

Quiz # 1 Review Sheet of goodness!

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Hello, Math 355 students! Stewie Griffin here. Corey asked me to write you this review sheet for the Quiz coming up on April 24. I hope that it's helpful! Below, for each section that the quiz will cover, I have listed out the material that I find interesting from each section in hopes that it will help you better study for the upcoming quiz.

1. Section 1.1: Proofs. This section is simply a refresher and introduction to those of you who are a little rusty on logical implications. We studied direct proofs, and indirect proofs (better known as “proof by contradiction”). Also, the “if and only if” proofs (called “biconditional”) were also studied. These sorts of logical facts lay the framework for how we will prove things in this course. Look closely at the homework questions that Corey assigned, in addition to the examples given in class—those should provide a good idea for what Corey could ask about from this section.
2. Section 1.2: Sets. We studied sets, their unions, intersections, and compliments. We learned about DeMorgan’s laws (which would be a good thing to study), and how to denote an arbitrary union or intersection of such sets. In addition, we discussed the cross product of sets. Again, the homework and examples from class form excellent practice problems to work on.
3. Section 1.3: Functions. In this section we discussed functions, (direct) images, and inverse images. We also discussed how sets are related to functions, for example,

that $f^{-1}(S \cup T) = f^{-1}(S) \cup f^{-1}(T)$. The issue with these sorts of facts is that the function's images don't always "distribute", for example, $f(A \cap B) \subseteq f(A) \cap f(B)$. This isn't always an equality, but it is if f is 1-1. We also discussed extensions and restrictions of functions, and inverse functions. Be prepared to compute some images (some $f(S)$ and $f^{-1}(Y)$ stuff) on the quiz. In addition to the homework and examples from class, you may want to review the proofs of some of the facts listed above (and others like them), as these proofs are straightforward, and are really great quiz and test questions.

4. Section 1.4: Induction. I refer the discussion of induction to your notes and the book. But what you should take away from this section is that induction is a powerful form of proof that always has the same ingredients. How you establish the induction hypothesis, however, is not always through the same steps. The homework provides great practice.
5. Other comments. I would suggest that you study for this quiz, and that you put extra emphasis on the homework questions assigned and the examples done in class. Remember, that when the day of the quiz comes, you'll be sitting there without a book or notes trying to prove something, and so I suggest that you put yourself in a similar situation as you study for the actual event. Other than that, ROCK ON!