Introduction to Logical Reasoning

Assessing Categorical Syllogisms

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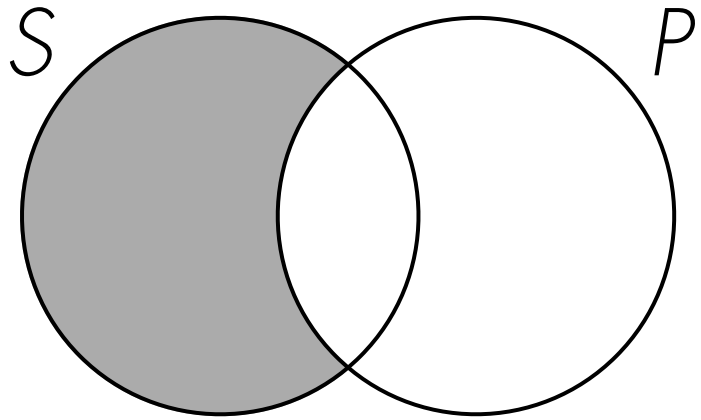
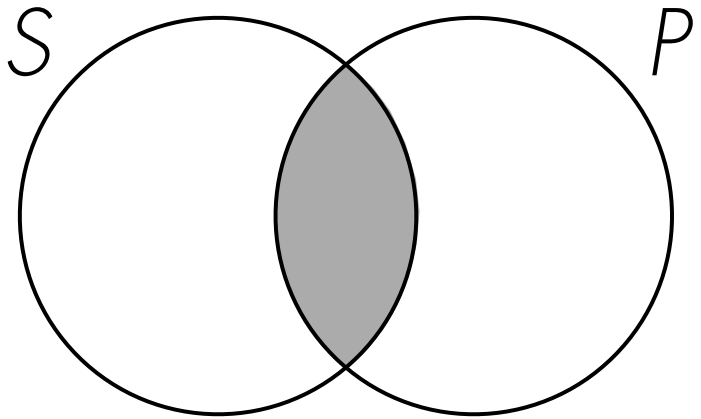
Categorical Statements

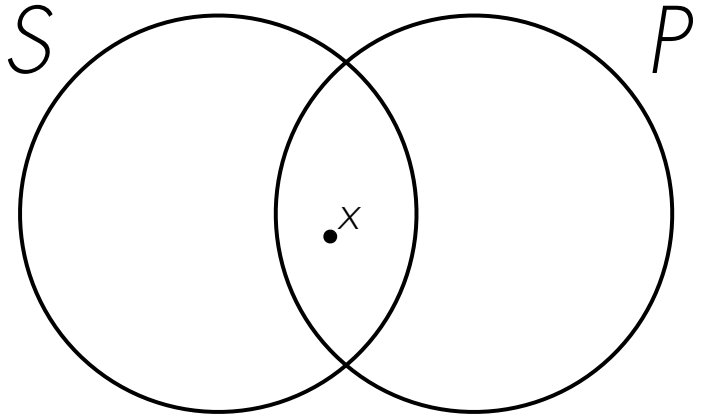
The four standard forms of categorical statements:



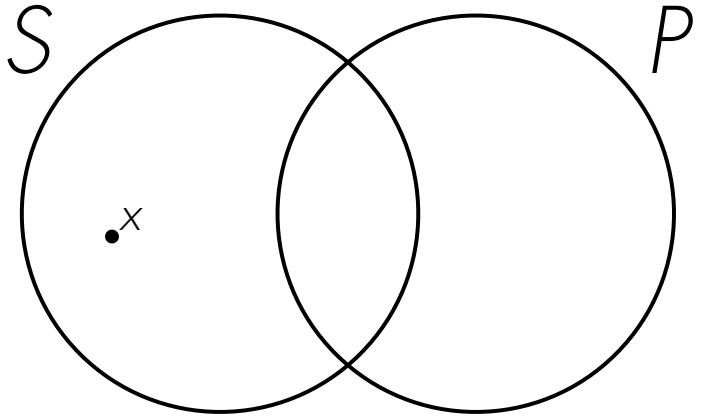
A: All *S* is *P*.



E: No *S* is *P*.



I: Some *S* is *P*.



O: Some *S* is not *P*.

Categorical Syllogisms

Last time we looked at categorical syllogisms, which are arguments involving three categorical statements. In particular, we saw how to put arguments of either sort into standard symbolic form, and how that form can be used to determine its validity.

Argument 1

This argument:

2 Some writers are mediocre hacks, but 1 no great journalists are mediocre hacks. As a result, some writers are not great journalists.
CI C

Is put into standard symbolic form:

1. No *P* is *M*.
2. Some *S* is *M*.

∴ Some *S* is not *P*.

But can we check its validity without appealing to a memorized table of valid syllogistic forms?

Assessing Validity

Recall that a **valid** argument is an argument where the truth of all its premises logically entails the truth of its conclusion.

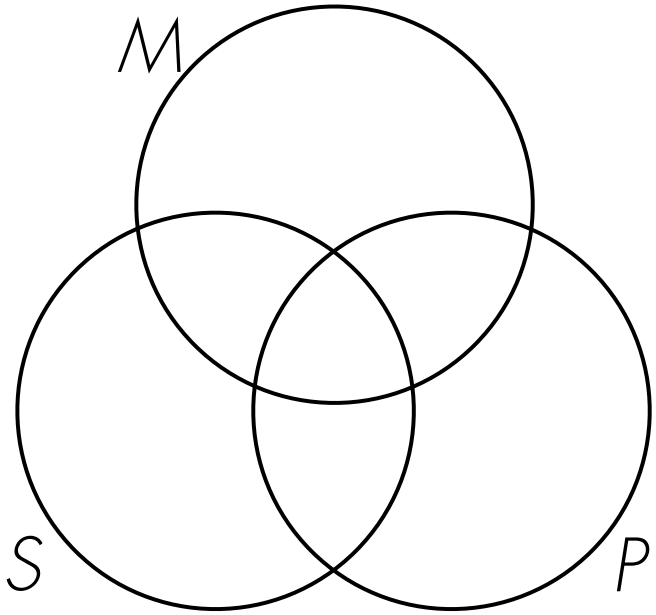
So we check the validity of a categorical syllogism by assuming that all its premises are true and then checking whether the conclusion must also be true. If the conclusion is in fact *true*, then the syllogism is valid; if the conclusion is either *false* or *undetermined*, then the syllogism is invalid.

Assessing Validity

The easiest way to check validity without resort to memorization is by using Venn diagrams. The idea is to first assume that the premises are true and diagram them. After that, diagram the conclusion. Finally, see if this diagram of the conclusion conforms what appears in the diagram of the premises.

Assessing Syllogisms

First, draw the three circles as follows:



Note: To keep things consistent, *always* put the major term (*P*) on the right, the minor term (*S*) on the left, and the middle term (*M*) on the top.

Assessing Syllogisms

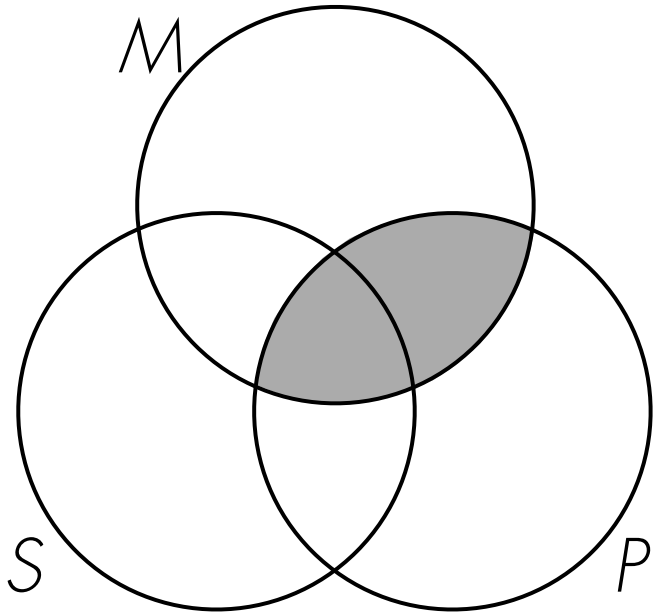
Second, put in the information expressed by the two premises into the diagram. However, there are two rules you must keep in mind for doing this:

1. Diagram any universal statements first, and *then* diagram any particular statements.

2. If a given particular statement is not clear which side of a line the *x* belongs on, just draw the *x* on top of that line.

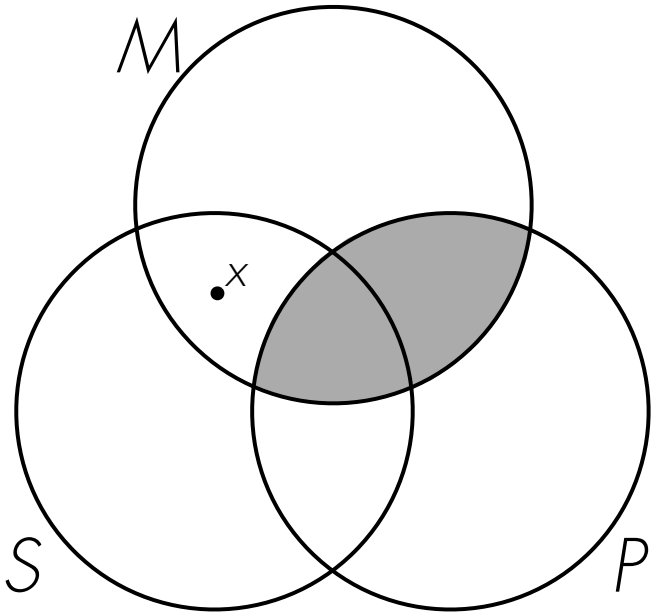
Assessing Syllogisms

In argument 1, there is a universal statement (No *P* is *M*), so we diagram this premise first:



Assessing Syllogisms

Now we can add to this diagram the information in the particular statement (Some *S* is *M*):

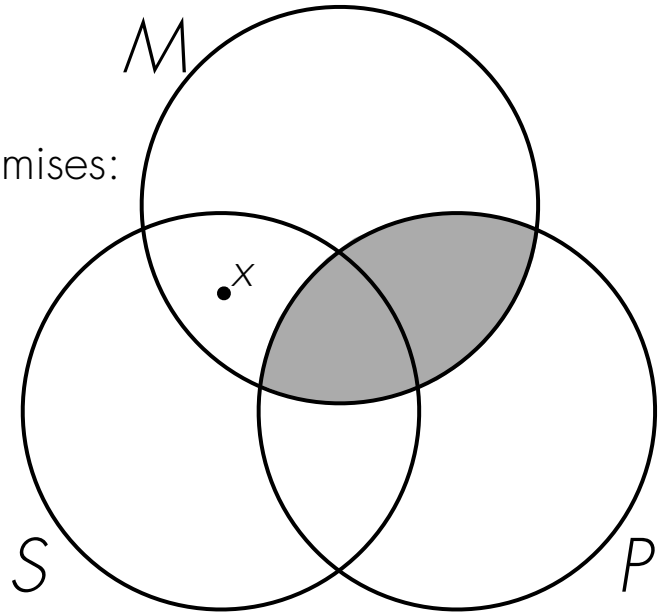


Here there is no confusion where the *x* should go.

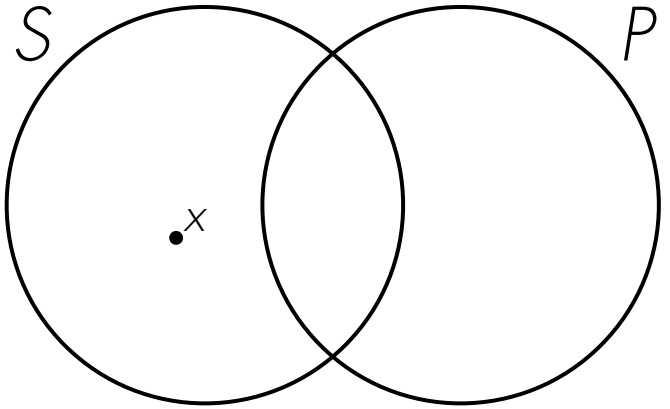
Assessing Syllogisms

Third, see if this diagram conforms to what the conclusion requires. If so, the syllogism is valid.

The premises:



The conclusion
(Some *S* is not *P*):



In this case, the conclusion is confirmed. It is *valid*.

Argument 2

This argument…

2 Some journalists are mediocre hacks, but

1 all failures are mediocre hacks. As a result, CI

C some journalists are not failures.

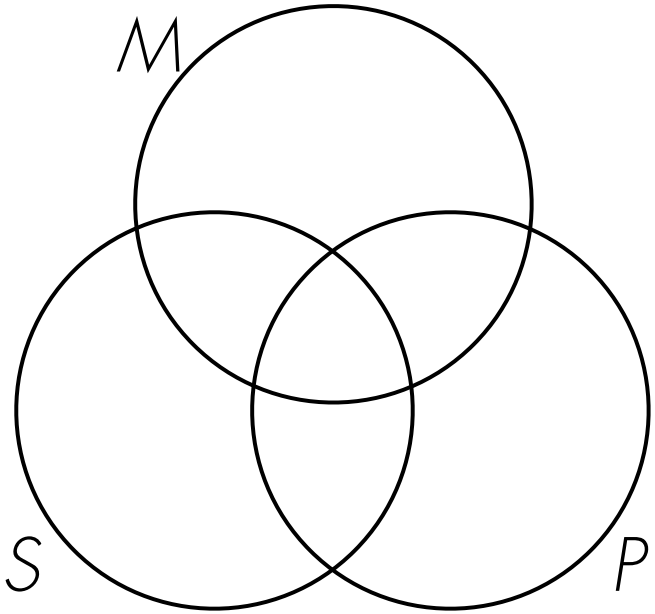
Is put into standard symbolic form…

1. All *P* is *M*.
2. Some *S* is *M*.

∴ Some *S* is not *P*.

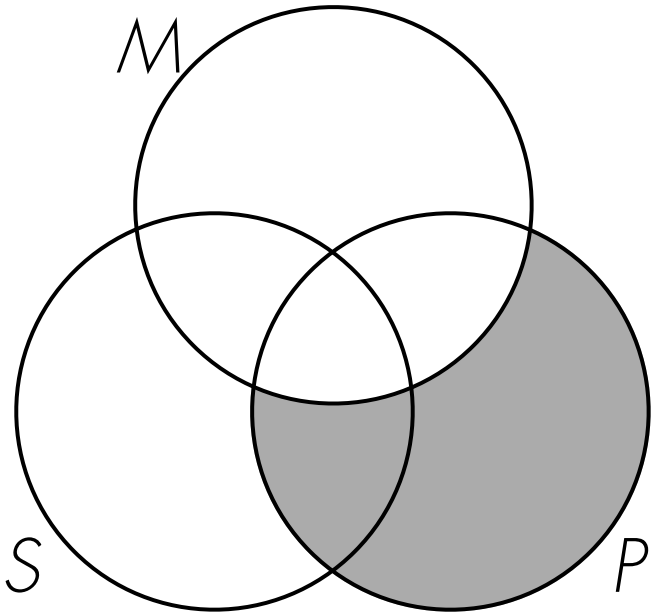
Assessing Argument 2

First, draw the three circles:



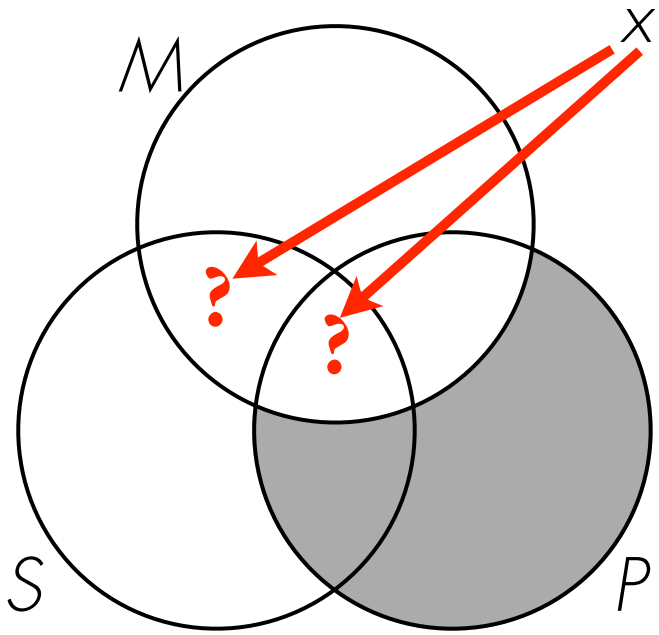
Assessing Argument 2

Second, put in the information expressed by the two premises into the diagram. As usual, do any universal statement first. There is one here (All *P* is *M*):



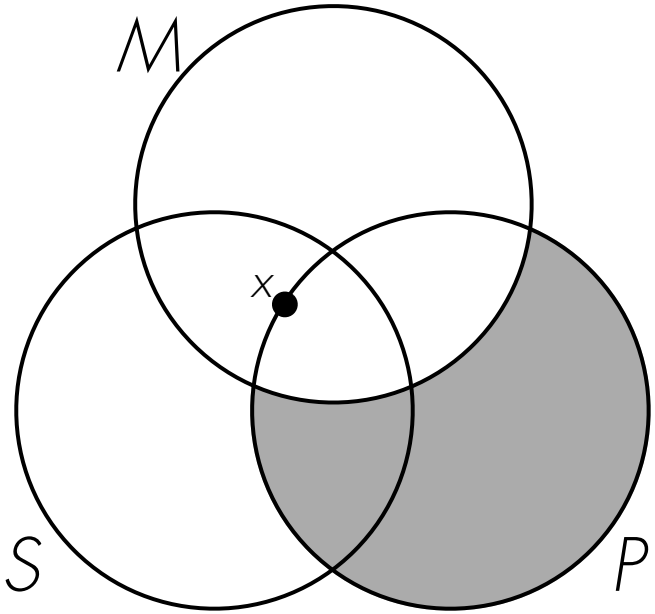
Assessing Argument 2

Now add any particular statements. There is one (Some *S* is *M*). However, notice that it is not clear where the *x* should go in this case:



Assessing Argument 2

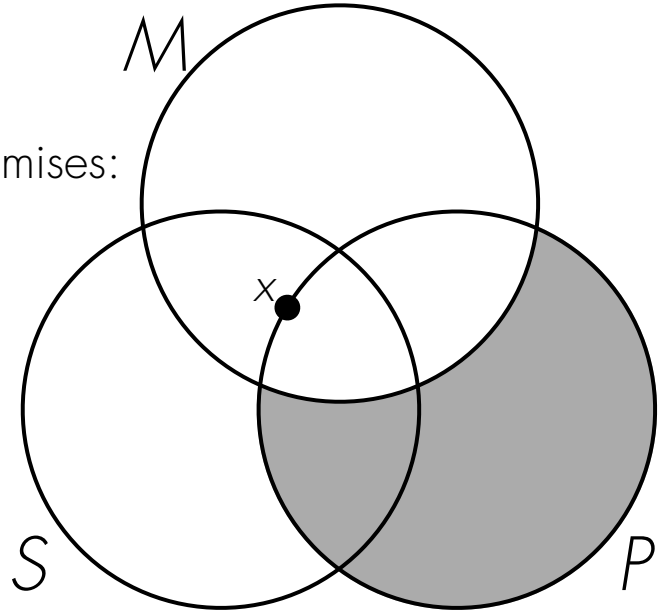
So we just put the *x* right on the line between those two regions. It could be in *either* of them. We do not have enough information to know anything further.



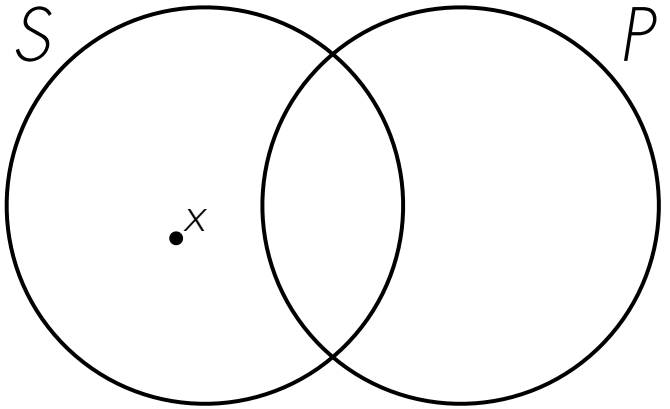
Assessing Argument 2

Third, see if this diagram conforms to what the conclusion requires.

The premises:



The conclusion
(Some *S* is not *P*):



This does not conform to the conclusion because *x* might actually be in *P*. So this syllogism is *invalid*.

Argument 3

This argument…

2 Some clever people are journalists, and

1 all clever people are hard workers. As a CI result, some journalists are hard workers.

C

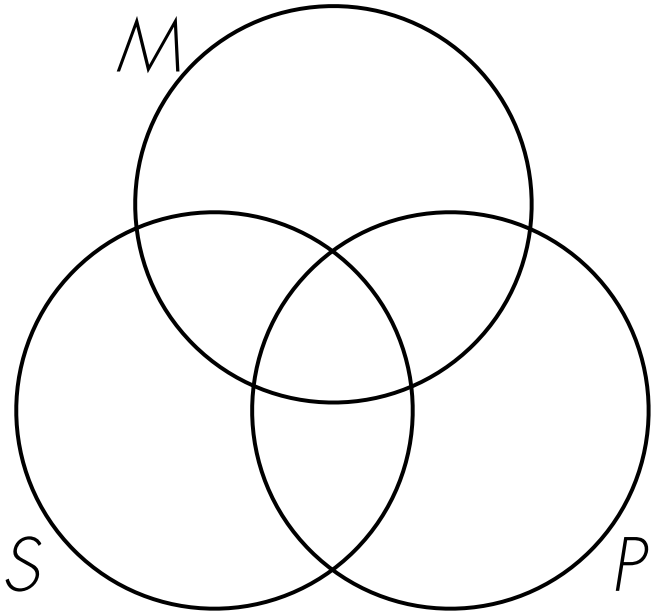
Is put into standard symbolic form…

1. All *M* is *P*.
2. Some *M* is *S*.

∴ Some *S* is *P*.

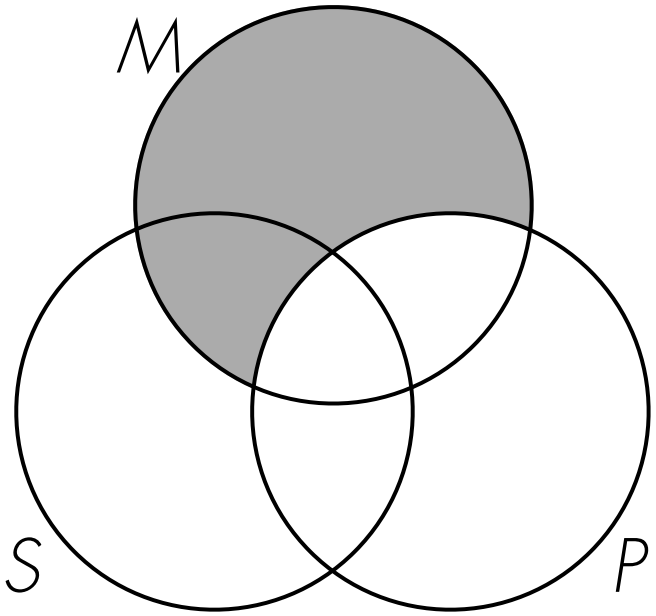
Assessing Argument 3

First, draw the three circles:



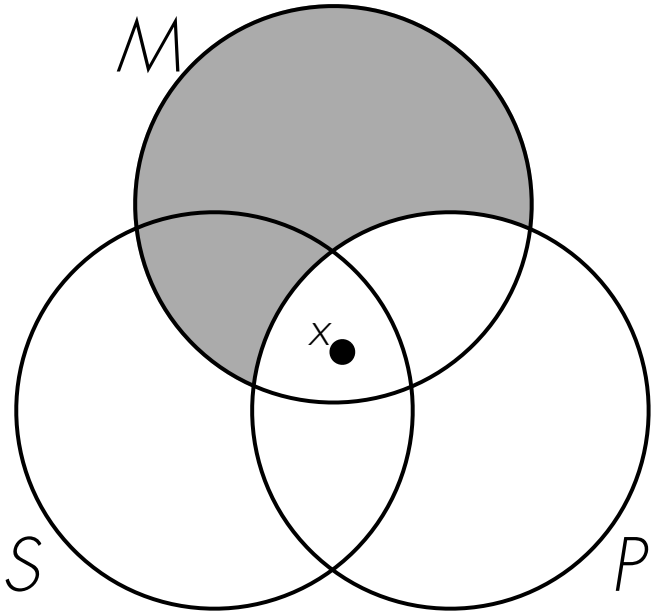
Assessing Argument 3

Second, put in the information expressed by the two premises into the diagram. As usual, do any universal statement first. There is one here (All *M* is *P*):



Assessing Argument 3

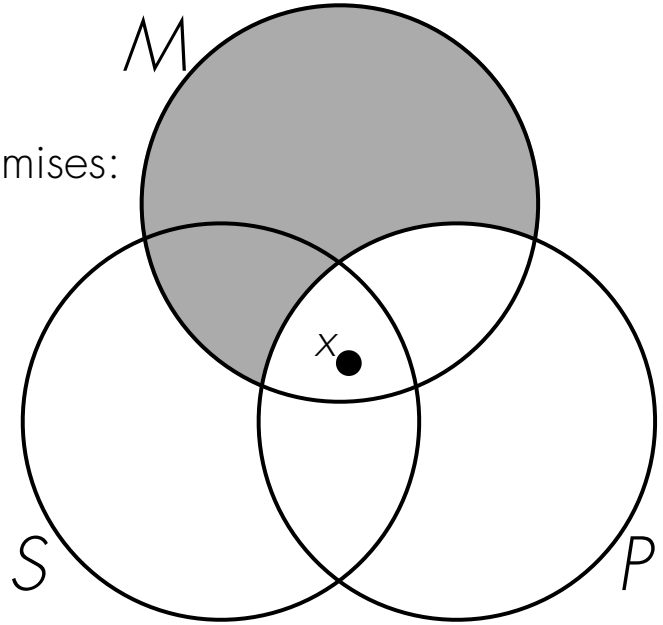
Now add any particular statements. There is one (Some *M* is *S*). There is no confusion now about where to put that pesky *x*!



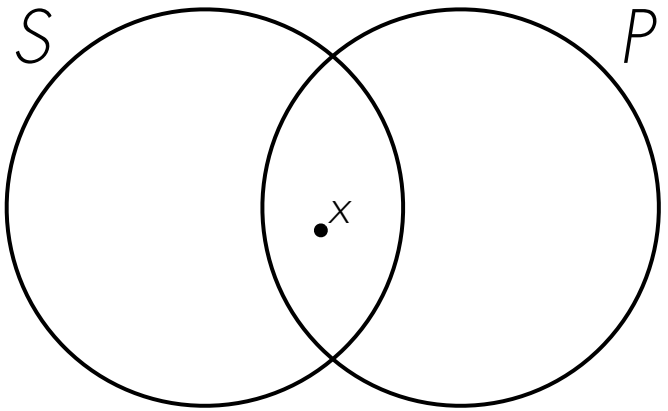
Assessing Argument 3

Third, see if this diagram conforms to what the conclusion requires.

The premises:



The conclusion
(Some *S* is *P*):



In this case, the conclusion is confirmed. It is *valid*.

Next Class…

Workshop assessing the validity of categorical syllogisms with Venn diagrams.

Do not forget that **exam #3** is a week from today (December 11TH). Anything from unit #7 is fair game. We will have an in-class review session this Sunday (December 9TH), but please start preparing now!