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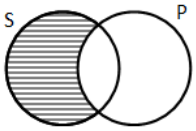
Using Venn diagrams to test categorical syllogisms for validity

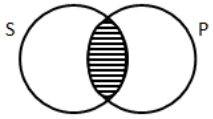
Using a "hypothetical" viewpoint, i.e. not presupposing that things exist in the categories under discussion:

You can test any categorical syllogism for validity using a Venn diagram. The method is: (a) draw three overlapping circles, one for each of the three categories or terms in your syllogism; (b) represent each of the two premises on the diagram; (c) look to see whether representing the two premises automatically represents the conclusion. If the conclusion is automatically represented, that means that *it's impossible to have true premises without also having a true conclusion*. In other words, given the premises, the conclusion is unavoidable: the syllogism is valid. If the conclusion doesn't appear, the syllogism is invalid.

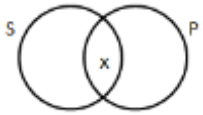
The diagrams immediately below show how each type of categorical proposition is represented (taking a "hypothetical" viewpoint, that is, not assuming that anything necessarily exists in the categories under discussion). The bars mean nothing exists in the area that's blocked off, or "barred". The X means at least one thing exists in the specific area the X occupies.



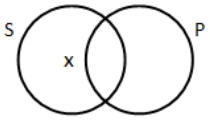
All S are P



No S are P



Some S are P



Some S are not P

Diagram of a valid argument:

No P Is M
All S is M
∴ No S is P

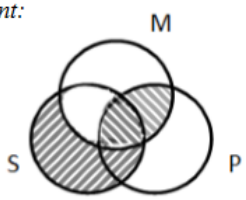
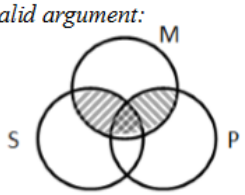


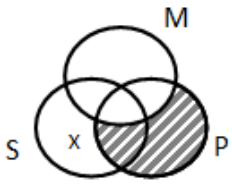
Diagram of an invalid argument:

No P is M
No S is M
∴ No S is P

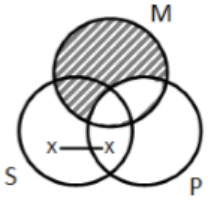


It doesn't, in the end, matter which premise you represent first in your Venn diagram. But in cases where you have both a universal premise (an "all" or "no" premise) and a particular premise (a "some" premise), it may be a little easier if you represent the universal premise first. Doing so will reduce the number of situations in which you're representing a particular premise and discover that you have more than one area where you can put the X. (See left diagram below). In some syllogisms that include a particular premise there will be more than one area where you can put the X *regardless* of the order in which you represent the two premises. *All these syllogisms will be invalid*. To visualize, put an X in *each* area that is a candidate, and draw a line connecting the Xs. You know that something exists at *one of* the Xs on the line, but you don't know which one. So the conclusion is not pictured: you're not *guaranteed* that it's true. (See right diagram below.)

All P are M
Some S are not M
∴ Some S are not P



All M are P
Some S are not M
∴ Some S are not P

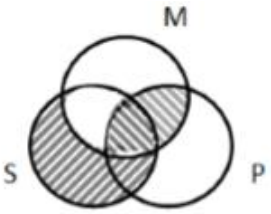


Using an "existential" viewpoint, i.e. presupposing that things exist in at least one category under discussion:

With most syllogisms, whether or not you presuppose that things exist in the three categories doesn't matter in assessing validity. But in a few cases – all involving syllogisms with two universal premises and a particular conclusion – it does. If you have a syllogism with two universal premises and a particular conclusion it will be counted "invalid" using the test above. To tell whether it is valid assuming the existence of things in at least one of your categories, after representing the premises, represent the key assumption you want to make about existence and see whether the conclusion is then represented. For instance:

Invalid from hypothetical viewpoint:

No M are P
All S are M
∴ Some S are not P



Valid from existential viewpoint, <u>assuming the existence of S's</u>: