

DATA ANALYSIS

Week 1: Getting Started

welcome!



Abhilasha Kumar
(she/her)

- instructor



Whitt Dodge
(he/him)

- learning assistant



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(she/her)

- learning assistant



agenda for today

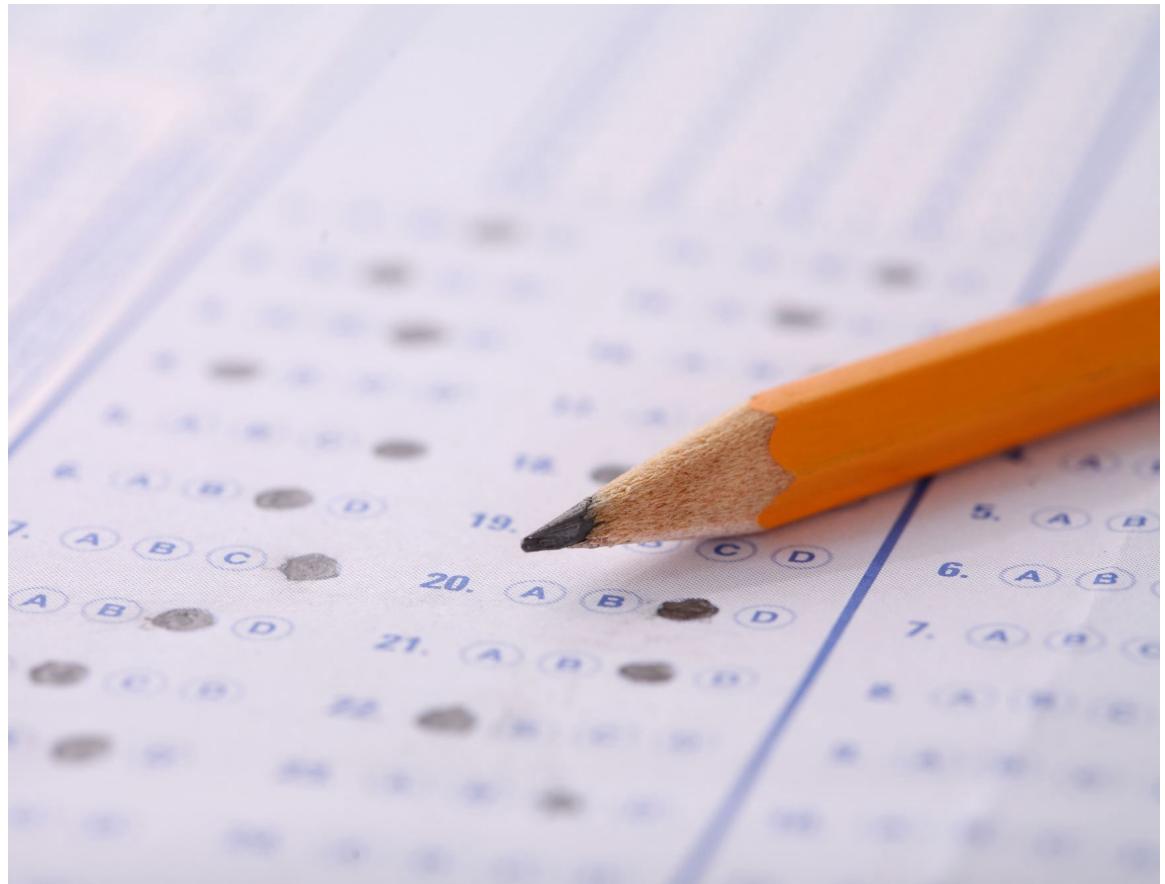


- meet & greet
- course & canvas walkthrough
- general intuitions about statistics

a problem and an ice breaker

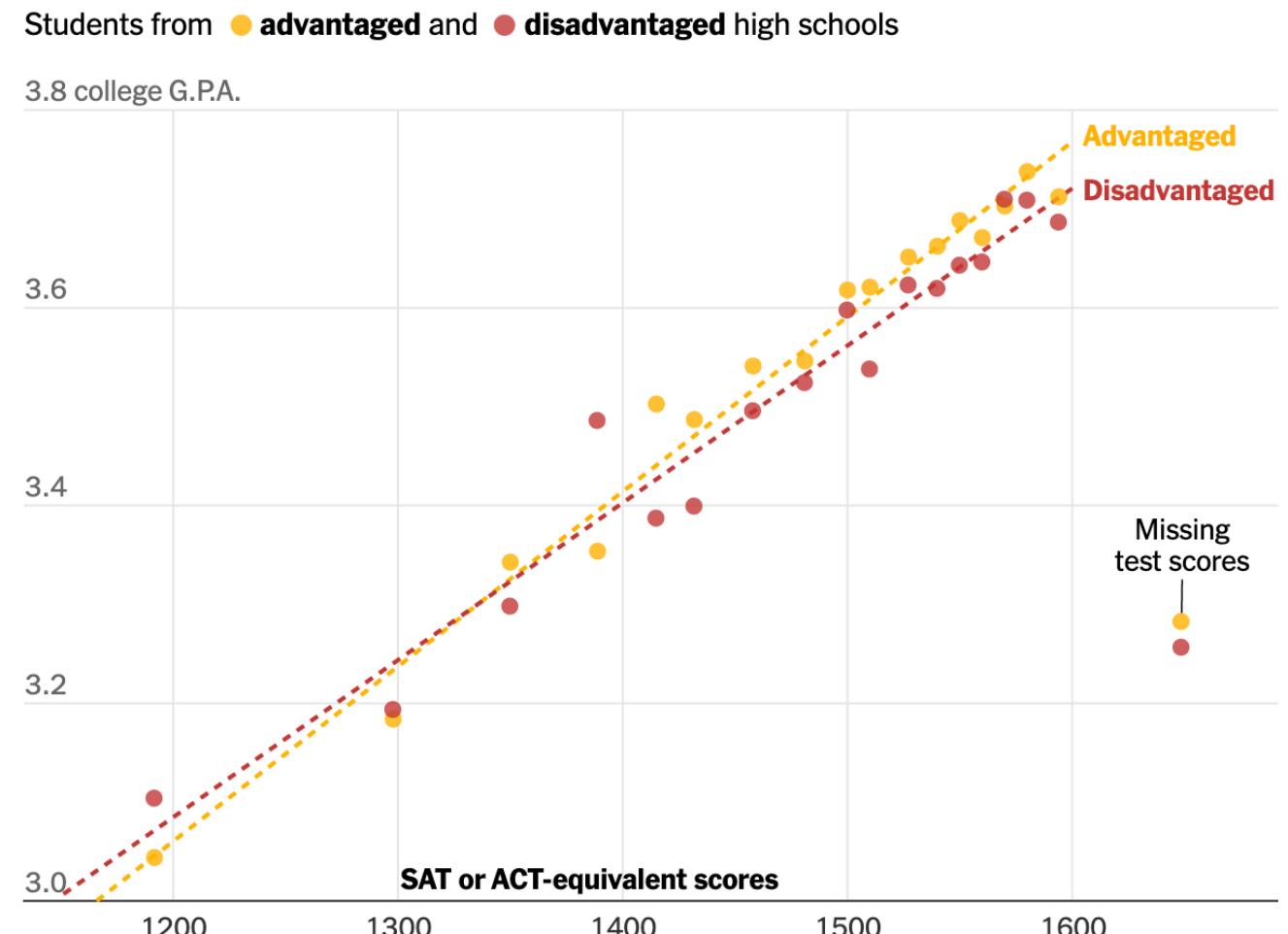


- in groups of 3-4, discuss:
 - your names, pronouns, class years, and something boring about yourself
 - should test scores (e.g., SAT/ACT) be used for college admissions?
 - what are some pros and cons of test scores?
 - how would you tackle this problem if you were a policymaker at Bowdoin?
- report back your conversations



a problem

- get back into the same groups to discuss:
 - what is the information being presented in this graph?
 - what is main message the graph is trying to communicate?
 - what are some questions a policymaker may have about this graph?



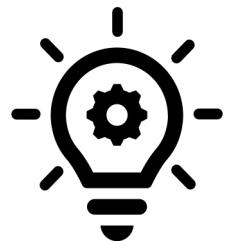
Notes: Data is for students who entered college from 2017 to 2022, excluding 2020. • Source: Opportunity Insights and Friedman, Sacerdote and Tine (2024) • By Ashley Wu

what is this course about?

- an introduction to the statistical procedures commonly used [by psychologists] to describe, analyze, and interpret data
- learning goals
 - **understand** data, uncertainty, and the logic behind statistical thinking
 - **evaluate** scientific and non-scientific work by applying a statistical toolkit to specific claims and questions
 - **communicate** through numbers, graphs, and scientific writing
 - [empowering you with **transferable and highly valued skills**]



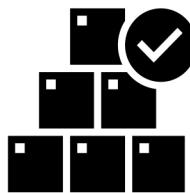
course outline



understand

lectures

activities



evaluate

quizzes

discussions



communicate

problem sets

reflections

your words!

data

significance

scared

impactful

computation

analysis

numbers

math

probability

p-value

graphs

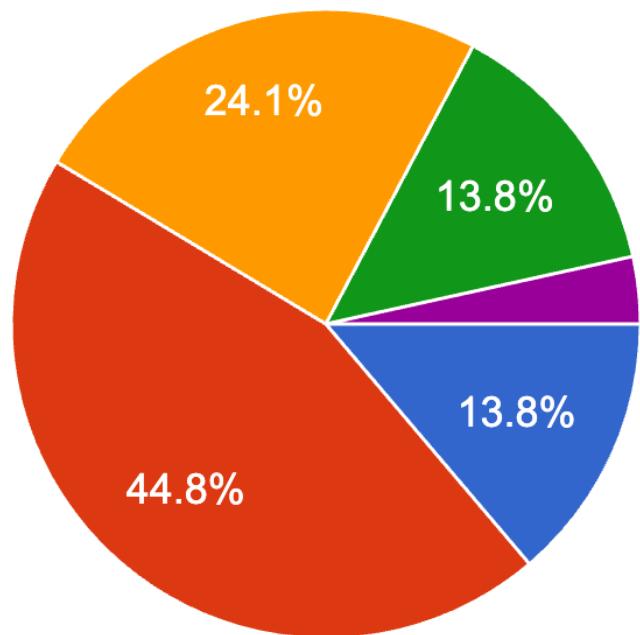
tables

z-scores

excel

How would you describe your knowledge of statistics?

29 responses



- I have no formal knowledge of statistics
- I know the conceptual basics of descriptive statistics (e.g., calculating means, histograms, etc.)
- I know the conceptual basics of inferential statistics (e.g., t-tests, ANO...
- I have learned about how to perform basic statistical analyses (descriptive...
- I am somewhere between no knowledge and conceptual basics of inferential st...

so many feelings...

A circular diagram illustrating various feelings. At the center are the words "excited" and "nervous". Surrounding them are several other words arranged in a circle:

- Top: "indifferent" (purple), "hard" (dark blue)
- Top-right: "stress" (dark blue)
- Right: "confused" (light blue)
- Bottom-right: "overwhelmed" (pink)
- Bottom: "intimidated" (pink)
- Bottom-left: "scared" (pink)
- Left: "learn" (light blue)
- Top-left: "hoping" (purple)
- Top-center: "challenging" (purple), "eager" (dark blue), "enjoyed" (pink), "loving" (pink)
- Bottom-center: "interesting" (dark blue), "fun" (dark blue)

where does the course live?

- course website:
 - <https://teaching-me.github.io/data-analysis/>
 - course schedule and policies
 - syllabus, slides, and schedule
- canvas
 - announcements
 - ALL submissions & discussions
 - grades + Q&A
- textbook
 - Gravetter, F. J., & Wallnau, L. B. (2017). *Statistics for the Behavioral Sciences* (10th ed.). Belmont, CA: Thomson Wadsworth.

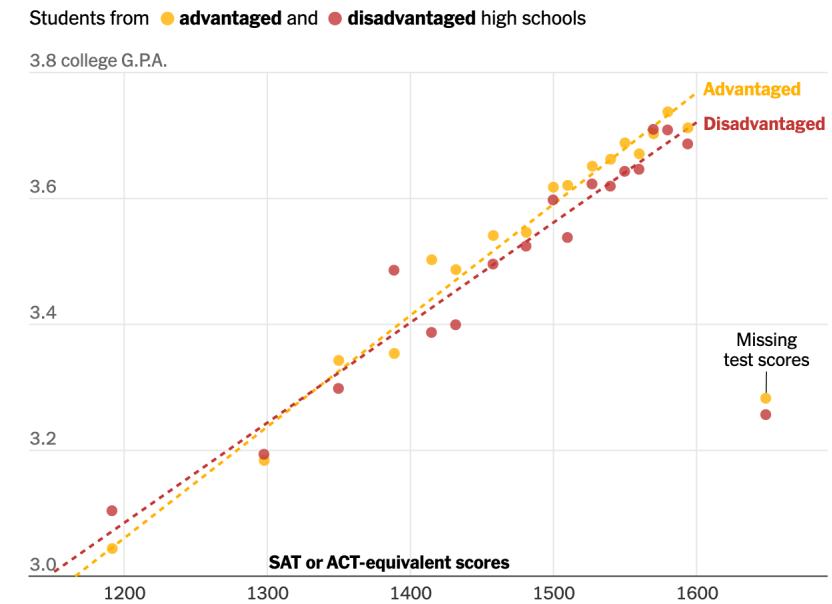


assessment formats

- quizzes
 - open book, NOT open person
 - on Canvas, 2 attempts: average score is recorded
- problem sets
 - can choose to opt-in or opt-out at three points
 - submissions are on Canvas, a combination of Google Docs + Sheets
- exams
 - midterms: not cumulative, final: cumulative
 - quiz-like in-class component + problem set-like take-home

discussion board: data around us!

- will remain active **all semester**
- contributes to class participation + extra credit
- sample post:
 - [screenshot]: should be visible in the thread!
 - type of data: continuous (interval/ratio scale) SAT and GPA
 - this is a line plot that suggests that there is a linear relationship between SAT/ACT scores and GPA, and this relationship is similar for students who come from advantaged or disadvantaged schools
 - they likely fit a linear regression model predicting GPA using SAT/ACT scores, with different models for the type of high school
 - I think this is informative/interesting but I have questions: XYZ



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course syllabus: questions

- find a group of 5!
- review the syllabus (5 minutes):
- come back with any questions!

Screenshot of a course syllabus page titled "Syllabus: Data Analysis".

The page includes a navigation bar with links to Home, Syllabus, Schedule, Grading, Video Tutorials, Additional Resources, and a search icon.

The main content area features a green circular icon labeled "data analysis".

Syllabus: Data Analysis

Basic Course Information

Course number: PSYC 2520
Semester: Spring 2024
When: Wednesdays & Fridays, 10.05-11.30 AM
Where: Mills 127
Website: You are here!
Pre-requisites: Two of:

- PSYC 1101 or Placement in above PSYC 1101
- Either BIOL 1102 or BIOL 1109 or Placement in BIOL 2000 level or PSYC 2510

Who is your instructor?

Abhilasha Kumar: [Hear my name!](#)



Pronouns: she/her

About me: I am a cognitive scientist who is fascinated by how humans think, learn, and communicate. My work involves conducting psychological experiments to understand different

On this page

- [Basic Course Information](#)
- [Who is your instructor?](#)
- [Who are your learning assistants?](#)
- [Student/Office Hours](#)
- [What is this course about?](#)
- [Why take this course? a.k.a. learning goals](#)
- [Course textbook](#)
- [Weekly module structure](#)
- [Course Schedule](#)
- [Grading](#)
- [Course Policies](#)

[Edit this page](#)
[Report an issue](#)

general class format

- you are expected to do some **reading before** class
 - textbook is an aid BUT not the bible
 - video tutorials are useful to watch before and after Friday's class
- **slides** will be uploaded right before class
 - hands-on format in most classes
 - minimize looking over in advance so you can be present!
- **class time** will be devoted to
 - conceptual content
 - learning by doing
- **each week**, these things are due (prep-try-apply)
 - textbook chapters/videos (prep)
 - weekly quiz (try)
 - problem sets (try / apply / usually every week)



canvas walkthrough

- canvas will be mainly used for:
 - announcements
 - make sure you have notifications turned on!
 - go into account settings on canvas to check this
 - all submissions
 - weekly quizzes
 - problem sets
 - canvas discussion board (data around us)
 - meme submission
 - keeping track of flex days

The screenshot shows the Canvas Learning Management System interface. On the left is a dark vertical sidebar menu with white icons and text, listing options like Account, Dashboard, Courses, Calendar, Inbox, History, Commons, Help, Home, Modules, Syllabus, Grades, Library Resources, BCILT Resources, Ally Course Accessibility Report, NameCoach, BCQs, Announcements, Attendance, Assignments, Discussions, Files, Pages, People, Collaborations, Quizzes, Outcomes, Rubrics, BigBlueButton, and Settings. At the top center, it says "PSYC2520 Spring 2024". To the right of the sidebar, the main content area has a header "Recent Announcements". Below it is a post from a user named "Hi students.Hope you've had a great start to the year and are ready for the semester (or getting there...)" with a timestamp "Jan 17, 2024, 9:09 AM". There are "Reply" and "Edit" buttons. To the right of the post is a "Course Status" section with "Unpublish" and "Published" buttons, and a "To Do" section with items like "Grade Pre-class survey" and "Grade Data Around Us!". At the bottom, there's a "Coming Up" section with "View Calendar" and entries for "Pre-class survey PSYC2520 1 point • Jan 23 at 11:59pm" and "Week 1 Quiz PSYC2520 10 points • Jan 28 at 11:59pm". A large decorative graphic with the words "data analysis" is visible on the right side.

how to study for this class

- utilize **evidence-based effective** study strategies:
 - **retrieval practice**: quiz yourself, ask-a-friend, flash cards
 - **elaborative encoding**: ask “why” questions, try problem sets, work with data!
 - **spaced practice**: space out your studying, do not cram!
- but...your **attitudes** toward effort also matter
 - a “growth mindset”
 - read the assigned chapters/readings **before** class
 - come prepared to class for engagement
 - minimize distractions
 - plan early for assignments and assessments

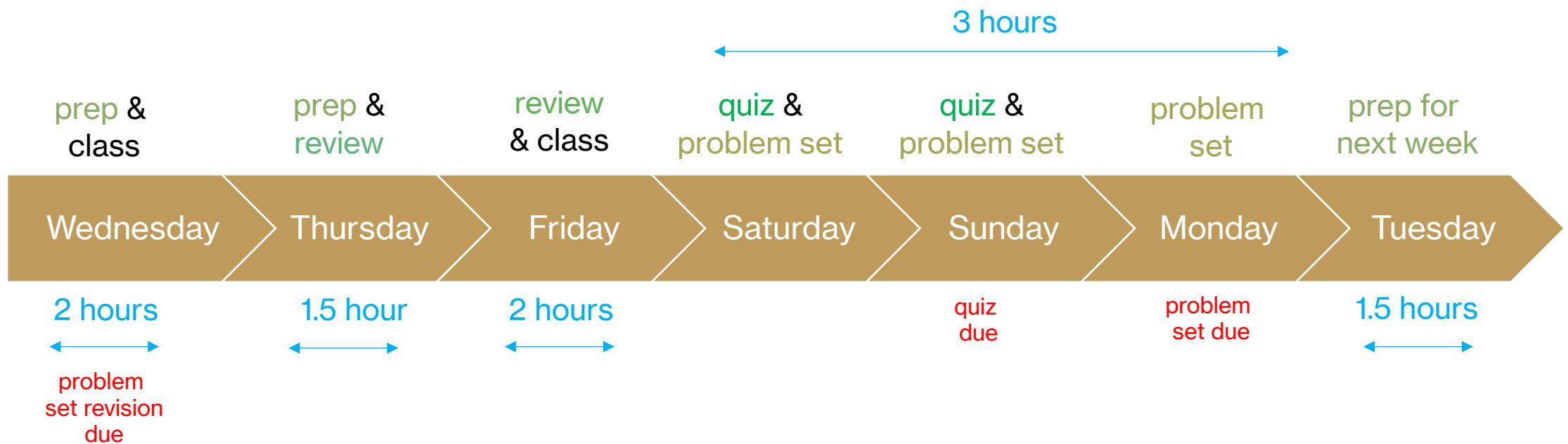


the course is designed to support you

- retrieval practice
 - class participation via activities/reflections
 - weekly quizzes on each learning module
- elaborative encoding
 - exercises that force you to learn by doing
 - discussion boards that connect class content to real life
- spaced practice
 - later concepts build on early concepts
 - problem sets involve integrating old and new content
 - exams are cumulative

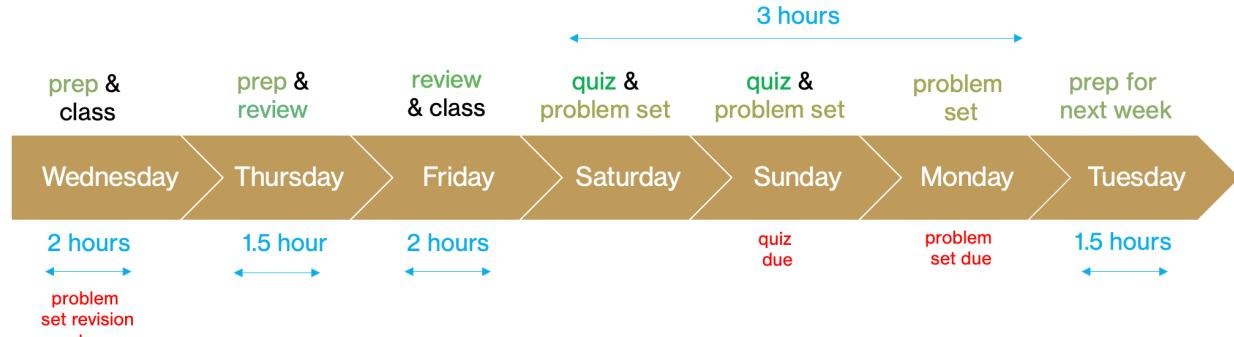


a weekly breakdown



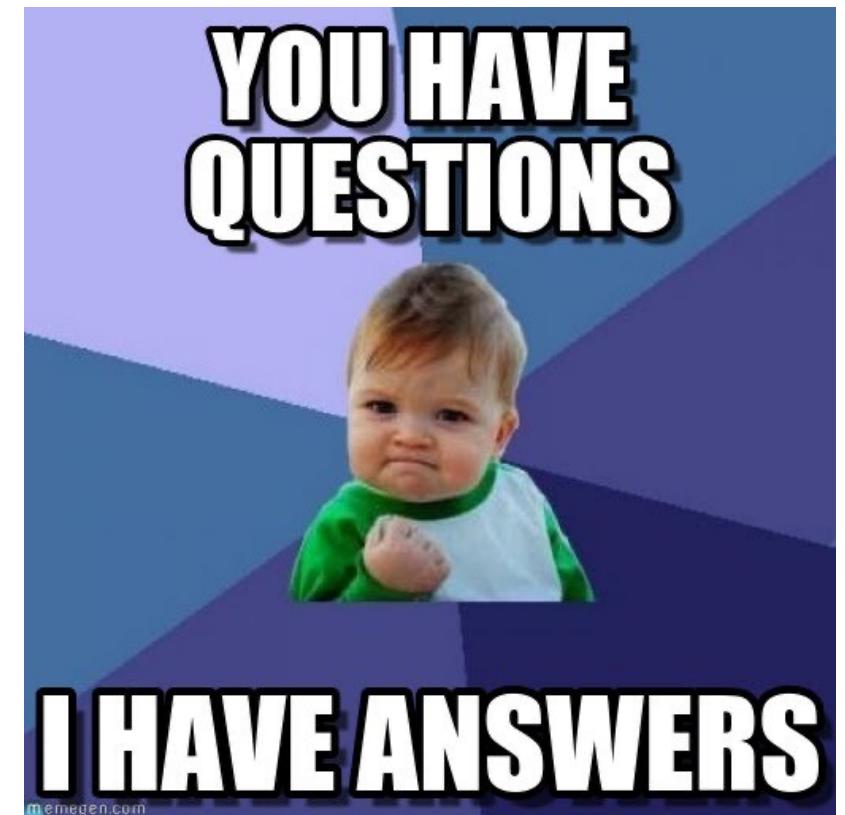
if I was a student, I would...

- USE A CALENDAR!!
- keep track of deadlines a week ahead of time
- use retrieval practice / elaborative encoding strategies
- make high-quality notes in class
- revisit notes and do some retrieval practice / reflection on Thursday/Friday
- complete quiz on Sunday
- allocate Saturday/Sunday/Monday to problem set
- think about a possible meme and/or discussion post on Saturday/Sunday



when you have thoughts and questions

- office **hours**: these are YOUR hours!
 - Prof. Kumar (Kanbar 217)
 - in-person: Wednesdays, 2 pm - 4 pm
 - via Zoom: Thursdays, 2 pm - 4 pm
 - Whitt: Mondays, 7 pm - 8.30 pm (Kanbar 101)
 - Yanevith: Sundays, 3.30 pm - 5 pm (Kanbar 101)
- meetings by **appointment**
- anonymous **feedback** surveys each month



reasons to come to office hours (and whose)

- Prof. Kumar
 - Qs about material / concepts / assignments
 - Qs about course policies/assessments/grades
 - reflections on the classroom experience
- learning assistants
 - Qs about problem sets
 - informal feedback about course pace
 - Qs about Canvas deadlines/due dates
 - tech troubleshooting



— valuing our voices



- I will try my very best to create an **inclusive environment** for all of you
 - we are all **different** and that is a **strength**
 - we also exist **beyond the classroom!**
- but...nobody is perfect!
 - my style may not match your style
 - I am always listening and learning so PLEASE reach out!

sheets 101: demonstration



- any [dataset](#) typically has rows and columns
 - each row (typically) denotes a single observation / data point
 - each column (typically) denotes the measure being observed
- doing math in Sheets is super easy
 - double click on an empty cell:
 - o add two numbers: =2+3
 - o subtract two numbers: =2-3
 - o multiply two numbers: =2*3
 - o divide two numbers: 2/3
 - adding values from existing columns
 - o =A2+B2 OR SUM(A2,B2)

quick note on math notation

- Σ : sigma / summation
- ΣX = adding all values in column X
- ΣX^2 = squaring all values in column X and then adding them
- $(\Sigma X)^2$ = adding all values in column X and then squaring the sum

water winter psychologist move
cabin using helping hiking
watch gym biking dedicate plant
outdoor taking probably salvador working adventurous
summer exciting country
volunteer garden preschool play friends
outside trail keep focus
sports bakery lot ski thought family
around soccer time happy novels scuba
live super seems justice
everything bake certifications gathering back
education resources communities go photography
dungeons fbi others
underfunded maybe world obtain environmental
fight love something become
island nature

swimming
people
interesting
whithin
always
dragons
movies woods
child activism
magic special
el island
nature

read
climb agent
spend
work hike appalachian
time
certifications
communities
resources
fbi
pictures

move
working cook times
equity
coach paint
hike dragons
movies woods
travel
something become
somewhere

next time

- **before class**
 - *prep*: Chapter 1 + Appendix A from textbook + Google Sheets video
 - *prep*: Google Sheets video (see website)
- **during class**
 - statistical thinking / what are data??