

## Math 160A - Winter 2002 - Homework #3

Instructor: Sam Buss - UC San Diego

*Due Wednesday, January 30.*

From the textbook. Section 1.7, pages 65-66: Problems 10, 11, 12.

For problem 10, give different algorithms for parts (a) and (b). For problem 11, assume you are given appropriate algorithms or procedures which make the two initial sets effectively enumerable; then construct a procedure for the union/intersection. For problem 12, the set can be finite (but does not need to be).

And, do one of the following “challenge” problems.

**Definition.** A truth-assignment is called ‘unitary’ if it assigns the value *True* to exactly one sentence symbol.

**Problem A.** Prove that there does not exist a set  $\Sigma$  of wffs such that the truth assignments satisfying  $\Sigma$  are precisely the truth assignments which are unitary.

**Problem B.** Prove that there does not exist a set  $\Sigma$  of wffs such that the truth assignments satisfying  $\Sigma$  are precisely the truth assignments which are *not* unitary.

**Problem C.** Let  $\Sigma$  be an infinite set of formulas. Suppose there is a finite set  $\Pi$  of formulas such that  $\Sigma$  and  $\Pi$  are tautologically equivalent. Prove that there is a finite subset  $\Sigma_0$  of  $\Sigma$  such that  $\Sigma$  and  $\Sigma_0$  are tautologically equivalent.