Quizzes

Goals:

There are a number of basic skills that you should demonstrate mastery of in an introduction to proofs course. These skill mastery quizzes are intended to emphasize a few things. One is that learning is a process. You will not be penalized for not mastering a skill the first time, but you are expected to eventually get there. Another is that mastery of the basic skills and knowing definitions is an important part of doing mathematics. For example, you shouldn't expect to be able to complete a complex proof about the notion of divides if you don't know the definition of divides. These quizzes also provide individual assessment so you know whether or not you are keeping up with course material. *Academic honesty:* Preparing for these together is allowed and encouraged, but no collaboration or resources are allowed during quizzes.

Structure:

We will have a quiz each Monday at the end of class assessing these skills. While each skill will be graded as only either ``S" for ``Satisfactory" or ``NY" for ``does Not Yet meet the standard" you will have multiple chances to demonstrate each skill. Once you demonstrate that you have mastered a skill you do not need to do so again. Mastery of a skill we'll be denoted as an S on Blackboard while skills needing to still be mastered will be denoted NY. You will be notified which skills will be on a quiz, but it is your responsibility to know which skills you have yet to master. The quizzes are closed book and notes. Each skill will be on three quizzes. Your grade for this component will be the percentage of the 15 skills listed below that you have mastered.

Skills:

Logic

L1: Given a conditional statement, identify the hypothesis and conclusion, determine its truth value, and apply it.

L2: State precisely the definition of an even and odd integer and outline the proof of a statement using these terms.

L3: Construct truth tables for statements that use the logical operators and, or, not, and implies.

L4: Write sets using set builder notation and interpret sets written in this notation.

L5: Negate a statement with and, or, not, implies, exists, and/or for all.

Proofs

P1: Given a theorem, correctly state what will be assumed in a direct proof, proof by contradiction, and proof by contrapositive.

P2: Identify situations in which it is appropriate to use induction and state the procedure for proving a statement by induction.

P3: Clearly and correctly disprove a statement using a counterexample.

P4: Evaluate if a given proof is valid and adheres to our writing guidelines.

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Sets, Functions, and Equivalence Relations

S1: Use the symbols related to sets (like $\in$, $\notin$, $\subseteq$, $\subset$, $=$, $\nsubseteq$) correctly.

S2: Given two sets and a universal set identify the union, intersection, complement, and set difference and find the power set of a given set.

S3: Correctly use function terminology such as domain, codomain, range, dependent variable, independent variable, image, and preimage.

S4: State the definition of injection, surjection, and bijection.

S5: Prove or disprove that a given relation is reflexive, symmetric, and/or transitive.

S6; State the definition of ``$a$ divides $b$" and ``a is congruent to b modulo n", and correctly apply these definitions in examples.