Prepare for the exam by carefully studying this list with reference to your notes, homework assignments, and in-class activities. As you study, strive to master the concepts and techniques for use in general; just memorizing specific problems we’ve practiced is unlikely to be reliable or successful on the exam. Many former students have reported good success by using the items listed here to make their own study guides that include solved examples and warnings as well.

**Logic with STATEMENT FORMS:** (i.e., using ONLY p, q, r, etc. and the symbols below)

1. Memorize and understand the symbols $\lor$, $\land$, $\sim$, $\rightarrow$, $\leftrightarrow$.
2. Construct truth tables or just individual truth values for given statement forms; be prepared for multiple variables.
3. Individual values may be asked about in terms of other statement forms, as in p.48, #21.
4. Use the Order of Operations to evaluate truth values for longer expressions.
5. Be careful of the truth values for conditional and for biconditional statement forms.
6. Explain what the term “logically equivalent” means; use truth tables to determine equivalence.
7. Explain what the terms “tautology” and “contradiction” mean; use truth tables to confirm.
8. (*) Convert between verbal statements and STATEMENT FORMS (i.e., using just p, q, r, etc. and the above symbols):
   (a) I may give you values to use for the statement variables, as in p.37 #8 or HW: Basics of Quantifiers.
   (b) You may have to declare your own, as in p.48 #16-17.

**Logic with STATEMENTS:**

1. Be prepared to use and understand statements that are:
   (a) Entirely verbal, as in “All real numbers are integers.”
   (b) Entirely symbolic, as in “$x > 0 \Rightarrow (x \in \mathbb{Z} \lor x^2 = 1)$.”
   (c) A mix of words and symbols, as in “For all $x \in \mathbb{R}$, $x$ is even and $x(x+1) < 0$.”
2. Be able to convert between verbal or symbolic form, introducing your own variable if needed (as in 3.1 homework).
3. Be able to use $\lor$, $\land$, $\sim$, $\rightarrow$, $\forall$, $\exists$, as well as basic symbols such as $=$, $<$, etc.
4. Recognize and understand the phrases “if...then,” “only ...if,” “necessary,” “sufficient” in conditional statements.
5. Given a conditional statement using any of the above phrases, be able to rewrite it using my choice of the others.
6. Given a conditional statement using any of the above phrases, write its negation.
7. Given a conditional statement using any of the above phrases, write its hypothesis and conclusion. (Remember that these should be “stand-alone,” complete sentences in their own right.)
8. Given a conditional statement using any of the above phrases, write its converse, its inverse, or its contrapositive, using my choice of the phrases.
9. Convert verbal statements written as conditionals using the above phrases into universal statements, AND VICE VERSA.
10. Be able to recognize universal or existential statements, including the many verbal synonyms.
11. Classify a given conditional, universal, or existential statement as true or false, and justify, as in class.
12. Negate verbal, symbolic, or mixed statements, including conditional, universal, and existential statements.
13. Answer questions about a given Tarski’s World diagram, and justify, as in HW.