

10.3 Categorical Syllogisms

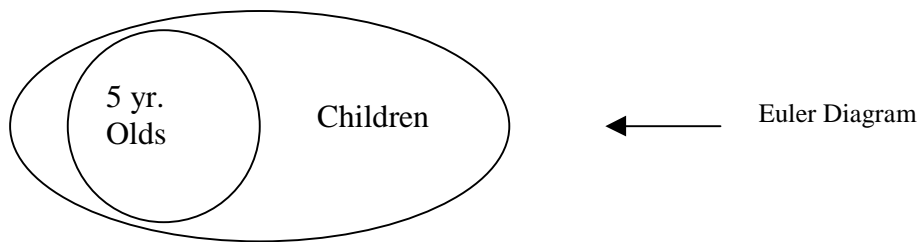
Definition: A Syllogism is an argument consisting of two (sometimes more) statements called premises followed by one statement called a conclusion

Definition: A syllogism that involves the use of use of statements about categories is called a categorical syllogism

Six Different Types of Sentence

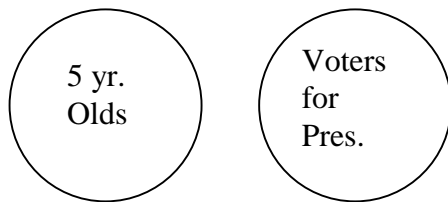
1. All X are Y

Example: All 5 year olds are children



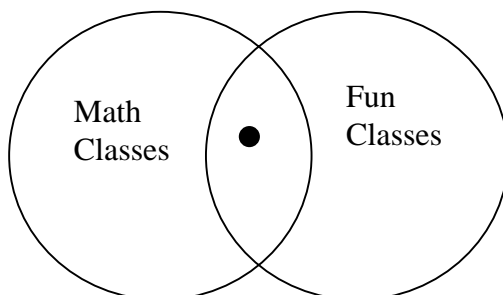
2. No X are Y

Example: No 5 year olds can vote for President



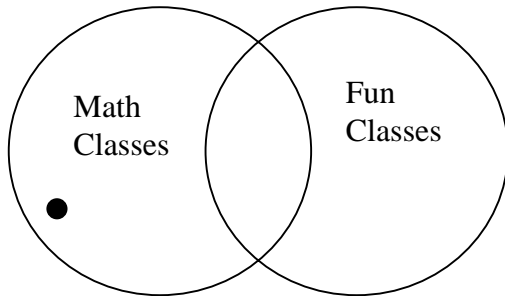
3. Some X are Y

Example: Some Math classes are fun



4. Some X are not Y

Example: Some Math classes are not fun



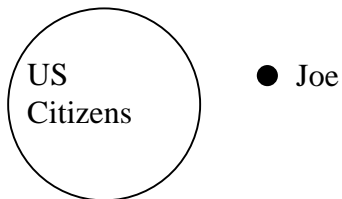
5. x is a Y

Example: Joe is a US Citizen



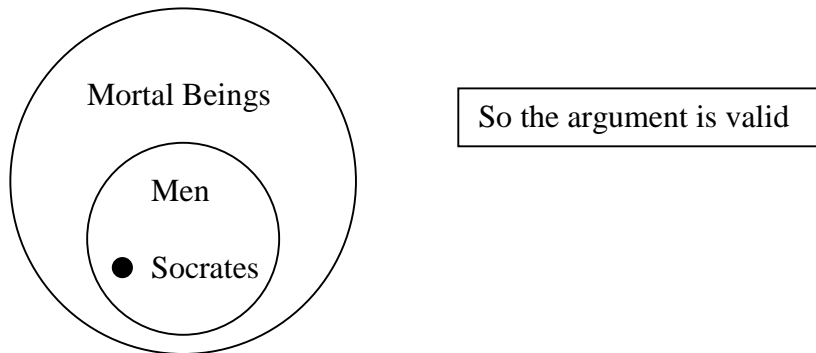
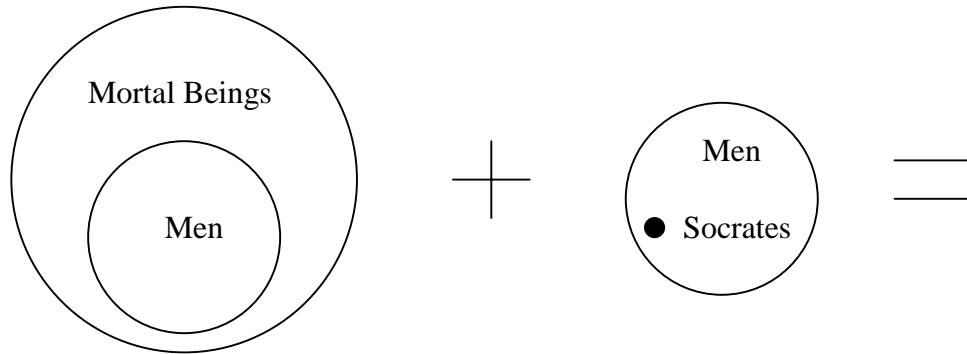
6. x is not a Y

Example: Joe is not a US Citizen



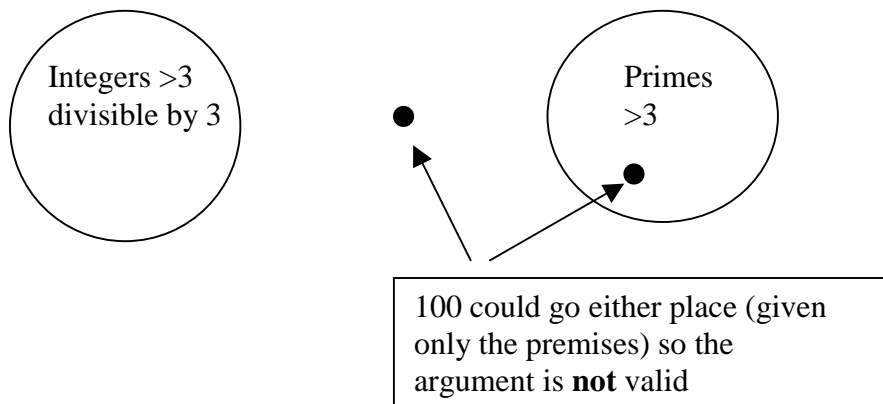
Definition: A Syllogism is valid if **whenever the premises are true the conclusion must be true**

Example: Premises: All men are mortal
 Socrates is a man
 Conclusion: Therefore, Socrates is mortal



Example: Determine the validity of the argument

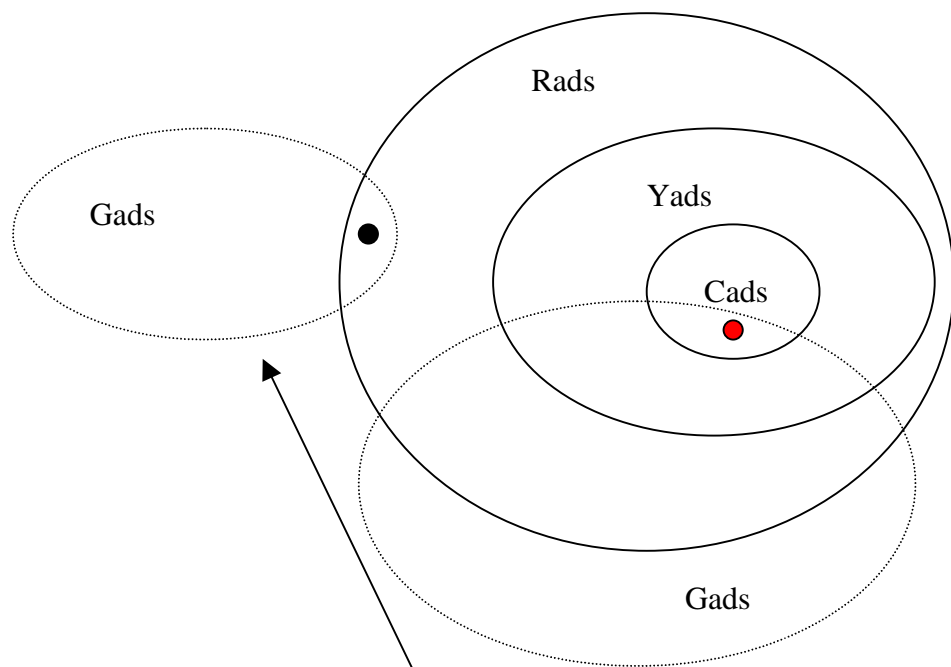
No prime number larger than 3 is divisible by 3
 100 is not divisible by 3
 Therefore 100 is not a prime



Definition: If the conclusion of an argument **is not guaranteed** by the truth of the premises then the syllogism is not valid. An invalid argument involving categories is called a categorical fallacy.

Example: Determine the validity of the argument

All Cads are Yads
All Yads are Rads
Some Gads are Rads
Therefore, Some Gads are Cads



It is possible to draw the picture so the conclusion is true, but it is also possible to draw the picture so the conclusion is false, so the argument is **not valid**

The notes above are for Math 108, Math for the Modern World using

Mathematics in Life, Society and the World 2nd edition by Parks, Musser, Burton, and Siebler. Prentice Hall 2000.