football, 53% liked watching hockey and 62% liked watching basketball. Also, 27% liked watching football and hockey both, 29% liked watching basketball and hockey both and 28% liked watching football and basket ball both. 5% liked watching none of these games.

Find the number of students who like watching only one of the three given games?

A. 190

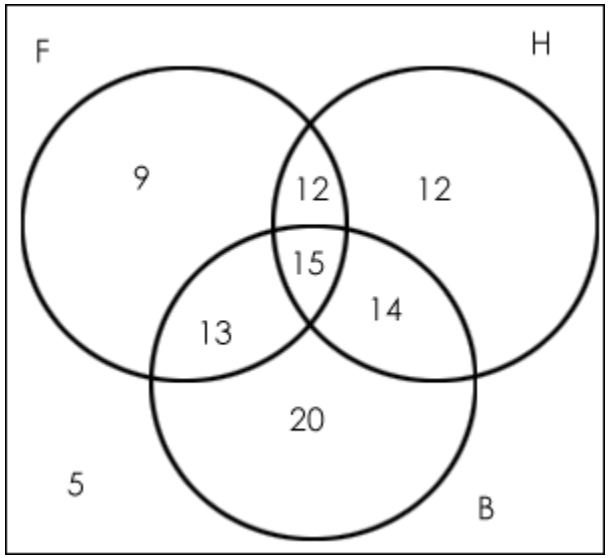
B. 200

C. 100

D. 205

Explanation: 03

n(F) = percentage of students who like watching football = 49%
n(H) = percentage of students who like watching hockey = 53%
n(B)= percentage of students who like watching basketball = 62%
n (F ∩ H) = 27% ; n (B ∩ H) = 29% ; n(F ∩ B) = 28%
Since 5% like watching none of the given games so, n (F ∪ H ∪ B) = 95%.
Now applying the basic formula,
95% = 49% + 53% + 62% -27% - 29% - 28% + n (F ∩ H ∩ B)
Solving, you get n (F ∩ H ∩ B) = 15%.



The number of students who like watching only one of the three given games = (9% + 12% + 20%) of 500 = 205

Question: 04

In a survey of 500 students of a college, it was found that 49% liked watching football, 53% liked watching hockey and 62% liked watching basketball. Also, 27% liked watching football and hockey both, 29% liked watching basketball and hockey both and 28% liked watching football and basket ball both. 5% liked watching none of these games.

Find the number of students who like watching at least two of the given games?

A. 270

B. 370

C. 250

D. 230

Explanation: 04

n(F) = percentage of students who like watching football = 49%
n(H) = percentage of students who like watching hockey = 53%
n(B)= percentage of students who like watching basketball = 62%
n (F ∩ H) = 27% ; n (B ∩ H) = 29% ; n(F ∩ B) = 28%
Since 5% like watching none of the given games so, n (F ∪ H ∪ B) = 95%.
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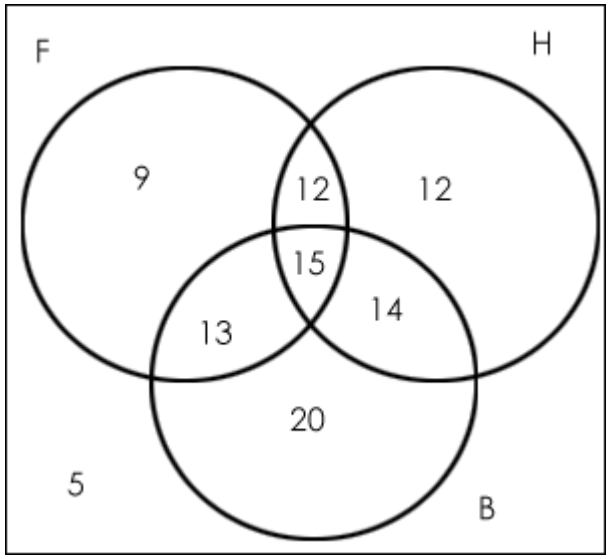
Solving, you get n (F ∩ H ∩ B) = 15%.



The number of students who like watching at least two of the given games=(number of students who like watching only two of the games) +(number of students who like watching all the three games)= (12 + 13 + 14 + 15)% i.e. 54% of 500 = 270

Question: 05

Let A, B and C represent people who like apples, bananas, and carrots respectively. The number of people in A = 10, B = 12 and C = 16. Three people are such that they enjoy apples, bananas as well as carrots. Two of them like apples and bananas. Let three people like apples and carrots. Also, four people are such that they like bananas and carrots. Answer the following questions:

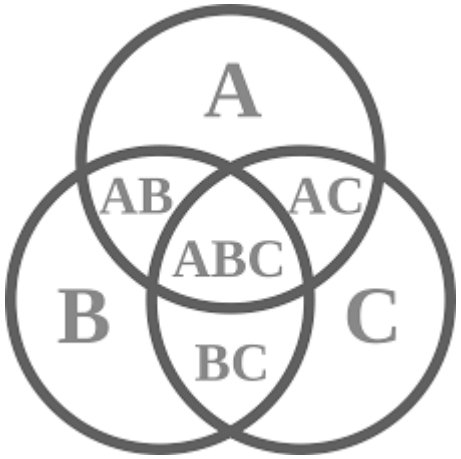
How many people like apples only?

A. 2

B. 7

C. 4

D. 11



Answer: **A**

Explanation: 05

This means that we have to find the number of people in A – the number of people in [AB + ABC + AC] only. We know that the number of people in A = 10. Also, the number of people in AB = 2, AC = 3 and ABC = 3. Therefore, we have: The number of people who like apples only = 10 – [2 + 3 + 3] = 2.

Question: 06

Let A, B and C represent people who like apples, bananas, and carrots respectively. The number of people in A = 10, B = 12 and C = 16. Three people are such that they enjoy apples, bananas as well as carrots. Two of them like apples and bananas. Let three people like apples and carrots. Also, four people are such that they like bananas and carrots. Answer the following questions:

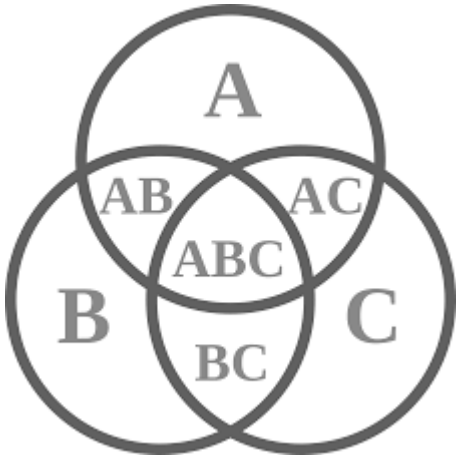
How many people like only one of the three?

A. 33

B. 30

C. 42

D. 26



Answer: **D**

Explanation: 06

The question here is asking us to find us the number of people in A + B + C – [AB + AC + BC + ABC] = 10 + 12 + 16 – [2+3+4+3] = 38 – 12 = 26.

LOGICAL CONNECTIVES

INTRODUCTION

What are Logical Connectives?

- Logical connectives are basically words or symbols which are used to form a complex sentence from two simple sentences by connecting them.
- Some Logical Connectives are – If, Only if, When, Whenever, Unless etc.

Some examples are like

1. If you are in navy, you have to wear uniform.

Cause – you are in navy, Effect –you have to wear uniform

2. Only if Rohit runs fast, he will catch the train

These statements are in the form of (Only If p, then q) or (q, only if p).

In these statements cause is a necessary condition for effect to happen but not sufficient condition.

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3. If and only If he clears the pre exam, he will get selected

It is like necessary and sufficient condition which means cause is a necessary and sufficient condition to take place

4. Unless Virat is the captain, India will lose the match.

These statements are in the form of (Unless p, q) or (q, unless p)

5. I drink either green tea or juice.

These statements are in the form of (either p or q).

Question: 07

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

Players can play, only if weather is good.

1. Players can play.
2. Weather is not good.
3. Players cannot play.
4. Weather is good.

A. 1 and 2
B. 3 and 4
C. 4 and 1
D. 2 and 3

Answer: **D**

Explanation: 07

From the given sentence, it is clear that if in case the weather is not good, then there is no chance that players can play. Hence, BC is the correct answer.

Question: 08

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

Vijay is sad, whenever he gets the last rank.

1. Vijay has not got the last rank.
2. Vijay has got the last rank.
3. Vijay is sad.
4. Vijay is not sad.

A. 1 and 2
B. 1, 2, 3 and 4
C. 4 and 1
D. 3 and 4

Answer: **B**

Explanation: 08

There are two implications that can be made form the given sentence. Vijay has got the last rank implies that Vijay is sad. Also, Vijay is not sad implies that he has not got the last rank. Hence, BC and DA is the correct answer.

Question: 09

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

If the cola is hot, then Ram cannot drink it

1. Ram can drink cola.
2. The cola is not hot.
3. Ram cannot drink cola.
4. The cola is hot.

A. 1, 2, 3 and 4
B. 1 and 3
C. 4 and 1
D. 3 and 4

Answer: **A**

Explanation: 09

There can be two implications made from the given sentence. Ram can drink the cola implies that it is not hot. The cola is hot implies that Ram cannot drink it. This is given by choice AB and DC.

Question: 10

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

Only if Kirti does not come, then Durga will come to play**.**

1. Kirti came hence Durga will also come to play.
2. Durga will not come to play. Hence Sheela will come.
3. Durga has come to play means Kirti has not come.
4. Kirti has not come hence Durga has come to play.

A. Only 1
B. Only 3
C. Only 2
D. Only 4

Answer: **B**

Explanation: 10

From the given sentence it can implied that if Durga has come to play then it implies that Kirti has not come.

Question: 11

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

Whenever it is cold, I wear a jacket.

1. It is cold implies I am wearing a jacket.
2. It is cold but I did not wear the jacket
3. It was not cold but I did not wear the jacket.
4. Both "It is cold implies I am wearing a jacket." and "It is cold but I did not wear the jacket."

A. Only 1
B. Only 3
C. Only 2
D. Only 4

Answer: **A**

Explanation: 11

From the given sentence it can be concluded that if it is cold then it can be implied that the speaker is wearing a jacket.

Question: 12

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

If the food is good, then I eat it.

1. I ate the food means it is good.
2. The food is good, hence I do not eat it.
3. I did not eat food, though it was good.
4. I did not eat food implies that the food was not good.

A. Only 1
B. Only 3
C. Only 2
D. Only 4

Answer: **D**

Explanation: 12

From the given sentence, it can be concluded that if the speaker did not eat the food, then it implies that the food is not good.

Question: 13

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

Whenever the employees want a hike, they go on strike.

1. The employees do not want a hike.
2. The employees want a hike.
3. The employees went on strike.
4. The employees did not go on strike.

A. 3 and 2
B. 2 and 4
C. 4 and 1
D. 4 and 2

Answer: **C**

Explanation: 13

From the given sentence, it can be concluded that if the employees did not go on strike then it implies that the employees do not want a hike. Hence, DA is the answer.

Question: 14

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

Either they use the computer or Abacus.

1. They use the computer.
2. They do not use Abacus.
3. They do not use the computer.
4. They use Abacus.

A. 3 and 2
B. 2 and 1
C. 4 and 1
D. 4 and 2

Answer: **B**

Explanation: 14

The given sentence indicates that either of two statements are possible. Either they use the computer or they use the Abacus. From this it can be concluded that if they do not use the abacus, then they use the computer. Hence, BA is the answer.

Question: 15

In the following question, there is a main statement followed by four statements A, B, C and D. From the choices choose the pair in which the first statement implies the second statement and the two are logically consistent with the main statement**.**

Dancers can dance, only if stage is good.

1. Dancers can dance.
2. Stage is not good.
3. Dancers cannot dance.
4. Stage is good.

A. 3 and 2
B. 2 and 1
C. 4 and 1
D. 4 and 2

Answer: **A**

Explanation: 15

From the conditions mentioned in the passage, we can conclude that only if the stage is good, then the dancers can dance. Therefore, if the stage is not good, dancers cannot dance.

THANK YOU