

## Chapter 7: Symbolizing and truth tables.

- a. Write the truth tables for each type of statement: conjunction, disjunction, negation, conditional and biconditional.
- b. Symbolize the following statements:
  - a. If my husband invites me to the movies, I will wear my yellow dress.
  - b. It is not the case that my laptop is red.
  - c. The book fails to be interesting.
  - d. Karl Marx was born during the XIX but Lincoln lived during the XVIII.
  - e. My mother was 20 years old when she got married even though my grandmother was 40.
  - f. Given that I my husband invites me to the movies, I will not wear my yellow dress.
  - g. I am 26 years old just in case I was born in 1987.
  - h. Given that Karl Marx is a philosopher and one of the main thinkers of Communism, then Communism is a theory that came alive during XIX.
  - i. My mother and my aunt are sisters unless my mother and my father were married in 1987.
  - j. I play soccer unless it rains only if my husband takes me to the movies and we watch "The Wolf on Wall Street"
  - k. I play soccer or I play football. If I play soccer I will probably win. If I play football, I might lose. Therefore, either I win or I lose.
  - l. If James enjoys everything written by Joyce, he likes Ulysses. Since he does not like Ulysses, he does not like Joyce.
- c. Using truth tables show if the arguments are valid or invalid:
  - a.  $E \rightarrow (P \vee S), \sim P \vee \sim S \therefore \sim E$
  - b.  $SVQ, S \rightarrow E, Q \rightarrow P \therefore E \vee P$
  - c.  $T, Q, P \vee D, D \rightarrow Z \therefore Z$
  - d.  $(A \cdot B) \rightarrow (D \cdot V), A \cdot B \therefore V$
  - e.  $\sim(A \cdot B), \sim(B \cdot \sim C) \therefore \sim C \rightarrow \sim A$
- d. Use truth trees to show if the arguments are valid or invalid
  - a.  $(A \cdot B) \vee (C \cdot D), (A \cdot B) \rightarrow V, (C \cdot D) \rightarrow X \therefore V \vee X$
  - b.  $(A \rightarrow B) \vee (X \cdot C), \sim(X \cdot C) \therefore A \rightarrow B$
  - c.  $G \vee J, H \vee J \therefore G \cdot J$
  - d.  $\sim(A \rightarrow B) \therefore A \leftrightarrow B$
- e. Determine if the following statements are tautologies, contingencies or contradictions
  - a.  $G \vee (H \cdot \sim G)$
  - b.  $H \vee (\sim I \rightarrow \sim H)$
  - c.  $\sim[(A \rightarrow \sim B) \rightarrow \sim(A \rightarrow B)]$
  - d.  $H \rightarrow (H \vee \sim H)$

d. Determine if the following statements are equivalent

- a.  $\sim[(A \cdot B) \vee C], \sim(A \cdot B) \cdot \sim C$

b.  $(W \rightarrow D) \rightarrow D, \sim(\sim W \vee D) \vee D$

c.  $M \rightarrow (K \vee D), \sim[M \rightarrow (K \cdot D)]$

d.  $V \cdot K, (V \cdot K) \vee \sim[D \rightarrow (W \cdot V)]$

e.  $A \cdot (B \vee D), \sim A \vee (\sim B \cdot \sim D)$