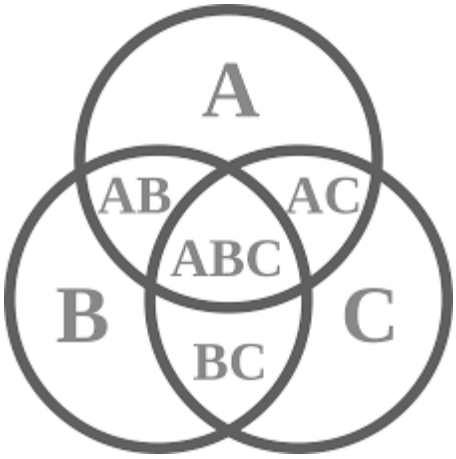
Venn diagram

Venn Diagrams are a schematic way of representing the elements of a set or a group. In your exam, you shall definitely encounter such problems. In each Venn diagram, we represent sets or groups of objects with the help of circle or ellipse. The questions asked in the bank exams will either have the Venn Diagrams are given or you will have to guess the type of Venn diagram that will suit the particular relation.

Venn Diagram

The intersection of these ellipses represents all those elements that are present in either of the sets. In mathematical language, it represents the intersection of the two groups. These ellipses are often drawn inside a rectangle. This rectangle is supposed to be the master set or the universal set. Consider the following diagram:

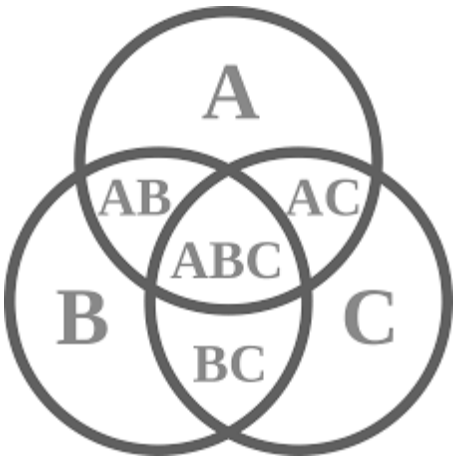


In the above diagram, we see that there are three groups or sets called ‘A’ ,’B’, and ‘C’. These three sets could represent any given collection of people. For example, say set A contains all the people that like candy. Set B represents all the people who like ice cream and set C represents all the people who like chocolate. Then the region marked as AB represents all the people who like both candy and ice cream. The region marked BC represents all the people who like both ice cream and chocolate. Similarly, the region AC represents all the people who like candy and ice cream.

The region ABC is known as the intersection of the sets. The people in this region belong to all the groups i.e. they like candy, ice cream as well as chocolate. Now that we know what Venn diagrams are, let’s solve some examples.

First Kind of Problems

In these types of problems, Venn Diagram will be given and you will be asked to answer questions based on the given Venn Diagram. Take care of the boundaries and do write down the data that is given. For example, consider the following diagram again:



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:

Q 1: How many people like apples only?

A) 2 B) 7 C) 4 D) 11

Answer: 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.

Q 2: How many people like only one of the three?

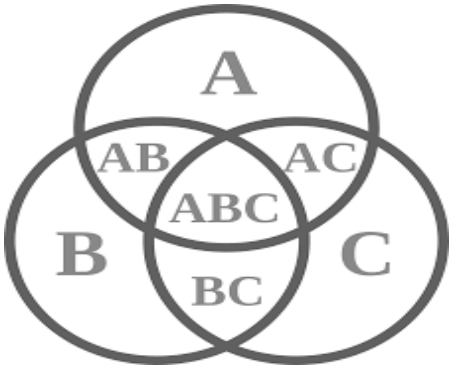
A) 33 B) 3 C) 4 D) 2

Answer: 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.

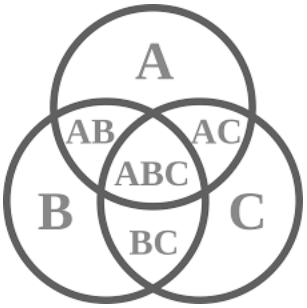
Problems of The Second Kind

In these types of questions, the Venn Diagrams are given in the options. The question will contain analogous words, and you will be asked to represent these in the form of a Venn Diagram. Let us consider the following examples:

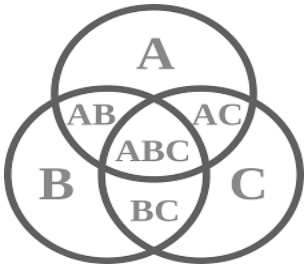
Q 1: Out of the following Venn Diagrams which one represents the relationship between the following: animals, horses, dogs?

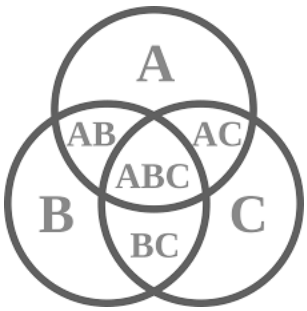


(A)



(B)

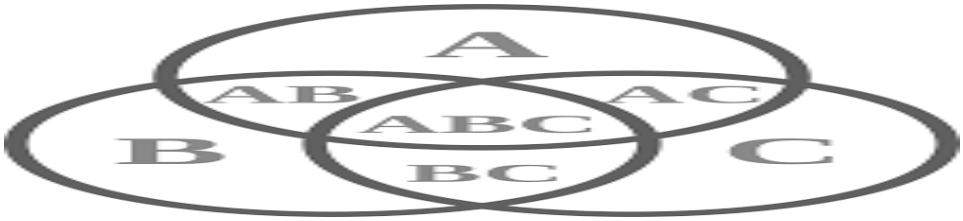




(C) (D)

Answer: All dogs are animals. Also, all horse is animals. So if we have two circles one representing the group of dogs and the other representing the group of horses, then we can say that these two circles should be inside the greater circle that represents animals. However, no dog is a horse and no horse is a dog. So the two circles or ellipses representing the group of dogs and the group of horses will not intersect. Thus we see that option (A) is the correct option.

Q 2: Consider the following diagram:



How many people like tea and wine? If you check the region of overlap between the triangle and the rectangle, you will find that

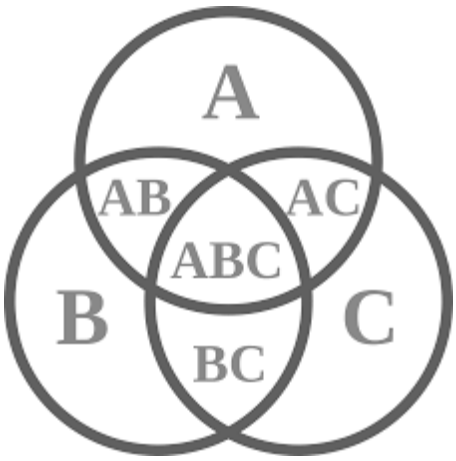
in the region shared by the two figures, we have 17 + 15 people = 32 people. So 32 people are such that who like both tea and wine. Similarly, you can ask how many people like tea only? As you can see the answer is 20+10 = 30.

Summary

Solving Venn Diagram questions is easy if you take the help of visual aids. You can shade or mark different areas that represent different groups or sets. However, the point to be noted here is that the relationship or the absence of any relationship between the given quantities should be marked very carefully.

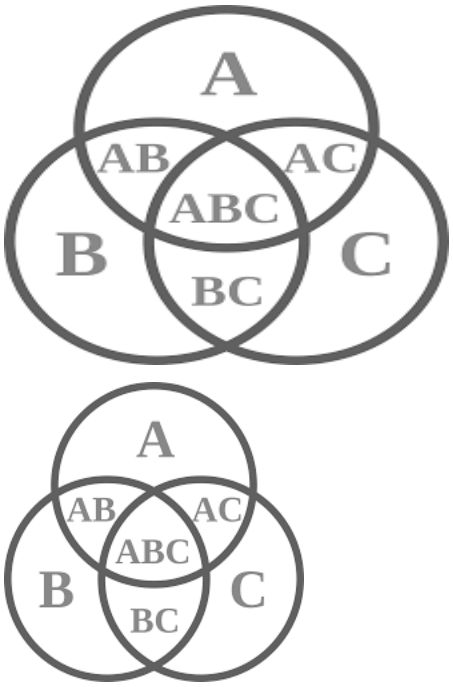
Practice Questions

Q 1: In the Venn Diagram given below, A represents the total number of people in a town who like cricket = 1300. B represents the total number of people who like badminton = 500 and C represents the total number of people who like Tennis = 100. If AB = 9, BC = 12, AC = 13 and ABC = 2, how many people like only one game?



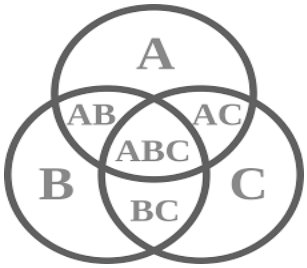
Ans: 1264

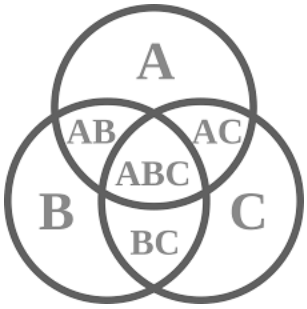
Q 2: Out of the following Venn Diagrams which one represents the relationship between the following: earth, moon, planets?



(A)

(B)





(C)

(D)

Ans: (B)