

# Being a TA in the Math Department

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UC San Diego

# Your Guides

Course Website: <https://elybrand.github.io//MATH500/>



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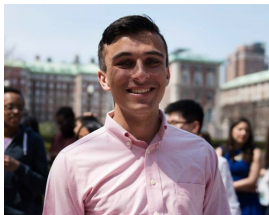


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# Your Guides



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# Overview

Responsibilities as a TA

Discussion Section

Office Hours

Managing a Grader

Faculty & Student Interactions

## Core Responsibilities

- ▶ Hold weekly discussion sections.
- ▶ Hold weekly office hours.
- ▶ Grade exams (stay tuned)
- ▶ Grade homework (if applicable)
- ▶ Oversee course grader (if applicable)

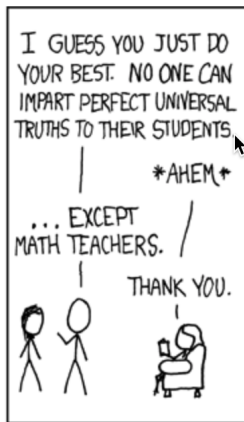
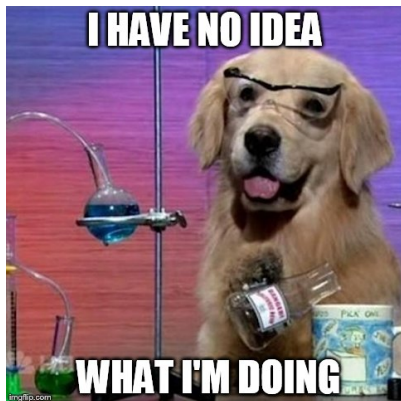


Figure: xkcd.com

# NOT Your Responsibilities

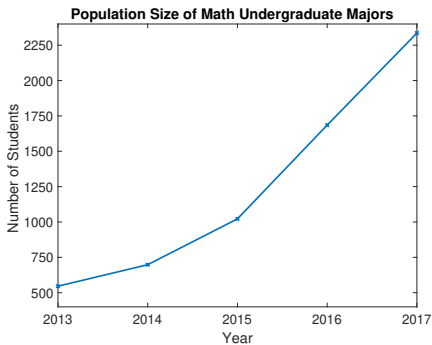
- ▶ Substitute for the instructor in lecture
- ▶ Write exam questions
- ▶ Work in excess of employment level
- ▶ Assign final course grades



## Discussion Section

# Why Do We Have Discussion Sections?

- ▶ Most lectures too large for interaction.
- ▶ Opportunity for weekly review.
- ▶ Opportunity for learning by doing.
- ▶ See where students are struggling.
- ▶ Go over past homework set.





## Discussion Section Template

1. (2-3 min) Go over course announcements, homework due dates, upcoming tests/quizzes.
2. (40 min) Working on problems.
  - ▶ If students are lost, go through a quick example. Have students work on similar problem individually or in groups.
  - ▶ Ask students what they'd like to see. If they are unsure, have examples prepared. Keep in mind breadth and depth of topics.
  - ▶ Always spend at least 1-2 min recapping at end of problem: what were key steps/observations? What happens if we replace any of the hypotheses?
3. (5 min) Summarize what you did today. Minimize the amount of loose-ends or partial answers without hints. Students need closure.

## Discussion Section Key Ideas

1. Not all sections will look like this template.
  - ▶ Do what fits best with your section. You may need to adapt as you go along.
  - ▶ Inquiry based learning examples: [calculus](#) and [intro to proofs](#).
2. Should not just be a lecture.
3. Students should feel encouraged to discuss topics and ask questions without judgement.
4. The TA should be looking out for common misunderstandings. Relay these to the instructor.

## A Few Suggestions

- ▶ Do not dismiss section early

**where can we find basic rules for  $\Sigma$**

*1/27/18 3:53 PM*

there are lots of things instructor believed that we have already knew but we did not actually.

## A Few Suggestions

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- ▶ Prepare homework hints or extra related problems
- ▶ Ask leading questions to encourage participation
- ▶ Embrace awkward silences. Wait 10-15 seconds before moving on.

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*1/27/18 3:53 PM*

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## Boardwork: the Good, the Bad, and the Ugly



# Boardwork

- ▶ Clearly label which problem you are working on. Write a summarized problem statement.
- ▶ Writing should be large and legible.
- ▶ Distinct problems should be clearly separated, e.g. by drawing a vertical line down the board between them.
- ▶ Do not stand in front of what you just wrote. Step aside after writing each step. Pause to give students time to absorb what was said.
- ▶ Erase the oldest material first, not what you just wrote.



# The Bad Board

CANONICAL FAMILY

$\Sigma \subseteq S^3$  surface

$\Phi: B^4 \times [-\pi, \pi] \rightarrow S^3$

$\Phi(\nu, t) = (\phi_\nu(\Sigma))_t$

$B^4 \cong$  Conformal dilations

$\phi_\nu: S^3 \rightarrow S^3$

Given  $S^1 \subseteq S^3$ ,  $S_t$  is equidistant surface at distance  $t$

Blowup  $\Rightarrow \tilde{\Phi}: S^3 \rightarrow S^3$

$\deg \tilde{\Phi} = \text{genus } \Sigma$

# The Good Board

③ OPEN

① LIST COLORING CONS (VIZING AM...)

LINE GRAPH  $G$

$\chi_p(G) = \chi(G)$  KAHN


② ALGORITHMS? IN PARTICULAR

$\chi_p(G) \in (p-1) \cdot \chi(G)$


GIVEN CUBIC, PLANAR BRIDGELESS  $G=(V,E)$  WITH A LIST  $L_v$  OF 3 COLORS

$\forall e \in E$ , CAN WE FIND AN EDGE COLORING  $\beta: E \rightarrow \cup_{v \in e} L_v$

$\beta(e) \in L_v \forall v \in e$ , PRIMER, EFFICIENTLY?



Ex




LINE GRAPH  $G$  OF CUBIC, PLANAR BRIDGELESS GRAPH  $H$   $\chi(G) = 3$

LINE GRAPH OF  $H$  HAS  $VIS = \text{EDGES of } H$ , TWO ADJACENT  $\Leftrightarrow$  INCIDENT IN  $H$

MINX RE:  $\chi_p(G) = 3$  ?

(A+MRSI)



## Office Hours

## Office Hours: Fine Print

- ▶ Minimum of 2 hours.
- ▶ If 25%, no more than 2 hours.
- ▶ If 50%, up to 4 hours.
- ▶ Contact instructor to see how many office hours you are expected to hold.
- ▶ MATH 18, 20D must have half of office hours in MATLAB lab.

## Office Hours: A Few Suggestions

- ▶ Be courteous to your office mates.
- ▶ Reserve a room if too many students.
  - ▶ Email [frdesk@math.ucsd.edu](mailto:frdesk@math.ucsd.edu)
  - ▶ Run up to the 7th floor
  - ▶ Space is tight. Please be considerate with your room reservations.
- ▶ Be mindful of your students' schedules.
- ▶ Not a time to lecture. Delegate and multitask.

## Managing a Grader



# Homework Grading

- ▶ Either you or a grader will grade homework.
- ▶ You collect and return homework.
  - ▶ Reserve [one](#) homework box in basement ASAP. Try sharing for class.
- ▶ You provide rubric
- ▶ Proofread comments & scores
- ▶ Gradescope & TritonEd

From: [MATH 152 on Piazza](#) >

To: [REDACTED]

Hide

MO

**HOMWORK 2 !!**

Today at 10:41 AM

-- Reply directly to this email above this line to create a new follow up. Or [Click here](#) to view.--

A new private Question was posted by

[REDACTED]

**HOMWORK 2 !!**

WE WISH TO WORK ON HW2 TODAY.

WHEN CAN IT BE POSTED?

## This week: contact instructor

- ▶ Contact the instructor this week. Find out their expectations for sections.
- ▶ Understand what you are expected to do and when. Do it on time.
- ▶ Tasks assigned by instructor are not optional! However, they should not exceed 20hr per week for 50% (10hr for 25%).
- ▶ Respect instructor's time. Show up promptly for meetings, answer emails.

## Interaction with Students

- ▶ Be respectful, encouraging, and helpful. Math is hard for many. No put-downs for basic questions or errors. No stereotypes by gender, ethnicity, nationality, sexual orientation, etc.
- ▶ Keep all appointments: section, office hours, exams. Be prompt.
- ▶ Be fair and impartial. Respect confidentiality of student data.
- ▶ Be prepared and competent, but not a know-it-all, showoff, or intimidating.

## Interaction with Students

- ▶ Explain math at an appropriate level. Calculus is not analysis. Algebra and terminology may be challenging for students.
- ▶ Encourage student participation: questions, reasoning, discussion. No stigma for errors. You need to hear them to know what's confusing them.
- ▶ Help students notice patterns. This is not automatic.