Math (P)refresher 2009

Instructor: Patrick Lam
TF: Viridiana Rios

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Introduction

us

us

- **instructor**: Patrick Lam (plam@fas.harvard.edu)

us

- **instructor**: Patrick Lam (plam@fas.harvard.edu)
- **tf**: Viridiana Rios (vrios@fas.harvard.edu)

you

you

- name
- subfield (research interests)
- where you're from
- what do you like to do in your spare time?

schedule

- lecture in the morning, computing and problem set sessions in the afternoon (generally)

schedule

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- everyday except sunday

schedule

- ▶ lecture in the morning, computing and problem set sessions in the afternoon (generally)
- ▶ everyday except sunday
- ▶ GSAS orientation wednesday

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- ► lunch with random gov grad students on saturday

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- ▶ everyday except sunday
- ▶ GSAS orientation wednesday
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- ▶ except for today, the lunches will be limited to gov grad students

textbook

textbook

- Essential Mathematics for Political and Social Research by Jeff Gill (second printing onward)

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- $35 (cash or check out to Harvard University)

computing

computing

- fas account

computing

- fas account
- novell account

why math?

why math?

Almost any political science question can be answered with

why math?

Almost any political science question can be answered with

- statistical data analysis

why math?

Almost any political science question can be answered with

- ▶ statistical data analysis
- ▶ formal theory

statistical analysis

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theory: x causes y

statistical analysis

theory: x causes y

evidence: lots of data

statistical analysis

theory: x causes y

evidence: lots of data

q: how do you process lots of data?

statistical analysis

theory: x causes y

evidence: lots of data

q: how do you process lots of data?

a: use math and statistical analysis

formal theory

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observation: x and y occur together

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q: how to explain this observation in a logical and internally consistent manner?

formal theory

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q: how to explain this observation in a logical and internally consistent manner?

a: build a formal mathematical model

tips

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- information overload

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- focus on concepts

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- math is cumulative

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- you are the smartest person in the room

tips

- information overload
- focus on concepts
- math is cumulative
- you are the smartest person in the room
- attitude is half the battle

Computing

three things

three things

- VNC server (unix OS)
- R
- LaTeX

vnc server

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- virtual network computing

vnc server

- virtual network computing
- unix

vnc server

- virtual network computing
- unix
- link to FAS

vnc server

- virtual network computing
- unix
- link to FAS
- benefits

R

R

- statistical analysis

R

- statistical analysis
- open-source

R

- statistical analysis
- open-source
- based on S programming language

R

- statistical analysis
- open-source
- based on S programming language
- (potentially) limitless capabilities

LaTeX

- document preparation

LATEX

- document preparation
- TeX and donald knuth

LaTeX

- document preparation
- TeX and donald knuth
- no need to worry about formatting

LaTeX

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- no need to worry about formatting
- typing math is easy

LaTeX

- document preparation
- TeX and donald knuth
- no need to worry about formatting
- typing math is easy
- never use MS Office again

installing LaTeX

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1. TeX distribution

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   - MiKTeX for Windows: `http://miktex.org/`
   - MacTeX for Mac: `http://www.tug.org/mactex/`

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2. LaTeX editor

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2. LaTeX editor
   - Texmaker: `http://www.xm1math.net/texmaker/`
   - WinEDT, Xemacs, LyX, etc.

R

R

CRAN: http://cran.r-project.org/

vnc server

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- ▶ Windows: HMDC script
  (`http://www.hmdc.harvard.edu/HMDC_VNC.EXE`)

vnc server

- ► Windows: HMDC script
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- ► Mac: Chicken of the VNC
  (`http://sourceforge.net/projects/cotvnc/`)

getting onto the VNC server, after lunch

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(or see slides on prefresher website under VNC)