

The Little Logic Book
Hardy, Ratzsch, Konyndyk De Young and Mellema
The Calvin College Press, 2013

Exercises for The Little Logic Book may be downloaded by the instructor as Word documents and then modified for distribution to students; or students may be instructed to download the exercises and then told which ones to answer. This is an exercise bank; it is not assumed that students will do all the exercises for any one chapter. Comments, questions or suggestions for Chapter Two of The Little Logic Book can be sent to logic@calvin.edu

Exercise Bank for Chapter Two:
Truth Tables
(Posted January, 2014)

1.0 Basic Concepts

Define or identify the following:

- 1.1 Truth table
- 1.2 Tautology
- 1.3 Contradiction
- 1.4 Exclusive disjunction
- 1.5 Inclusive disjunction
- 1.6 Logical equivalence
- 1.7 Double negation
- 1.8 Identity
- 1.9 Contraposition
- 1.10 De Morgan's laws
- 1.11 Contingent
- 1.12 Law of Non-contradiction
- 1.13 Corresponding conditional

2.0 Truth Table Basics

Indicate whether the following claims are true or false. Explain your answers.

- 2.1 The corresponding conditional for any valid argument is a tautology.
- 2.2 The corresponding conditional for any invalid argument is a contradiction
- 2.3 The truth table for an argument containing five separate premises would have 32 lines.
- 2.4 The truth table for an argument containing five separate propositions would have 32 lines.
- 2.5 A disjunction can be either inclusive, exclusive, or both. (Careful – this is tricky.)

What would you expect to see in the last column of the truth table for:

- 2.6 a tautology
- 2.7 a contradiction

2.8 a contingency

2.9 State the basic form for a contradiction.

2.10 Using truth tables, verify that the logical equivalences listed below are indeed logical equivalences.

2.10.1 $(A \rightarrow B) \equiv (\sim B \rightarrow \sim A)$

2.10.2 $\sim(A \vee B) \equiv (\sim A \wedge \sim B)$

2.10.3 $\sim(A \rightarrow B) \equiv (A \wedge \sim B)$

3.0 Truth Tables and Arguments

3.1 Explain the method of evaluating validity or invalidity of an argument using truth tables.

3.2 Using truth tables, verify that modus tollens is a deductively valid argument form.

3.3 Using truth tables, show that Affirming the Consequent is not a deductively valid argument.