MATH 267 Fall 2026 - Class Notes

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Summary: We began class with a warm up, identifying statements and their truth values. We looked at Polya's problem solving method to review the locker problem from last class. Then, we looked at defining the logical operators and their matching truth tables. We defined DeMorgan's laws for simplifying expressions, and ended with exercises simplifying logical statements.

Notes:

- Polya's problem solving method: Understand the problem, devise a plan, carry out the plan, and look back at the solution.
- The meaning of Or for our purposes is different than english. P or Q is true when P is true, Q is true, or both P and Q are true.
- Looking at the case where P implies Q, there is an important example to note in the truth table. When P is false and Q is true, then P implies Q is still a true statement. The initial statement did not declare anything about Q, so the only way the statement would break is if P was true but Q was false. See table below.
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p	q	$p \implies q$
T	T	T
T	F	F
F	T	T
F	F	T

- If we are to negate the statement inside parenthesis, then it would be Negate (P implies Q). This would flip all of the values, and give us the following truth table.
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p	q	$\neg(p \implies q)$
T	T	F
T	F	T
F	T	F
F	F	F

- If two statements result in the same results every time, just like in algebra, we can say they are equal.

Definitions:

Definition 1. *Operations:*
$P \wedge Q$ *And*
$P \vee Q$ *Or (true if at least one of the statements is true)*
$P \implies Q$ *Implies (if p, then q)*
$\neg Q$ *Not*
$P \iff Q$ *Equivalency*

Definition 2. *Demorgan's Laws:*
$\neg(\neg P) \iff P$
$\neg(P \vee Q) \iff (\neg P \wedge \neg Q)$
$\neg(P \wedge Q) \iff (\neg P \vee \neg Q)$
$\neg(P \implies Q) \iff P \wedge \neg Q$

Questions raised in class: We did not have any open/unresolved questions during the lecture today. Many had questions on the definition of "or" in this context, which was reviewed at the beginning of the lecture.