

Economics 300
Methods and Tools of
Economic Analysis
Professor Peter Cramton
Spring 2014

Outline

- Syllabus
- Why math in economics?

Syllabus

- Math for economists
 - Review and learn math concepts/methods
 - Apply to economic problems
- Pre-requisites
 - Econ 200, Econ 201, Math 220 or Math 140
 - If you took Math 141 and liked it, may want to take Math 241 instead

Sample problem: Solve for x and y

$$x + 2y = 3$$

$$x + y = 2$$

Instructor

- Professor Cramton
 - www.cramton.umd.edu
 - Tydings 4101a, pcramton@gmail.com
 - Office hours by appointment

About Me

- B.S. Engineering, Cornell University
- Ph.D. Business & Economics, Stanford University
- Associate Professor, Yale University, 1984-93
- National Fellow, Hoover Institution, Stanford University, 1992-93
- Professor of Economics, University of Maryland, since 1993
- Chairman, Market Design Inc., since 1995

Teaching assistants

- [Hector Lopez](#)

Tydings 4101D, Office hours Tue 2:30-3:30, Fri 12-1:00
section 2 Fri 9am Tydings 2102
section 3 Fri 10am Tydings 2102
section 5 Fri 11am Tydings 2110

- [Yiqun Chen](#)

Tydings 4128, Office hours Wed 2:30-3:30, Fri 11-12
section 1 Fri 9am Tydings 1114
section 4 Fri 10am Tydings 1132
section 6 Fri 12pm Tydings 1108

Web sites

- cramton.umd.edu (click Courses, Econ 300)
 - Syllabus
 - Course documents
- elms.umd.edu
 - Grades
 - Announcements
- Email
 - Be sure your email at www.registrar.umd.edu is up to date

Software

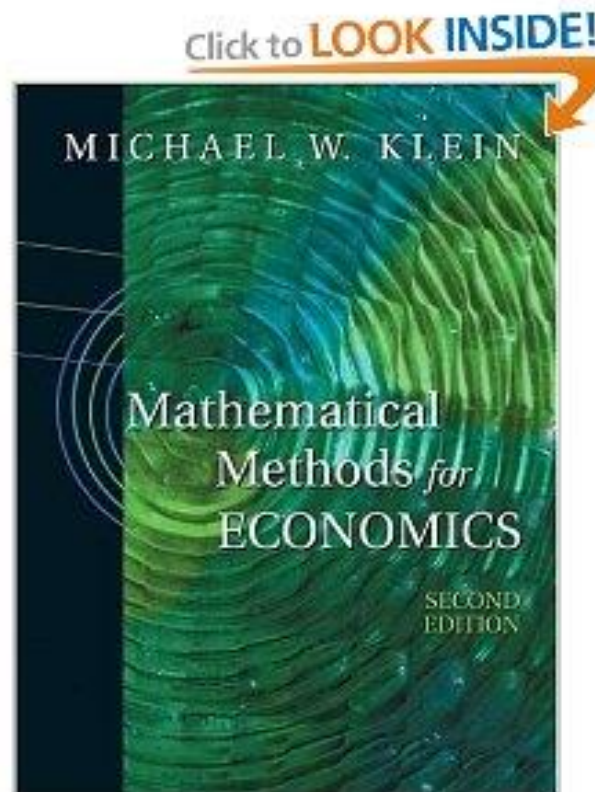
- Make use of www.wolframalpha.com
- Consider [Wolfram Alpha Pro](#), \$2.99/month
- For most advanced use consider Mathematica 9, free download www.oit.umd.edu/slic/howto/homeuse.html
- Demonstrations illustrate topics in course
- You may use Wolfram Alpha and Mathematica for problem sets (but not exams)

Problem sets

- 6 problem sets
- Hard copy handed in at discussion session
- Hand in to Econ 300 mailbox if must miss session, not my mailbox
- *No late problem sets accepted for any reason*
- Grade: 4 excellent, 3 good, 2 fair, 1 poor
 - Lowest score is dropped

Recommended Textbook (Klein)

- Michael W. Klein, *Methods and Tools of Economic Analysis* (Custom Edition for University of Maryland Econ 300), Pearson
- Or: Michael W. Klein, *Mathematical Methods for Economics* Addison-Wesley
- We won't use bundled software.



Grades and assignments

- Problem sets 10%
- First midterm exam 25%
- Second midterm exam 25%
- Final exam 40%
- Total 100%

Exams

- Multiple choice
- Can bring
 - 8.5 x 11, *Cheat sheet* (two-sided)
Formulas, definitions, theorems, steps, etc.
 - Calculator with \log , e^x , x^y , $+$, $-$, \times , $/$
- Cannot bring
 - Computer, iPhone, ...
 - Books

Topics

- Functions
- Exponential functions
- Logarithmic functions
- Systems of equations
- Differential calculus
- Univariate calculus
- Elasticities
- Multivariate calculus
- Extreme values
- Constrained optimization
- Statistics and probability
- Decision making under uncertainty
- Risk theory
- Game theory
- Market games

Why math in economics?

- Because it is useful
- Economics - study of choice and decision-making in a world with limited resources
- Mathematics - logic of quantity and shape and arrangement

Both built on a few assumptions

- People have preferences and seek to maximize happiness
 - Consumers maximize utility
 - Firms maximize profits
- Use math to model economic setting
 - Improve our understanding of economic world
 - Make a better world

Learn how to *do math in economics*

- Conrad Wolfram at TEDGlobal 2010,
“Stop Teaching Calculating,
Start Teaching Math”

www.computerbasedmath.org