

Math 105: Multivariable Calculus

First Lecture (2/5/10)

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Introduction and Objectives

Introduction

- Building block course.
- Study how things change / modeling.
- Learn material **and techniques**.
- General math skills:
 - ◇ Good notation.
 - ◇ Asking right questions (see motivation clip).
 - ◇ Common techniques.
 - ◇ Brute force vs. elegance.
 - ◇ Building intuition / special cases.

Extra Credit Problem (due 2/10/10)

Assume team A wins p percent of their games, and team B wins q percent of their games. Which formula do you think does a good job of predicting the probability that team A beats team B ?

$$\frac{p + pq}{p + q + 2pq},$$

$$\frac{p + pq}{p + q - 2pq}$$

$$\frac{p - pq}{p + q + 2pq},$$

$$\frac{p - pq}{p + q - 2pq}$$

Types of problems

- **Physics:** Forces, Newton's laws, partial differential eqs,
- **Economics:** Optimization,
- **Finance:** Monte-Carlo techniques (dartboard),
- **Geometry / Probability:** Areas / volumes,
- **Approximation Theory:** Everything!
 - ◇ Discovery of Neptune.
 - ◇ Library trip.

Course Mechanics

- **Pace:** faster than 104, learn by doing / daily HW.
- **Food / Cell phones:** Food okay, hearing cell-phones isn't.
- **Preparation:** Read material before class.
- **Supplemental lectures:** 12 weeks vs 15 weeks.
- **Office hours:**
 - ◇ Strongly urge to visit.
 - ◇ Strongly urge to go to TAs.

Grading (Controlling your education)

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HW 15%, Midterms 40% (best 2 of 3 or best 1 of 2), Final 45%.

Scribe option: Replaces 5% of the exams.

Quiz option: Replace 5% of the exams.

Project option: Replace 5% of the exams.

Can do two for 10% or three for 15%.