Homework I

1. [10 points]
Show that for any wffs □, □ and □, the propositional formula ((□ □) □ (□□ □)) □ □ □is a tautology.

2. [15 points]
Provide an expression utilizing *only* the '**nand**' operation (negated 'and', see truth table definition below) that is logically equivalent to each of the three usual Boolean operations □, □, and .

P	Q	P **nand** Q
T	T	F
T	F	T
F	T	T
F	F	T

3. [10 points]
Show that (x **nand** y) **nand** z is not logically equivalent to x **nand** (y **nand** z) (i.e., **nand** is not associative).

4. [10 points]
Determine if the program assertion (see Chapter 14 of Diller) below is valid and justify your answer. Assume that the domain of the program variables is integers.

{true}
if X>Y **then skip else** X:= X*X*Y
{X>Y}