Study this list with reference to your notes, text, and graded and ungraded HW. Strive to master the concepts, explanations, and proof techniques in general; just memorizing specific examples we’ve practiced is seldom successful.

Non-proof tasks:

1. Negate statements combining the logical components “and,” “or,” “not,” conditional/biconditional, or quantifiers.
   (a) Avoid the word “not” when there is a meaningful alternative: for example, “not positive” = “negative or zero.”
   (b) Anything amounting to “it’s not the case that (original stmt)” is worth no points.
   (c) Be especially careful with short, nonsymbolic sentences such as “All integers are rational”: “Not all integers are rational” is really just “it’s not the case that (orig. stmt)” and earns you no points.
2. Recognize and interpret synonyms in conditional statements (such as only if, sufficient, etc.).
3. Rewrite a conditional statement from using one synonym to another.
4. Verbally state the converse, inverse, or contrapositive of a given conditional statement; the above components and synonyms will be involved.

Proof tasks:

1. Prove a given result using direct or contrapositive proof.
   (a) Proofs may be about even/odd, rational, parity, divides, or remainders.
   (b) They may require algebra concepts, like the “points lying inside a circle” proof from HW #3.
   (c) Be prepared for the choice of proof type to be mine as well as to be yours (that’s a bit harder).
2. Be prepared for a proof by cases if your hypothesis begins with or later produces an or.
3. Recognize opportunities for “without loss of generality,” and use it correctly.
4. Prove a biconditional statement, annotating with ⇒ and ⇐.
5. Recall that you can use different styles of proof for the two parts of a biconditional proof.
6. Outline verbally what you assume and what you need to show in order to prove a given unfamiliar verbal statement by my choice of direct, contrapositive, or contradiction proof. This task will not require a whole proof.
7. Full proof by contradiction will NOT appear EXCEPT for results similar to “√2 is irrational.”
8. Your proofs will be graded for correctness both of your reasoning and your logical writing style.
9. Practice many proofs, and in mixed order, so that you are able to quickly choose which type is most reasonable. I do try to give partial credit even if you choose an inefficient type of proof.
10. In proofs about even, odd, divides, and rational, be sure to point out integers where they matter!

The exam questions are usually printed all on one single sheet of paper; in that case, you’ll receive blank paper on which to do all your work. Turn in the question sheet to be stapled atop the rest of your exam.

My exams have been known to run long in upper-level courses with just 50-minute periods. If this happens, DON’T PANIC: your job is to show me what you know; let me deal with interpreting the time factor.

However, part of truly understanding the material at this level is being able to draw upon it in a reasonable amount of time. You can’t afford to take 10 minutes to write three unnecessary cases, or not know what step to try next because you didn’t look to your “NTS” line for guidance.