Philosophy 110
Introductory Logic
Spring 2008

Homework #5
Due at the beginning of class on Monday, February 18

Exercises 5-3
2, 4, 6, 10

Exercises 5-4
2, 6

Theorems
Provide derivations of the following theorems.

1. \((P \& Q) \rightarrow \neg (\neg P \lor \neg Q)\)
2. \((P \rightarrow Q) \rightarrow (\neg P \rightarrow \neg Q)\)

Equivalences
Use pairs of derivations to show that the following sentences are equivalent. Explain why your derivations show that the sentences are equivalent.

1. \(P \rightarrow (Q \rightarrow R) \rightarrow (P \& Q) \rightarrow R\)

Inconsistency
Use a derivation to show that the following set of sentences is inconsistent, and explain briefly why your derivation shows that the set is inconsistent.

1. \(\neg (P \& Q) \rightarrow (P \& \neg Q)\)

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Evaluation of English Arguments
Symbolize the following English arguments, using the symbolization scheme provided. If the resulting symbolic argument is valid, use a derivation to show that it is. If it is not valid, then provide a truth table (either a complete one or an appropriate single row of one) that shows that it is not valid, and say briefly why the table (or row) shows that it is invalid.

P: The Pirates will win the pennant.
N: The Pirates will get a new manager.
G: The Pirates will get a good manager.
O: The Orioles will get a good manager.

1. The Pirates will get a new manager, provided that if they get a good manager then they’ll win the pennant. But it’s not the case that if they get a good manager then they will win the pennant. Therefore, the Pirates will get a new manager.

2. The Pirates will win the pennant, assuming that the Pirates will get a good manager and the Orioles will not. It is not the case that both the Orioles and the Pirates will get a good manager. The Pirates will get a good manager, if they get a new manager. It’s not the case that the Pirates won’t get a new manager. Therefore, the Pirates will win the pennant.