AILET

Syllogism: Definition, Meaning, Questions, Tricks, Rules and More

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*This article is an introduction to all the rules and regulations around solving syllogism. With logical reasoning and deductive reasoning being part of **CLAT 2020**, syllogism is an important topic.*

Syllogism definition

A syllogism is an inference drawn in which one proposition (the conclusion) follows of necessity from two others (known as premises). **It is important to assume the statements given to be true** and then move forward with the questions.

Syllogism: Meaning and sample questions

Syllogisms consist of three things: major & minor (the premises) and a conclusion, which follows logically from the major and the minor and is derived from the given statements.

- A major is a general principle.
- A minor is a specific statement.
- Logically, the conclusion follows from applying the major to the minor.

Example 1

If all humans (B's) are smart (A), major

And all Indians (c's) are humans (B's), (minor)

Then all Indians (c's) are smart (A) conclusion

Example 2

Men lie (general principle)

Ram is a man (specific statement)

Ram will lie (Application of major to minor)

Syllogism: Parts of the definition and meaning

Major premise: The first premise in the syllogism

Minor Premise: The second premise in the syllogism

Major term: The category mentioned in both the minor premise and the conclusion. The second term is the conclusion

Minor term: the category mentioned in both premises but not the conclusion. It is what links major term and minor term together in the syllogism.

Figure: the figure of a categorical syllogism is the position of its major, minor and middle terms. There are four figures. The major and minor terms have standard positions in the conclusion which are the same for all figures.

Each figure is distinguished by the placement of the middle term.

Position of the middle term

Figure	Major Premise	Minor Premise
First	Subject	Predicate
Second	Predicate	Predicate
Third	Subject	Subject
Fourth	Predicate	Subject

Fallacy: A mistake in reasoning which makes an argument invalid.

Syllogism: Classification into four figures

1. First figure: M P; S M; S P.

All men are smart;

Ram is a man;

Ram is smart

1. Second figure P M; S M; SP.

All whales are mammals,

some animals are not mammals;

some animals are not whales

1. Third figure: M P; M S; S P.

No snake lives in Himalaya.

All snakes are reptiles.

Some reptiles don not live in Himalaya

1. Fourth Figure: P M; M S; S P.

Some bows are wood objects;

All wood objects are organic;

some bows are organic

What changes here is the position of M, the middle term

Syllogisms: Rules to construct syllogism in four figures

1. There are only three terms in a syllogism (by definition)
2. The middle term is not in the conclusion (by definition)
3. The quantity of a term cannot be greater in the conclusion. Nothing can be added in order to derive a logical conclusion.
4. The middle term must be universally quantified in at least one premise-you cannot deduct anything from particular observations
5. At least one premise must be affirmative.
6. If one premise is negative, the conclusion is negative
7. If both premises are affirmative, the conclusion is affirmative
8. At least one premise must be universal
9. If one premise is particular, the conclusion is particular

Syllogism: Logical fallacies that occur include

Fallacy of four terms

Fallacy means a mistake in the reasoning which makes the argument invalid. The fallacy of four terms is a logical fallacy that occurs when a three-part syllogism has four terms as we have established that the syllogism will only have three things.

Valid syllogisms always take the form: Major premise (connects the minor premise and the conclusion)

For example

All fish have gills

Minor Premise That thing is a fish

Conclusion: that thing has gills

The three terms are: that thing, fish and gills

Using four terms invalidates the syllogism;

For example-

Major Premise: All fish have gills

Minor Premise: a toad is a fish

Conclusion: Mogambo has gills

In the above example, it should be clear that there are four terms and therefore the major premise does not actually connect the minor premise and the conclusion. When premises are not connected to the conclusion it is called a d non sequitur

Such examples may seem ridiculous but the nature of human language makes it possible to hide premises and the exact number of terms may not always be clear in casual writing and speech.

Equivocation is a common sub fallacy where two terms use the same word or phrase but with different definitions giving a false appearance of a valid syllogism:

For example –

Major premise: nothing is better than chicken wings

Minor Premise: A potato is better than nothing

Conclusion A potato is better than chicken wings

Fallacy Occurring in categorical syllogism: These type of propositions can be categorized on the basis of the following things – their quality, their quantity and their distributive qualities.

The Qualities referred here are of two types- the affirmative and the negative. They refer to whether the proposition affirms or denies the inclusion of a subject to the class of the predicate.

Whereas a quantity refers to the number of subjects in one class which are included in the other class. The first quantifier is universal all. This means every subject of one class has membership in the predicated class.

The other quantifier is called particular. It is an indefinite number which could mean two, twenty-two or perhaps, all, but always at least one. From quality and quantity there are four types of categorical propositions designed:

- All S is P
- No S is P
- Some S is P
- Some S is not P

Al four types have different distribution properties. Distribution refers to what can be inferred from the proposition.

Example

All cows are mammals. All cows are indeed mammals but it would be false to say that all mammals are cows. Here we have to understand that although all x is said to be y but it's nowhere mentioned that the entire y is x too.

The second proposition does distribute in a bidirectional way between the subjects and predicate. From categorical proposition: no deer are mammals, we can infer that no mammals are deer. Both terms in I proposition are undisturbed.

For example, some Indians are conservatives. Neither term in this proposition can be entirely distributed to the other term. Form this proposition it is not possible to say that all Indians are conservatives or that all conservatives are Indians in this third proposition only the predicate term

is distributed.

Now that we can differentiate between the various types of categorical propositions, we can easily identify the mood of the syllogism. To do so, simply identify the types of propositions in the first premise, the second premise and the conclusion then state them in that order. In the categorical syllogism

All A is B

All C is A

Therefore, all C is B

This type of propositions is a universal affirmative. Next to be discussed is the figure of a categorical syllogism. However, in order to comprehend the figure, one must be able to identify the three different types of terms: major term, minor term and the middle term.

The term occurring as the predicate of the conclusion is the major term the minor term is the term that occurs as the subject of the conclusion; C is the minor term. Finally, by process of elimination, it can be deduced that the middle term is the term which does not occur in the conclusion but instead once in each premise.

Accordingly, A is the middle term, the figure of a categorical syllogism can be known by identifying the four possible arrangements of the middle term. The figures are represented numerically 1-4:

1. The middle term occupies the subject of the first premise and three predicates of the second premise
2. The middle term occupies the predicate of both the first and second premise
3. The middle term occupies the subject of both the first and second premise
4. The middle term occupies the predicate of the first premise and the subject of the second premise

Validity

A valid syllogism is one where the conclusion logically follows from its premises. To emphasise the difference between a valid argument and a sound argument, all premises and conclusions are randomly generated, such that many will be false.

The validity of an argument does not depend upon whether its premises or conclusions are true. It merely depends on the formal relations between the premises and conclusion. A valid syllogism can have false premises or false conclusions.

An argument is sound when it valid and has true premises. Validity is only part of what it takes to make an argument sound. Very few of the randomly generated syllogisms will be sound but a fair number will be valid.

Syllogism: Six Rules to test Validity

The last method is to memorise six rules using the information presented thus far.

1. Categorical syllogisms must contain exactly three terms, no more no less (avoid Fallacy of four terms), beware of synonyms and antonyms because they can create the illusion of invalidity, but can sometimes be rectified by substituting the interchangeable terms for one choice
2. If either premise is negative then the conclusion must be negative (Affirmative conclusion from a negative premise)
3. Both promises cannot be negative
4. Any term distributed in the conclusion must be distributed in either premise
5. The middle term must be distributed once and only once.
6. You cannot draw a particular conclusion with two universal premises.

List of possible syllogisms

The rules are so specific that only 256 infinite number of possible arguments structures qualify as a categorical syllogism. Not all categorical syllogisms are good arguments; though only 16 of 256 forms are valid. Invalid arguments we recall true premises guarantee a true conclusion.

Syllogism: List based on Aristotle Analytics

1. Barbara

Every B is an A

Every C is a B

Therefore, every c is an A

1. Celarent

No B is an A

Every C is a B

Therefore No C is an A

1. Darii

Every B is an A

Some Cs are B

Therefore Some Cs are As

1. Ferio

No B is an A

Some Cs are Bs

Therefore Some Cs are not As

1. Cesare

No B is an A

Every C is an A

Therefore No C is a B

1. Camestres

Every B is an A

No C is an A

Therefore No C is a B

1. Festino

No B is an A

Some Cs are As

Therefore some Cs are not Bs

1. Baroco

Every B is an A

Some Cs are not As

Therefore Some Cs are not Bs

1. Darapti

Every C is an A

Every C is a B

Therefore Some Bs are As

1. Datisi

Every C is an A

Some Cs is a s

Therefore Some Bs areas

1. Disamis

Some Cs are As

Every C is a B

Therefore Some Bs are As

1. Falapton

No c is an A

Every C is a B

Therefore Some Bs are not As

1. Ferison

No C is an A

Some Cs are Bs

Therefore, Some Bs are not As

1. Borocado

Some Cs are not As

Every C is a B

Therefore Some Bs are no As

No, don't worry, you don't need to remember the types of syllogisms. Just need to practice these types so as to know which are true syllogisms and which pose as syllogisms but are invalid statements!

Click here to see a practice paper on syllogism by CLATapult.

Read our post on deductive reasoning here.