Exercises for Reading 2.04

_____ Exercises - Part I. Peruse entire reading. Then read the introductory section at the very beginning of the reading. Read this section carefully and try to understand it as best you can.

1. Explain each of the four methods of reduction. [Review]

S: *Simple Conversion* of the proposition signified by the preceding vowel; (Simply switch S and P to P and S.)

Original	Converse	Valid?	By limitation
All S are P	All P are S	No	Some P are S
No S are P	No P are S	Yes	
Some S are P	Some P are S	Yes	
Some S are not P	Some P are not S	No	

P: *Per accidens*, or *Partial*, Conversion of the proposition signified by the preceding vowel; (See "By limitation" above.)

M: *Mutatio*, or *Transposition of the Premises*; make the minor premise the major, and the major the minor.

C: *Reduction by Contradiction*. This is the indirect method of reduction through (rather than to) BARBARA. It is signified by a noninitial c, and is applied only to BAROCO and BOCARDO.

2. What is the reason for reducing syllogisms to the First Figure in the first place?
The reason we are reducing syllogisms to the First Figure in the first place is to see more easily that they are valid, since validity is more obvious in the First Figure.

3. Which two moods cannot be reduced to the First Figure by using Direct Reduction?
BAROCO
BOCARDO

4. Which of the four operations (S, P, M, and C) do you use in Indirect Reduction?
C
Read: "Indirect Reduction." Read it carefully.

5. Why is Reduction by Contradiction considered indirect rather than direct?
Because, using the technique of changing the position of the middle term by converting and/or transposing the premises will not work to reduce to a first figure.

6. What is the principle upon which Indirect Reduction is based?

In a valid syllogism, if the conclusion is false, then at least one of the premises must be false.

7. Under this method, if a syllogism is valid, what should we expect?

By making the conclusion false, it forces us to deny one of the premises, proving that the syllogism is valid. (In other words, its invalidity is impossible, therefore, it is valid.)

_____ Exercises - Part 2. Read: "Indirect Reduction of BAROCO." Read it carefully.

8. In the example BAROCO given in the readings, if we say that all animals are rational creatures (thereby contradicting the conclusion of the original syllogism), what should we be able to derive at the end of our process of Indirect Reduction?

We should have the contradiction of at least one of the premises.

9. In BAROCO, which premise do we replace with the contradiction of the conclusion?

The minor premise, as indicated by the vowel that precedes the **C.**

10. When the operation indicated in question 10. is completed, what statement do we have as our new conclusion?

All rational creatures are created in the image of God.
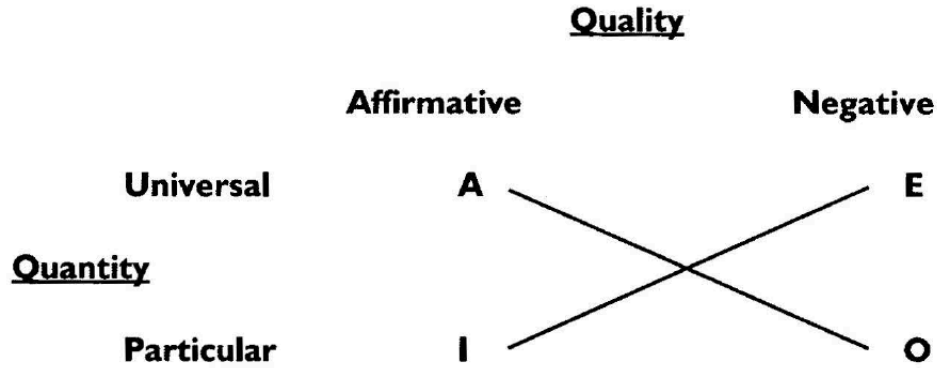All animals are rational creatures.
Therefore, All animals are created in the image of God.

(Did you understand it, or did you just copy it from the reading? If you copied it, go back and follow each of the prescribed steps, until you understand it.)

11. What does this show?

It proves that the argument is valid.

12. Fill out the following chart:

_____

Quality

	Affirmative	Negative
Universal	A	E
Particular	I	O

Quantity

(The diagram shows A, E on the Universal row and I, O on the Particular row, with diagonal lines crossing from A to O and from E to I.)

13. Which two sets of statements contradict one another?
A & O and E & I

14. In the example BAROCO in the readings, what should the new conclusion be (i.e. what kind of statement, A, E, I, or O)? Why?
A statement (All S are M).

15. What reasoning do we use in this procedure?
Because when we replaced the second premise with its contradictory (following the rule BAR**OC**O of contradicting the premise before the **C**), we end up with an A statement and First Figure. That means our syllogism is BARBARA. The conclusion must be an A statement.

Note:
Both premises are now affirmative, so we know the conclusion must be affirmative.

16. Give the three steps for the Indirect Reduction of BAROCO.
Step #I: Retain the original major premise
Step #2: Use the contradiction of the original conclusion as the new minor premise
Step #3: Derive the new conclusion, which, if the original syllogism is valid, should be the contradiction of the original minor premise.

17 Indirectly Reduce the following syllogisms:

All tabbies are cats	All tabbies are cats
Some animals are not cats	All animals are tabbies.
Therefore, some animals are not tabbies	All animals are cats

All Morgans are horses
Some animals are not horses
Therefore, some animals are not Morgans

All Morgans are horses
All animals are Morgans
Therefore, All animals are horses

_____ Exercises - Part 3. **Read section titled "Indirect Reduction of BOCARDO."**
Read it carefully.

18. In the example BOCARDO given in the readings, if we say that **_all things created by God are rational_** (thereby contradicting the conclusion of the original syllogism), what should we be able to derive at the end of our process of Indirect Reduction?
We prove that the argument is valid, because, if the conclusion is false, then at least one of the premises must be false. (When we deny the conclusion we end up with a denial of one of the premises.)

19. In BOCARDO, which premise do we replace with the contradiction of the conclusion of the original syllogism?
Major

20. If this is done, what is the statement that you should get as your new conclusion?
A contradiction of the original major premise.

21. What does this show?
That the argument is valid.

22. Generally speaking, is the reasoning we use in this procedure any different from what we used with BAROCO?
No

23. Give the three steps for the Indirect Reduction of BOCARDO.
Step #I: Retain the original minor premise
Step #2: Use the contradiction of the original conclusion as the new major premise
Step #3: Derive the new conclusion, which, if the original syllogism is valid, should be the contradiction of the original major premise.

24. Indirectly Reduce the following syllogisms:

Some cats are not tabbies
All cats are animals
Therefore, some animals are not tabbies

All animals are tabbies

All cats are animals
Therefore, all cats are tabbies

Some horses are not Morgans
All horses are animals
Therefore, some animals are not Morgans

All animals are Morgans
All horses are animals
Therefore, all horses are Morgans

Create a syllogism in each of the 19 valid moods (you may use the same three terms in all the syllogisms if you wish). In doing so, follow this five-step procedure:

> **Step #I: Construct your conclusion first. Make sure you include the quantifer, a clearly expressed subject and predicate, and copula.**
> **Step #2: Given the vowels in the name of the argument place the quantifiers at the beginning of the first two lines where you intend to put your premises.**
> **Step #3: Determine the figure of the syllogism you are trying to construct, and place a space (you can use an underline if you wish) where the middle term should appear in the two premises, according to what figure it is in.**
> **Step #4: Identify the minor and major terms (from the conclusion you have already written) and place them in the proper location in the premises**
> **Step #5: Fill in the blanks you left for your middle term with a term that makes the best sense in light of your minor and middle terms.**

Example: Let's say we want to create a BARBARA. We apply **step # I** and write our conclusion:

> All daisies are plants

We apply **step #2** and place the quantifiers, both of which in this case are all, since the first two vowels in
BARBARA are ***A's***:

> All
> All
> Therefore, all daisies are plants

According to **step #3**, then, we conclude that BARBARA is a First Figure syllogism, which means that the middle term is the subject of the major premise and the ***predicate*** of the minor premise. Therefore, we place a space indicating where the middle term should go:

All _____ are _____
All _____are _____
Therefore, all daisies are plants

Then, applying **step #4**, we identify the *minor* term (the subject of the conclusion: *daisies*) and the *major* term (the predicate of the conclusion: *plants*) and place them in the appropriate spot in the premises:

All _____ are plants
All daisies are _____
Therefore, all daisies are plants

Finally, we apply **step #5** by selecting an appropriate middle term and placing it in both of the blank spaces:

All flowers are plants
All daisies are flowers
Therefore, all daisies are plants

This gives us a BARBARA. Now, try it on the following:

25. BARBARA
All triangles have three sides
All scalenes are triangles
All scalenes have three sides

26. CELARENT
No triangles have four sides
All scalenes are triangles
No scalenes have four sides

27 DARII
All triangles have three sides
Some equilateral things are triangles
Some equilateral things have three sides

28. FERIO
No triangles have four sides
Some scalenes are triangles
Some scalenes do not have four sides

29. CESARE
No hexagons have exactly three sides
All triangles have exactly three sides
No hexagons have exactly three sides

30. CAMESTRES
All squares have four sides
No hexagons have four sides
No hexagons are squares

31. FESTINO
No hexagons have exactly three sides
Some polygons have exactly three sides
Some polygons are not hexagons

32. BAROCO
All squares have four sides
Some polygons are not four sided
Some polygons are not squares

33. DARAPTI
All triangles have three sides
All triangles are polygons
Some polygons have three sides

34. DISAMIS
Some triangles have right angles
All triangles are three sided
Some three sided things have right angles

35. DATISI
All triangles have three sides
Some triangles have right angles
Some right angled things have three sides

36. FELAPTON
No triangles have four sides
All triangles are polygons
Some three sided things have right angles

37 BOCARDO
Some triangles are not right angled
All triangles have three sides
Some 3 sided things are not right angled

38. FERISON
No triangles have four sides
Some triangles are polygons
Some polygons are not four sided

39. BRAMANTIP
All triangles are polygons
All polygons are 2-dimensional
Some 2-dimensional things are triangles

40. CAMENES
All skalenes are triangles
No triangles are balloons
No balloons are skalenes

41. DIMARIS
Some red things are balloons
All balloons can pop
Some red things can pop

42. FESAPO
No triangles are squares
All squares are polygons
Some polygons are not squares

43. FRESISON
No triangles have five sides
Some five sided things are beautiful
Some beautiful things are not triangles

_____ **Exercises - Part 4 Indirectly reduce the following syllogisms (identify the mood, replace the O premise with the contradiction of the conclusion, and come up with the new conclusion):**

44.   All Athenians live in Greece.
         Some Greeks do not live in Greece.
         Therefore, some Greeks are not Athenians

         AOO-2 BAROCO (original)
         All Athenians live in Greece.

45. Some Dorians are not Spartans .
All Dorians are Greeks.
Therefore, some Greeks are not Spartans .

OAO-3 BOCARDO (original)
All Greeks are Spartans .
All Dorians are Greeks.
Therefore, Dorians are Spartans .

46. All Macedonians are barbarians .
Some Athenians are not barbarians.
Therefore, some Athenians are not Macedonians.

AOO-2 BAROCO (original)
All Macedonians are barbarians
All Athenians are Macedonians
Therefore, All Athenians are barbarians

47. Some laws are not written.
All laws are to be obeyed.
Therefore, some things to be obeyed are not written.

OAO-3 BOCARDO (original)
All things to be obeyed are written
All laws are to be obeyed.
Therefore, all laws are written

48. All Spartans are soldiers.
Some Greeks are not soldiers.
Therefore, some Greeks are not Spartans .

AOO-3 BOCARDO (original)
All Spartans are soldiers.
All Greeks are Spartans
Therefore, All Greeks are soldiers

49. Take the syllogism that you thought up for FESTINO and directly reduce it to the appropriate First Figure mood.
No three sided things are hexagons
Some polygons have exactly three sides
Some polygons are not hexagons

50. Take the syllogism you thought up for DATISI and directly reduce jt to the appropriate First Figure mood.
All triangles have three sides
Some things with right angles are triangles
Some right angled things have three sides

51. Take the syllogism you thought up for BRAMANTIP and directly reduce it to the appropriate First Figure mood.
All polygons are 2-dimensional
All triangles are polygons
All triangles are 2-dimensional things

52. Take the syllogism you thought up for CESARE and directly reduce it to the appropriate First Figure mood.
Nothing with exactly three sides is a hexagons
All triangles have exactly three sides
No hexagons have exactly three sides

53. Take the syllogism you thought up for BAROCO and indirectly reduce it.
All squares have four sides
All polygons are squares
All polygons are four-sided

54. Take the syllogism you thought up for BOCARDO and indirectly reduce it.
All 3 sided things are right angled.
All triangles have three sides
Therefore, All right angled things are triangles

Read section titled, "Summary." Read it carefully.

55. Tell whether the following are true or false:

T   **F**   The two moods in which Direct Reduction does not work are BARBARA and BAROCO.

T   F   In those cases in which Direct Reduction cannot be used, we must use Indirect Reduction.

T   F   The reason we reduce figures to the First is in order to more easily show them valid.

T   F   We indirectly reduce a syllogism by replacing the O premise with the contradiction of the original conclusion.

T   **F**   In Indirect Reduction, if the contradiction of the major premise also contradicts the contradiction of the minor premise, then the syllogism contradicts itself.