CPSC 229, Fall 2015 — First Test Info

The first test for this course will be given in class on Wednesday, September 23. It covers Chapter 1, Sections 1 through 7 of the textbook.

The test will include some "short essay" questions that ask you to define something, or discuss something, or explain something, and so on. Other than that, you can expect most of the questions to be similar to problems that have been given on the homework. You can expect to do a few simple proofs, both formal proofs and more informal mathematical proofs. This might well include a proof by contradiction.

Here are some terms and ideas that you should be familiar with for the test:

translations from logic to English, and from English to logic
ambiguities in English
propositional logic
proposition
compound proposition
the logical constants $\mathbb{T}$ and $\mathbb{F}$
the logical operators "and" ($\wedge$), "or" ($\vee$), and "not" ($\neg$)
some information is lost when translating English to logic (for example, "but" vs. "and")
truth table
logical equivalence ($\equiv$)
the conditional or "implies" operator ($\rightarrow$)
equivalence of $p \rightarrow q$ with $(\neg p) \vee q$
"the statement $p \rightarrow q$ makes no claim in the case when p is false"
the negation of $p \rightarrow q$ is equivalent to $p \wedge \neg q$
the biconditional operator ($\leftrightarrow$)
equivalence of $p \leftrightarrow q$ with $p \rightarrow q \wedge q \rightarrow p$
tautology
Boolean algebra
some basic laws of Boolean algebra (double negation, De Morgan's, commutative, etc.)
logic circuits and logic gates
AND, OR, and NOT gates
making a circuit to compute the value of a compound proposition
finding the proposition whose value is computed by a circuit
converse of an implication
contrapositive of an implication
logical equivalence of an implication and its contrapositive
predicate logic
predicate

one-place predicate, two-place predicate, etc.
entity
domain of discourse
quantifiers, “for all” ($\forall$) and “there exists” ($\exists$)
using *variables* with predicates and quantifiers
negation of a statement that uses quantifiers
the difference between $\forall x\,\exists y$ and $\exists y\,\forall x$
arguments, valid arguments, and deduction
premises and conclusion of an argument
definition of validity of an argument
formal proof of the validity of an argument
how to show that an argument is invalid
translating arguments from English into logic
Modus Ponens
Modus Tollens
mathematical proof
hypotheses
doing a “$\forall x\big(P(x) \rightarrow Q(x)\big)$” proof
doing an “if and only if” proof, using two cases
proving $p \vee q$ by assuming $\neg p$ and proving q based on that assumption
existence proof
counterexample
proof by contradiction
the integers, $\mathbb{Z}$
rational number (real number that can be expressed as a quotient of integers, $\frac{a}{b}$)
irrational number (real number that is not rational such as π or $\sqrt{2}$)
divisibility (for integers n and m, n is divisible by m if $n = km$ for some integer k)
prime number (only positive integer divisors are itself and 1)
even and odd numbers