

Aptitude Advance

Syllogism Basic & Advanced

eBook

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Chapter 1: Syllogism

Syllogism has been defined as “A form of reasoning in which a conclusion is drawn from two given or assumed propositions”. It is deductive reasoning rather than inductive reasoning.

For Example the two Propositions could be

1. All short men are fat.
2. All fat men wear caps.

We can conclude on the basis of the above two statements that “All short men wear caps”

However the validity of the conclusion is important. Not all conclusions need to be valid. Only those two propositions which lead to a valid conclusion are relevant to our cause.

For Example

1. All trains are long.
2. Some buses are long.

The conclusion that “Some buses are trains” is invalid. You might be facing some difficulties regarding which

type of statement can lead to what type of conclusion. If you understand the rules given below and their proper use, you are likely to commit no mistakes.

Classes of Statements

“A class is defined as the collection of all objects that have some characteristics in common”. Classes can be related to each other in many ways. If every member of one class is also a member of a second class, then the first class is said to be included or contained in the second. If some but perhaps not all members of one class are also members of another, then the first class may be said to be contained partially in the second class. Of course, there are pairs of classes having no members in common, such as the class of all triangles and the class of all circles.

Now let us take 4 statements

1. All politicians are liars
2. No politician is a liar
3. Some politicians are liars
4. Some politicians are not liars.

The first statement is about two classes and clearly defines that the first class is included in the second.

The second statement says that the first class is wholly excluded from the second.

The third statement says that at least one member of class 1 is also a member of class 2.

The fourth similarly implies that at least one politician is not a liar.

Note: it is important to understand the above four statements completely before proceeding further.

1. **Universal Positive Statement:** First of all universal means something which is applicable to all and positive means, this is of 'yes' format. Universal positive statement indicates something positive applicable to all the items of that category. This is represented by the letter 'A'. These kind of statements begins with all, every & each.

Some Examples are

All boys are cute.

All girls are hardworking.

All Indians are brave.

Every fan is a cooler.

Each of the schools is a college.

All these are 'A' type of statements, because they all are conveying universal positive meanings.

2. **Universal Negative Statement:** Again in this case, the only difference from the last category is that, in this case, the statement conveys a negative meaning. It implies that it refers to that kind of statements, which are universal and giving negative impression. These types of statement begin with No, None of the, Not a single etc. and are represented by the letter 'E'.

Some examples of these types of statements are

No S is P.

No computer is intelligent.

No Hema is Rekha.

No girl is lazy.

None of the boys is crazy.

Not a single sheet is paper.

3. **Particular Positive Statement:** In this case, the statement given gives a positive impression but it covers only some items and not all. This kind of

statement begins with some, any, a few and are represented by the letter 'I'.

Some examples of I type of statements are

Some actors are comedians.

Some vegetables are potatoes.

Few colleges are schools.

Some telephones are shoes.

- 4. Particular Negative Statement:** Here, the statement again covers only some items, but it gives a negative impression. These kinds of statements are represented by the letter 'O'.

Some examples of this are

Some boys are not cute.

Some buses are not circular.

Some x are not y.

Some Kapils are not Sunils.

Few breads are not butters.

The definitions of the A, E, I, O statements are very important and the student must be able to immediately recognize the statement. With this

thing in mind, given below is a list of all the four types of statements.

Sr. No.	Type of statement	Represented by the letter
1.	Universal Positive	A
2.	Universal Negative	E
3.	Particular Positive	I
4.	Particular Negative	O

As far as the questions of syllogism are concerned, there are so many varieties of questions; it could be two statements and two conclusions, three/four statement and three/four conclusions and it could also be a question having six statements. In order to solve questions, first the candidate should try to check the conclusions, by reversing the individual statements given and then by combining the two/three statements given. First of all, we will start with, what can be derived from a single statement. Before we start with that, let us understand some universal principles.

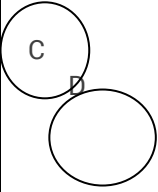
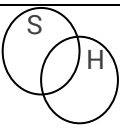
Rules for Conclusions

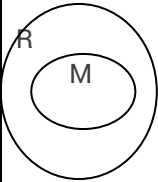
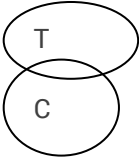
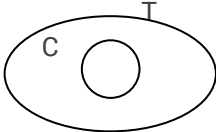
- With two particular statements, no universal

conclusion is possible.

- With two positive statements, no negative conclusion is possible.
- With two negative statements, no positive conclusion is possible.
- With two particular statements, no conclusion is possible, except when an 'I' type of statement is given and then by reversing it an 'I' type of conclusion is given.

Chapter 2: Venn Diagram Approach

No	A statement of Type			When reversed gives a conclusion of type	
	Type	Example	Venn Diagram	Type	Conclusion
1.	E	No cat is dog		E & O	No dog is cat Some dogs are not cats. \therefore O is a part of E
2.	I	Some scooters are helmets		I	Some helmets are scooters Here, the conclusion 'some helmets are not scooters' is seemingly right, but simply remember the universal principal no. 2. So this can not be true.

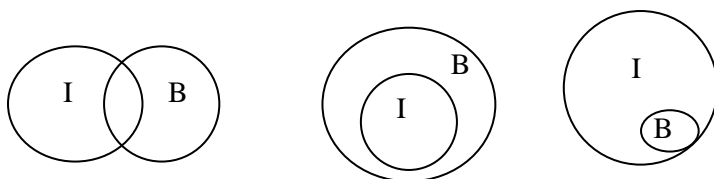
3.	A	All mouses are rats.		I	<p>Some rats are mouses.</p> <p>In this case, if you are also taking the conclusion 'some rats are not mouses' to be true, again remember the second universal principal. (no negative with positive is possible)</p>
4.	O	Some TV are not computer		No conclusion is possible	<p>With O type of statement, you cannot get any conclusion. Even you cannot make the conclusion as 'some computers are not TVs'. The representation of the main statement could be given in the following way.</p> <div style="text-align: center;">  </div> <p>Because the statement only signifies that some part of TV must be outside the circle of computers, and all the diagram, which are representing that are valid diagram.</p>

2.1 Some Examples

You may have some confusion regarding I and O types of statements. Each of the statements should be taken literally i.e. nothing should be assumed.

Let us take an example of a statement of type I.

Some Indians are brave. This information just indicates that some part of the circle of Indians must be inside the circle of brave, *may be all*. Please note, the stated words are “may be”, therefore this statement can be represented in three different diagrammatic ways, which are



All these three diagrams are valid ones. You should always make the first type of diagram, but always keep in mind that the second and third types of diagram are also possible. The second diagram is indicating that, if you conclude that 'Some Indians are not brave', then it is wrong. Similarly the third diagram indicates that if you conclude 'Some brave are not Indians', even that is

wrong. Because the statement given is positive, you cannot conclude anything negative.

Let us try to find all the possible conclusions from the statements given. Let us take some examples.

Ex.1. Statements: I. Some printers are scanners.
II. Some scanners are not clocks.

Sol. Now, in this case, the possible conclusion is Some scanners are printers (I to I), as the universal principal no. 4 says, that with two particular statements only I to I is possible, therefore only 1 conclusion is possible.

Ex. 2. Statements: I. Some houses are not homes
II. Some theatres are not houses.

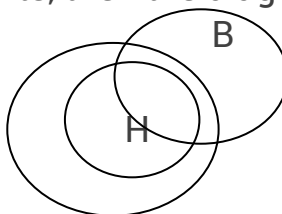
Sol. It can be seen here that both the statements given are particular and none of the statements is of I type, so no conclusion is possible.

Ex. 3. Statements: I. Some bags are helmets.
II. All helmets are telephones.

Sol. Here the possible conclusions are

1. Some helmets are bags. (I to I)
2. Some telephones are helmets. (A to I)

These two conclusions have been derived from the individual statements alone, but if you combine these two statements, then the diagram becomes



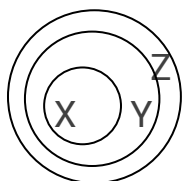
By combining these two statements, the third conclusion possible is 'Some telephones are bags'. Similarly the fourth conclusion is 'some bags are telephones'. So four conclusions are possible.

Ex. 4. Statements: I. All X are Y II. All Y are Z.

Sol. Here by these statements, individually, the following conclusions can be drawn.

1. Some Y are X.
2. Some Z are Y.

If you combine these two statements then the diagram would be



From this diagram, the conclusions, which can be drawn are

3. All X are Z.

4. Some Z are X.

Again, if you are getting the conclusion, some Z are not X, then simply remember the universal principal no. 2, with two positive statements, no negative conclusion is possible.

Ex. 5. Statements: I. All A are B

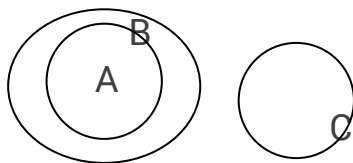
II. No B is C.

Sol. Now individually, the conclusions are

1. Some B are A (A to I)

2. No C is B (E to E)

Again if you combine these two statements, then the diagram would be like



The conclusions, which can be drawn from this diagram are

3. No A is C

4. No C is A.

Chapter 3: Syllogism - Complimentary Pairs

The concept of 'Complimentary Pairs' is very important in syllogisms.

Consider the statement: $x \geq y$

Conclusions: 1. $x > y$ 2. $x = y$

Now, if you see the first conclusion only, it may or may not be true; hence it is independently false.

And if you see the second conclusion only, it may or may not be true; hence it is independently false as well.

But if you conclude that both the conclusions are false at the same time, then it would imply $x < y$, which negates the given statement. Hence, the conclusion should be either 1 or 2 is true i.e. both cannot be *false simultaneously*. So conclusions 1 and 2 make a *complimentary pair*.

The following are the three conditions for the statements to be complementary to each other:

1. The conclusions to be included in the complimentary pairs are those, which are not definite otherwise.

2. The subject and the predicate should be same i.e. some x are not y or some x are z, cannot be included in the complimentary pairs.
3. This is because the subject is same but the predicate is not the same.

The following three kinds of pairs can be included in complimentary pairs.

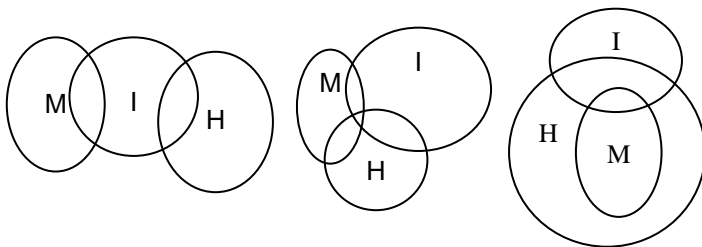
i) 'Some are NO'

Ex. 1. Statements: 1. Some men are intelligent.
2. Some intelligent are honest.

Conclusions:

- I. Some men are honest
- II. No man is honest.

Sol. The statements can be depicted using Venn diagrams as:



From the above diagrams, it is clear that nothing can be definitely concluded about the positions of men and honest. So independently, each conclusion is false.

But if we consider only the first conclusion i.e. some men are honest; it implies that men and honest will either partially overlap or all men will lie inside honest or all honest will lie inside men...As some means few or all.

In the second conclusion, it says that men and honest will not intersect each other at all. Now, both the conclusions cannot be false at the same time as there is no other possible position for the two circles representing honest and men.

Hence, with respect to the position of the two circles representing honest and men, there can only be two possibilities: (1) either they partially intersect or (2) not intersect at all.

Hence one of the conclusions has to be true. So the answer is either conclusion 1 or 2.

ii) 'Some not All'

Ex. 2. Statements: 1. Some men are intelligent.

2. Some intelligent are honest.

Conclusions: I. Some men are not honest.

II. All men are honest.

Sol. As discussed earlier, each conclusion is false, when taken independently.

But if you consider only the first conclusion i.e. some men are not honest, it means that men circle will be at least partially outside the honest circle.

The 2nd conclusion implies that all men are inside the honest circle. Now both the conclusions cannot be false simultaneously as there is no third possible position for the two circles honest and men. Hence, one of the conclusions has to be true. Therefore, the answer is either conclusion 1 or 2.

iii) 'Some are Some not'

Ex. 3. Statements: 1. Some men are intelligent.

2. Some intelligent are honest.

Conclusions:

I. Some men are not honest

II. Some men are honest

Sol: Again, each conclusion is false, when taken independently.

But if we consider only the first conclusion i.e. some men are not honest, it means that men and honest will be at least partially non-intersecting or two absolutely different circles.

Further, the 2nd conclusion implies that either the men circle will at least partially intersect with the honest circle. Now, both the conclusions cannot be false at the same time as there is no third possible position for the two circles honest and men. Hence, one of the conclusions has to be true. Therefore, the answer is either conclusion 1 or 2.