Math 1030 #2c
Venn Diagrams and Testing Validity

Use Venn Diagrams to Analyze Deductive Arguments

Basic Process

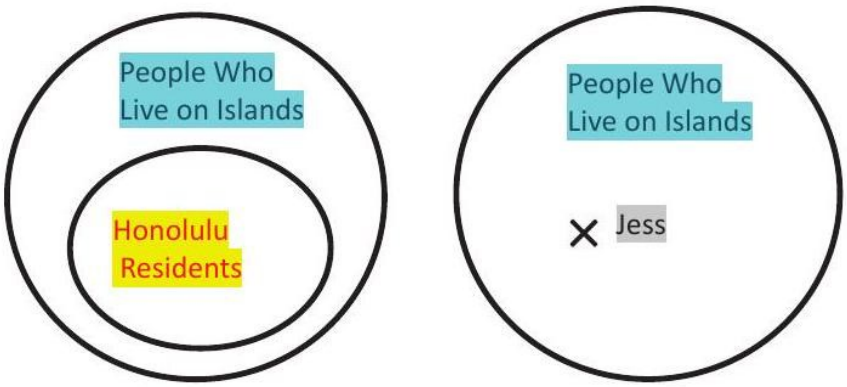
(Variation on Process in the Math 1030 Videos and Textbook)

1. Represent the premises AND the conclusion with Venn Diagrams.
2. Compare the Venn Diagrams to determine validity
    - The Venn Diagrams agree → valid.
    - The Venn Diagrams do not agree → invalid.
3. Determine soundness
    - If an argument is valid, consider whether the premises are true (don't need the Venn Diagram for this.)
        - Yes → the argument is sound
        - No → the argument is not sound
    - If an argument is invalid, it is automatically not sound.

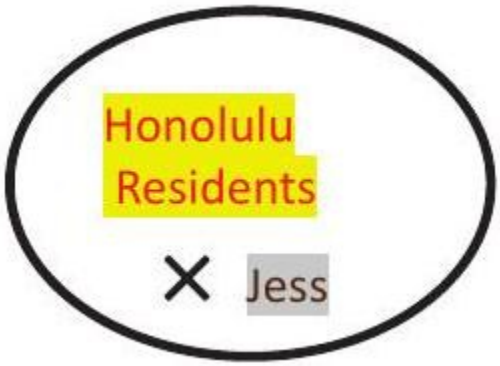
EX 1:

Represent the information in the premises and in the conclusion with separate Venn Diagrams. Then determine the validity and soundness of the argument and explain your reasoning.

a) Premise: Residents of Honolulu live on an island.
Premise: Jess lives on an island.



Conclusion: Jess: lives in Honolulu.



Analysis and explanation:

b) Premise: All Japanese cities are on islands.
Premise: Tokyo is a city in Japan.
Conclusion: Tokyo is on an island.

VD for Premises	VD for Conclusion	Analysis and Explanation

c) Premise: Everything in space is a star.
Premise: Pluto is in space.
Conclusion: Pluto is a star.

VD for Premises	VD for Conclusion	Analysis and Explanation

EX 2:

Statements with negation
Represent the information with Venn Diagrams. Then determine the validity and soundness of the argument and explain your reasoning.

a) Premise: Moths only eat textiles made of natural fibers.
Premise: Polyester is not a natural fiber.
Conclusion: Moths will not eat polyester.

VD for Premises	VD for Conclusion	Analysis and Explanation

b) (Example also shown in Video 2B)

Premise: If a figure is a quadrilateral, it has four sides.
Premise: Triangles are not quadrilaterals.
Conclusion: Triangles do not have four sides.

VD for Premises	**VD for Conclusion**	**Analysis and Explanation**