Math 1271/3071 Midterm II Info Sheet

The purpose of this handout is to help you study by listing the concepts, definitions, and results you will need to know for the midterm.

Midterm Information. The second midterm will be on Friday Nov. 16, 2012 at 8:30AM. The midterm will take place in our regular classroom and will be 50 minutes long. You will *not* be allowed to bring in any notes, use the text book, or use a calculator. Please bring your **Student Card**.

Material Covered. All the material discussed in class may appear on the midterm. The material that we covered was Chapters 4 to 6. Below, I have given a breakdown of what you will need to know from each section.

> **Section 4.1** Know what a relation is; know how to construct new relations from old, e.g., union, intersection, and composition. Know what is meant by the inverse relation. Know the terms: reflexive, irreflexive, symmetric, antisymmetric, asymmetric, and transitive. Be able to determine if a relation has these properties.
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> **Section 4.2** Know the definition of an equivalence relation, and be able to determine if a relation is an equivalence relation. Know what is meant by an equivalence class, and be able to describe elements in an equivalence class. Know what a partial order is, and what it means for two elements to be comparable and incomparable in a partial order.
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> **Section 4.3** Know the definition of a function. Know terms likes domain, codomain, range, image, and composition. Know what a one-to-one and onto function are; also be able to come up with examples of functions of this type. Also know what an inverse function is.
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> **Section 5.1** Know terms like experiment, sample space, and event. Know when to use the multiplication principle to count. Also, know how to use tree diagrams for counting.
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> **Section 5.2** Know the formula for principle of inclusion-exclusion and how to use it. Be able to use Venn diagrams for counting.
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> **Section 5.3** You will not be tested on this section.
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> **Section 5.4** Know what a permutation is, and know the formula for $(s)_k$. Also, know how to count the number of permutations when repetition is allowed, and how to count permutations when some of the elements are indistinguishable (e.g., like Sample Problem 5.22).
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> **Section 5.5** Know what a combination is, and the formula for $C(n,k) = \binom{n}{k}$. Also know what Pascal's triangle is.
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> **Section 5.6** Know how to use the Binomial Theorem to expand out binomials of the form $(a+b)^n$.
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> **Section 5.7** Know what a derangement is and its formula. Also know the general formula for the principle of inclusion-exculsion. Also know how to use the Pigeonhole Principle.
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> **Section 6.1** Know what we mean by terms like probability distribution, and uniform distribution. Also know the formulas at the bottom of page 169.
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> **Section 6.2** You will not be tested on this section.
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> **Section 6.3** Be able to use the counting techniques learned in Chapter 5 in order to calculate probabilities. You should be able to do problems like those discussed in this section.
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> **Section 6.4** Know the formula for conditional probabilities. Also, know what it is meant when we say two events are independent (see pg 195).
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> **Section 6.5** Know how to use Bayes' Formula. Be able to do problems like those discussed in class.

If you have questions, please feel free to email me. Good luck!