

Phil 57 section 3
Fall 2010
Homework #6

Determine the main connective in each of the following:

1. $((P \rightarrow Q) \cdot R)$
2. $(P \rightarrow (Q \cdot R))$
3. $(\sim(P \rightarrow Q) \leftrightarrow (R \vee S))$
4. $\sim((P \rightarrow Q) \leftrightarrow (R \vee S))$
5. $((P \rightarrow Q) \rightarrow (R \rightarrow S))$
6. $((Q \cdot R) \cdot (P \cdot S))$
7. $(Q \cdot (R \cdot (P \cdot S)))$
8. $((P \cdot Q) \rightarrow T) \vee S$

Write out the truth-functional definition (i.e., the truth-table) for each of the following:

1. $(P \vee Q)$
2. $(P \rightarrow Q)$
3. $\sim P$
4. $(P \cdot Q)$
5. $(P \leftrightarrow Q)$

Translate each the following English statements into PL using the suggested scheme of abbreviation:

1. If you're going to smoke in here, you must open the windows. (P = You're going to smoke in here, Q = You must open the windows.)
2. You can have the energy boost or the protein boost in your smoothie, but not both. (R= You can have the energy boost in your smoothie, S = You can have the protein boost in your smoothie.)
3. You can have the energy boost or the protein boost in your smoothie, but not both – unless you pay an extra dollar. (R= You can have the energy boost in your smoothie, S = You can have the protein boost in your smoothie, T = You pay an extra dollar.)
4. If Americans buy American products, then there are jobs for Americans. (P= Americans buy American products, Q= There are jobs for Americans.)
5. Americans buy American products, and there are jobs for Americans. (P= Americans buy American products, Q= There are jobs for Americans.)
6. Tobacco companies could not survive without luring teenagers into using their products. (S = Tobacco companies survive, T = Tobacco companies lure teenagers into using their products.)
7. If the Chiefs beat the 49ers and Buffalo (their final opponent), and should the Raiders beat Denver (their last opponent) and play to a tie against Kansas City, then the Dolphins would be eliminated by losses to the Colts and the Packers. (F= The Chiefs beat the 49ers, B= The Chiefs beat Buffalo, D= The Raiders beat Denver, K= The Raiders tie Kansas City, E= The Dolphins are eliminated, C= The Dolphins lose to the Colts, P= The Dolphins lose to the Packers.)

Are the claims you translated in #4 and #5 logically equivalent? (Support your answer with a truth table.)