

MATH 210, Section 1

Supplemental homework 5: Deductive reasoning and symbolic logic

February 10, 2012

- Analyze the logical forms of the following statements by converting to symbols:
 - We'll have either a reading assignment or homework problems, but we won't have both homework problems and a test.
 - Either John and Bill are both telling the truth, or neither of them is.
 - You won't go skiing, or you will and there won't be any snow.
 - I'll have either fish or chicken, but I won't have both fish and mashed potatoes.
 - $\sqrt{7} \not\leq 2$
 - 3 is a common divisor of 6, 9, and 15.
- What English sentences are represented by the following expressions?
 - $\sim (P \wedge \sim S)$, where P stands for the statement "I will buy the pants" and S stands for the statement "I will buy the shirt."
 - $\sim P \wedge \sim S$, where P and S mean the same as in (a).
 - $(S \vee G) \wedge (\sim S \vee \sim G)$, where S stands for the statement "Steve is happy" and G stands for "George is happy."
 - $[(S \vee (G \wedge \sim S)) \vee \sim G]$, where S and G mean the same as in (c).
- Determine whether each sentence on Supplemental Homework 1 is simple or compound.
- Which of the following are well-formed formulas?
 - $\sim (\sim p \vee \sim \sim r)$
 - $\sim (p, q, \wedge r)$
 - $p \wedge \sim p$
 - $(p \wedge q)(p \vee r)$
- Simplify the following statements as much as possible. (Use what you know about the ordering of real numbers.)
 - $(\pi > 0) \wedge (\pi < 10)$
 - $(3 < 4) \wedge (3 < 6)$
 - $(e < 4) \wedge (e^2 < 9)$
 - $(\pi > 0) \vee (\pi > 1)$
 - $(\pi < 0) \vee (\pi > 0)$