Teaching Formal Logic
with Joelle Hodge

Lesson 14: Discovery of Deduction, Chapter 6.5

Outline:

Chapter 6, Lesson 6.4

- Relationships of Equivalence
- The Relationship of Contraposition
- Points to Remember
  - Contraposition applies only to *A* and *O* propositions.
  - Contraposition is achieved by performing a three-step process on standard categorical propositions:
    - Obvert the original proposition.
    - Convert the proposition (you just created).
    - Obvert the proposition ~~again~~ (you just created).
  - *E* and *I* propositions cannot use contraposition because a logically equivalent proposition is not created.
- We often need a variety of ways to present an idea. How can we take a statement and say it a different way while maintaining the truth-value and distribution of terms.

- Original: All men are mortal.
  - Obvert: No men are non-mortal.
  - Convert: No non-mortals are men.
  - Obvert: All non-mortals are non-men.
- Original: 2(3x + 5x) = 30

$$2(8x) = 30$$
$$16x = 30$$
$$x = 15/8$$

- With contrapositioning, why can we only perform the rule on A & O statements?
  - Original: (A) All men are mortal.
    - Obvert: (E) No men are non-mortal. (both S and P are fully distributed)
    - Convert: (E) No non-mortals are men.
    - Obvert: (A) All non-mortals are non-men.
  - Original: (O) Some trees are not hardwoods.
    - Obvert: (I) Some trees are non-hardwoods.
    - Convert: (I) Some non-hardwoods are trees.
    - Obvert: (O) Some non-hardwoods are not non-trees.
  - Original: (E) No dogs are cats.
    - Obvert: (A) All dogs are non-cats. (subject fully distributed, predicate is partially distributed)
    - ~~Convert~~: This introduces the error of changing distribution.
  - Original: (I) Some berries are blueberries.
    - Obvert: (O) Some berries are not non-blueberries. (subject is partially distributed and predicate is fully distributed)
    - ~~Convert~~: This introduces the error of changing distribution.
- Converse – E & I Statements
  - *Partially convert an A*
    - Truth of the universal flows to the particular. Because (if) you have a true A statement, you also have a true I statement.
    - A – All men are mortal.
    - I – Some men are mortal. (subimplication)
    - I – Some mortals are men. (partially converted)
- Contrapositioning – A & O Statements
  - E – No dogs are cats.
  - O - Some dogs are not cats. (subimplication)
  - Obvert: Some dogs are non-cats.
  - Convert: Some non-cats are dogs.
  - Obvert: O - Some non-cats are not non-dogs.