

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

THE NECESSARY CONDITION FOR FINAL EXAM MATHEMATICS 2320

APRIL, 2005

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The necessary condition 1 to pass the Final Exam is to know definitions of the following (and how to use it in problem solving)

1. Logical statement, logical operations ($\vee$, $\wedge$, $\neg$, $\rightarrow$), truth value, universe of discourse, truth table, converse, contrapositive, negation of a statement, quantified statement, tautology, contradiction.

2. Validity of a logical argument

3. Proofs: direct, indirect, by cases, by contradiction. If and only if statements. Counterexamples. Math induction.

4a. Set, subset, power set. Set operations (union, intersection, complement). Universal set. Cartesian product of two sets. Cardinality of a set. Countable set. Uncountable set.

4b. Binary Relation. Reflexive, symmetric, anti-symmetric, transitive relations. Equivalence relation. Equivalence classes. Partial orders.

5. Function. Domain. Range. Target Set. Surjection. Injection. Bijection. Composition of functions. Inverse.

6. Inclusion-Exclusion Principle. The Addition and Multiplication Rules. The Pigeon-Hole principle.

7. Permutations. Combinations. Repeateditions. The binomial expansion.

8. Recurrence relations $a_{n+1} = Aa_n + Ba_{n-1}$, $a_0 = C$, $a_1 = D$.

The necessary condition 2 is to understand all homework and in-class problems and their solutions.