

## Worksheet: Basics of Logic

This worksheet tests you on propositional logic, truth tables and tautologies.

Basics of Logic  
Study guide



Model answers  
to this sheet



- Which of the following are propositions?
  - “Bertie was a man.”
  - “Was Bertie a man?”
  - “If Bertie was a man he was a good man.”
  - “Look out! Bertie!”
  - “Bertie was a man and Bertie was not a man.”
  - “ $3 + 4 = 7$ ”
  - “ $3 + 4 = 9$ ”
  - “This is not a proposition.”
  
- If  $p$  is the proposition, “He wears shoes” and  $q$  is the proposition, “He wears socks”, express the following in English.
  - $\bar{p} \vee p$
  - $\bar{\bar{p}}$
  - $\bar{p} \vee q$
  
  - $p \rightarrow q$
  - $p \leftrightarrow q$
  - $p \rightarrow (p \vee q)$

Make truth tables for these formulas. Which of them are tautologies?

3. Using the same propositions in question 2, express the following in terms of  $p$  and  $q$ .

- a) "He wears socks and he doesn't wear socks."
- b) "He doesn't wear shoes or socks."
- c) "He wears shoes if and only if he wears shoes."
- d) "If he wears socks then he doesn't wear shoes or socks."
- e) "If he wears socks he wears shoes and if he wears shoes he wears socks."
- f) "He doesn't wear shoes and he doesn't wear socks."
- g) "He wears shoes if and only if he wears socks."

Without making truth tables say which of these are tautologies and which are contradictions.

Which pairs of them are logically equivalent?



This worksheet is one of a series on mathematics produced by the Learning Enhancement Team.

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