Ignite AMATYC

Goldfishing For Statistics

Frank Monterisi
Trident Technical College
Charleston, SC

2018

O'REILLY

The snack that smiles back

- Were you aware that some goldfish crackers have smiles on them and some don’t?

Let’s Count!

- On your tables, determine 3 things:
  - How many crackers have smiles?
  - How many crackers don’t have smiles?
  - How many total crackers do you have?

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Calculate % of Smiles

- Determine the % of crackers that have a smile
  - ROUND TO THE NEAREST %

Let’s find out the results

Text **FRANKM** to **37607** once to join, then **A, B, C, D, E...**

What % of crackers HAD a smile	
X < 10%	**A**
10% < = X < = 15%	**B**
16% < = X < = 20%	**C**
21% < = X < = 25%	**D**
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36% < = X < = 40%	**G**
41% < = X < = 45%	**H**
46% < = X < = 50%	**I**
51% < = X < = 55%	**J**
56% < = X < = 60%	**K**
X > 60%	**L**

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Probability

- According to Pepperidge Farm, approximately 40% of all goldfish have a smile.

- This activity can be extended to use the colored goldfish to make contingency tables to assist with “conditional” probabilities

Acknowledgements

- Credit to my colleague Lisa Sterrett for introducing me to this activity.

- https://youtu.be/oO7ALeMo1wo
  - How Goldfish Crackers are Made Video

Mathematical Uno

Marlow Lemons, Ph.D.
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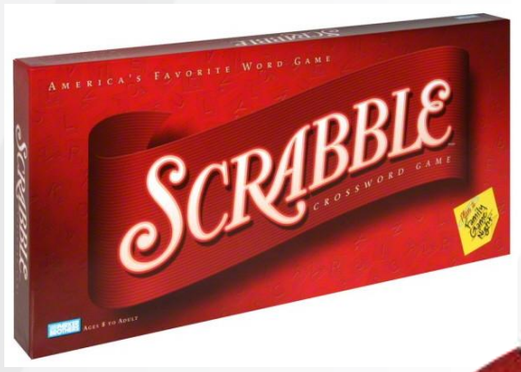
2018

Motivations

- I wanted an activity that:
  - Created a different type of study session
  - Uses as many students in the class
  - Builds teamwork
  - Acted as a “pep rally” event
  - Allowed some students to be leaders or heroes
  - Allowed students to get “revenge”

Several Game Activities

- I created several variants of study session activities.



- This presentation looks at using Uno.

Items Needed to Play

- 5 dry erase markers
- 5 miniature dry erase boards
- 5 dry erase board erasers*
- 1 pack of Uno cards
- 1 stopwatch*
- 50-60 minutes of classroom time

*Optional items

How to Play

Part 1: Q&A

- Students answer mathematics questions to determine the number of cards used in Uno round.

Part 2: Uno

- A student represents the class and plays Uno against the professor to win the round.

A round consists of two parts.
Mathematical Uno plays a total of 7 rounds.

How to Play- Part 1

- Pick 5 students to answer a math question.
- Each student gets a marker and board.
- Read question to student. Allow 1 to 3 minutes for students to answer the question.
- Each student writes his or her answer on the board and turn the board upside-down when completed.

How to Play- Part 1 (cont.)

Question #1

Simplify each complex fraction.

$$\frac{\frac{3x}{4}}{1-\frac{7}{16}}$$

Time: 3 minutes

How to Play- Part 1 (cont.)

Question #2

Unscramble the letters in the anagram to describe one way to take the derivative of a function

COLD RUPTURE

Time: 2 minutes

How to Play- Part 1 (cont.)

- When the solution is revealed, students turn over their boards to reveal their responses.
- Each correct answer adds 2 additional cards to the instructor's stack.
- Each incorrect answer adds 2 additional penalty cards to the students' stack.

How to Play- Part 2

- Students select one of their own to play against the instructor in a game of Uno.
- Deal 7 cards to the instructor and student. Then, deal the corresponding number of additional penalty cards to each hand.
- Fun part: let the student see his/her hand only. Then, give the student the option to play his/her hand or switch hands.

How to Play- Part 2 (cont.)

- Inform student of **standard** Uno rules:
  - The first card (base) must be a non-power card.
  - Non-power or Wild cards are played one per turn.
  - Draw a card from the deck if unable to play a card.
  - Skip, Reverse, and Draw-2/4 cards allow a player to go again.
  - Must say “UNO” on the last card in the hand. If the other player says “Uno” before he or she does so, a “Draw-2” penalty is given to the player.

How to Play- Part 2 (cont.)

- The instructor and student must keep their hands above the table and visible to each other.
- Either player may ask how many cards are left in the other player's hand.
- The first player (student or instructor) to get rid of their cards wins the round.

Award Points for Winning (or not)

Rounds	Stingy	Minimal	Fair	Nice	Generous
1	Cheer	1	1	1	1
2	Cheer	1	2	1	2
3	Cheer	1	1	2	2
4	Cheer	1	2	2	3
5	Candy	1	1	3	3
6	Candy	1	2	3	4
7	Candy	1	1	3	5
Total Pts.	**0**	**7**	**10**	**15**	**20**

Some “Make Sure-s”

- During Part 1 of rounds:
  - Students cover their boards while working on the problem: penalize for cheating.
  - Students circle their final answer.
  - Keep boards turned down after locking in their answers (no changing answers).
  - Make as many students, or all students, participate in this activity.

Some “If You Wants…”

- During Part 2 of rounds:
  - Allow students to huddle around the table.
  - After the student chooses which hand to play, allow other students to see the instructor’s hand before playing Uno.
  - While playing Uno, allow one student to shuffle cards as the deck gets low.
  - Let the same student continue to play Uno if he or she beats the instructor in Uno.

Versatility of this Activity

- Can be used for developmental math, transfer-level mathematics, statistics, or calculus.
- Questions can be vocabulary or concept-based, multiple-choice or open-ended; even computation-based.

Advantages of Activity

- Gets students to see that they have learned something in the course.
- Identifies topics that they know/don’t know.
- Helps the professor conclude the lecture emphasizing certain concepts.
- Students will think the instructor is cool and will nominate him/her for teaching awards.

Survey Results

- Survey given to students across four types of math courses in the 2016-2017 academic year:
  - 4 sections of Development Mathematics
  - 3 sections of Intermediate Algebra
  - 4 sections of Introductory Statistics
  - 3 sections of Calculus I

Survey Results

- Questions
  - Do you consider mathematics to be boring?
    - 1 = Yes, 0 = No
  - How statement best relates to your feelings about this activity?
    - 1 = I hated it.
    - 2 = I didn’t like it.
    - 3 = I liked it.
    - 4 = I loved it.

Survey Results

Courses	N	*n* (%) Boring	Overall Average Score	Average Score (of boring responses)
Developmental Mathematics	131	97 (74.0%)	3.43	3.61
Intermediate Algebra	88	35 (39.8%)	3.38	3.40
Introductory Statistics	91	60 (65.9%)	3.35	3.44
Calculus I	62	14 (22.6%)	3.11	3.18

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Five great games in five minutes!

Kathleen Offenholley,
Borough of Manhattan Community College

2018

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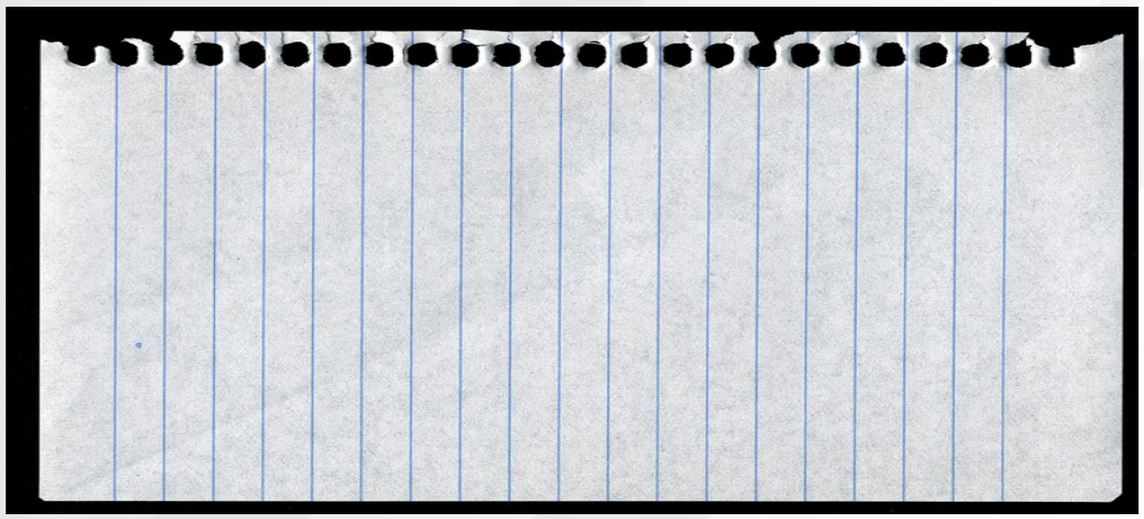
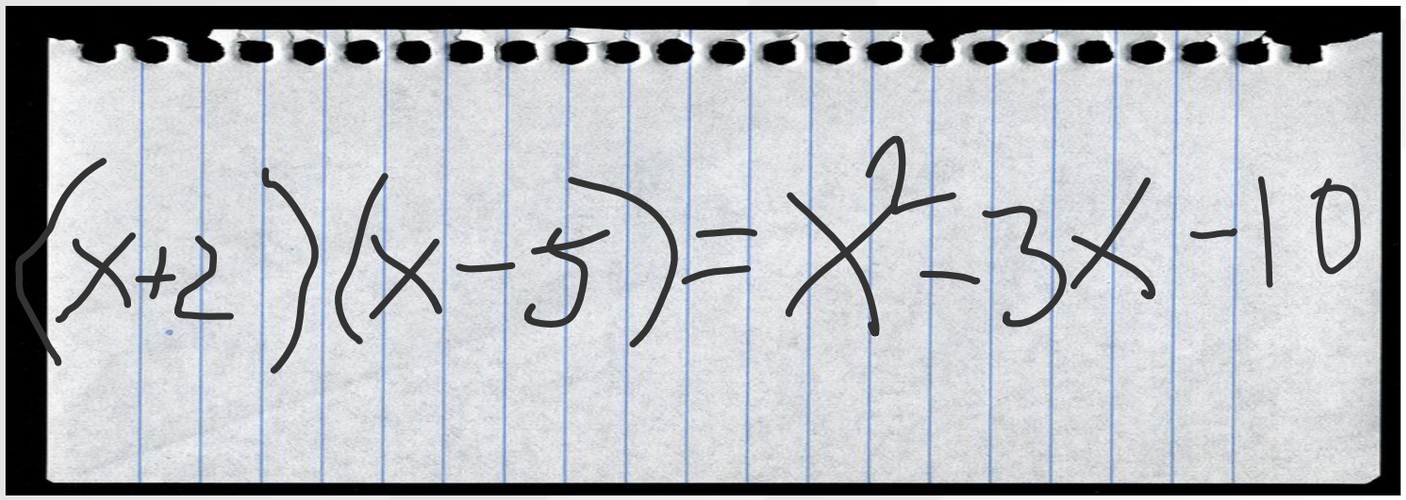
Game 1: Paper tear-ups

- No materials needed (your students provide the paper), no advance prep!
- Great for Algebra, Calculus, Pre calc, and more
- I have students work in pairs to make it less likely that they will mess up the problem. ☺

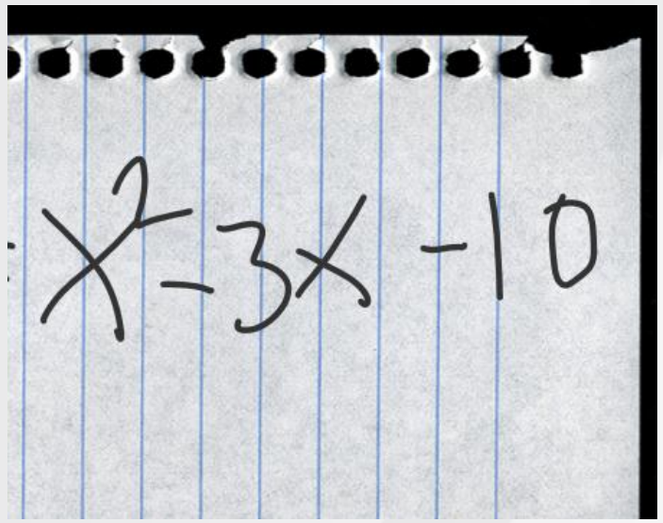


Paper tear-ups

- Instruction: on a piece of paper, multiply two binomials like my example on the board, but your own choice of numbers.
- You can use small numbers that will not be too hard on the other team – or go larger if the other team is really good at factoring!



- Tear the piece of paper in half, give the *answer* to another team. The other team has to figure out the original problem.



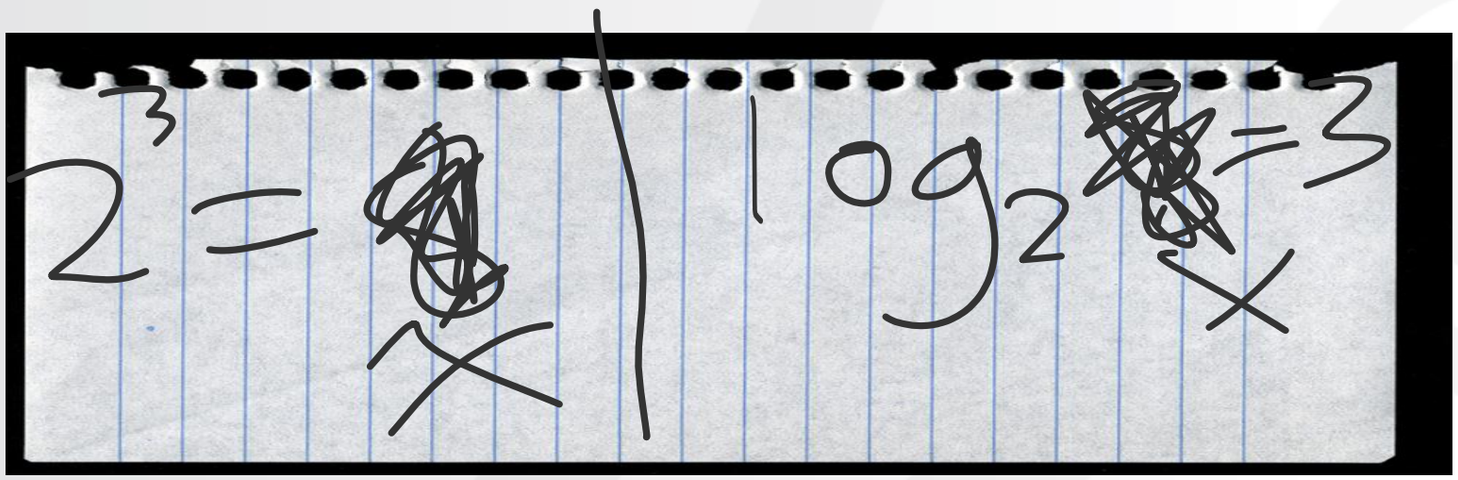
- It explicitly links factoring to multiplication.

Modifications

- Calculus: One side can be a function, the other the derivative!
- Explicitly links derivative and integral; shows why you need that pesky +C !

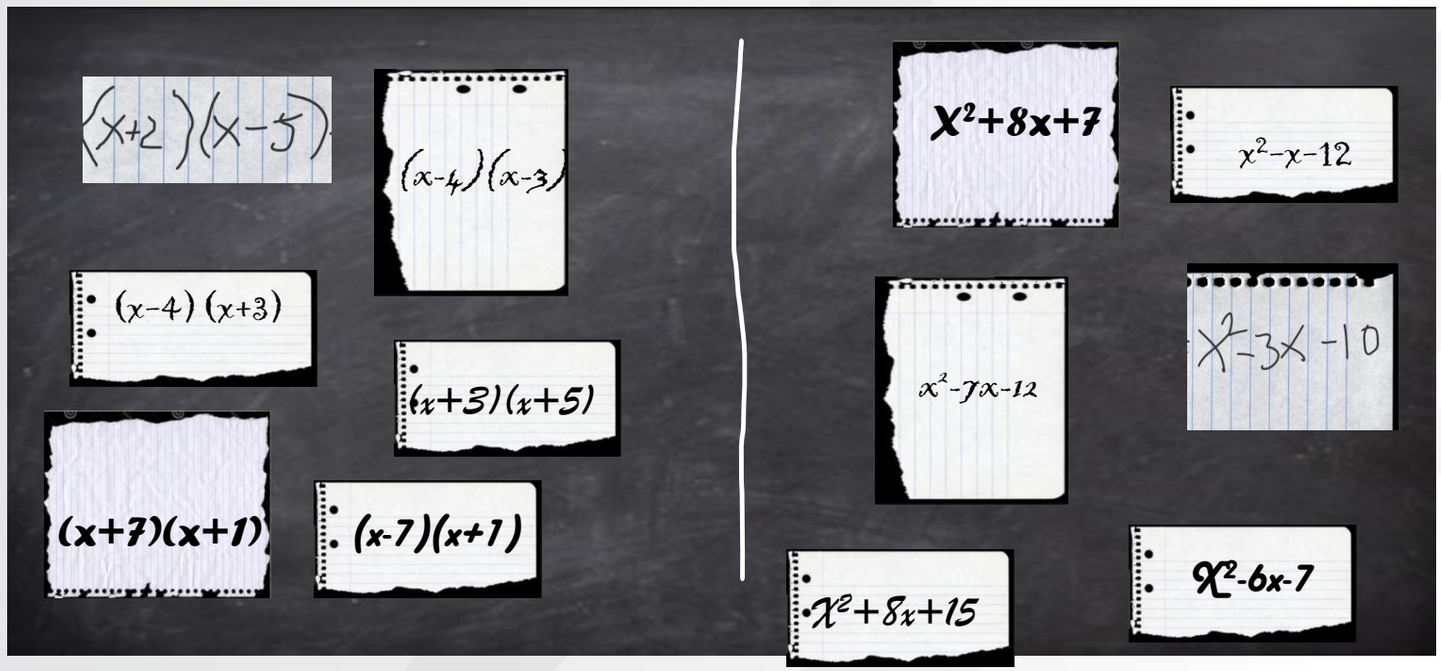
Modifications

- Algebra or Pre Calculus: One side can be exponential form, the other side is the log form – maybe with one number deleted!



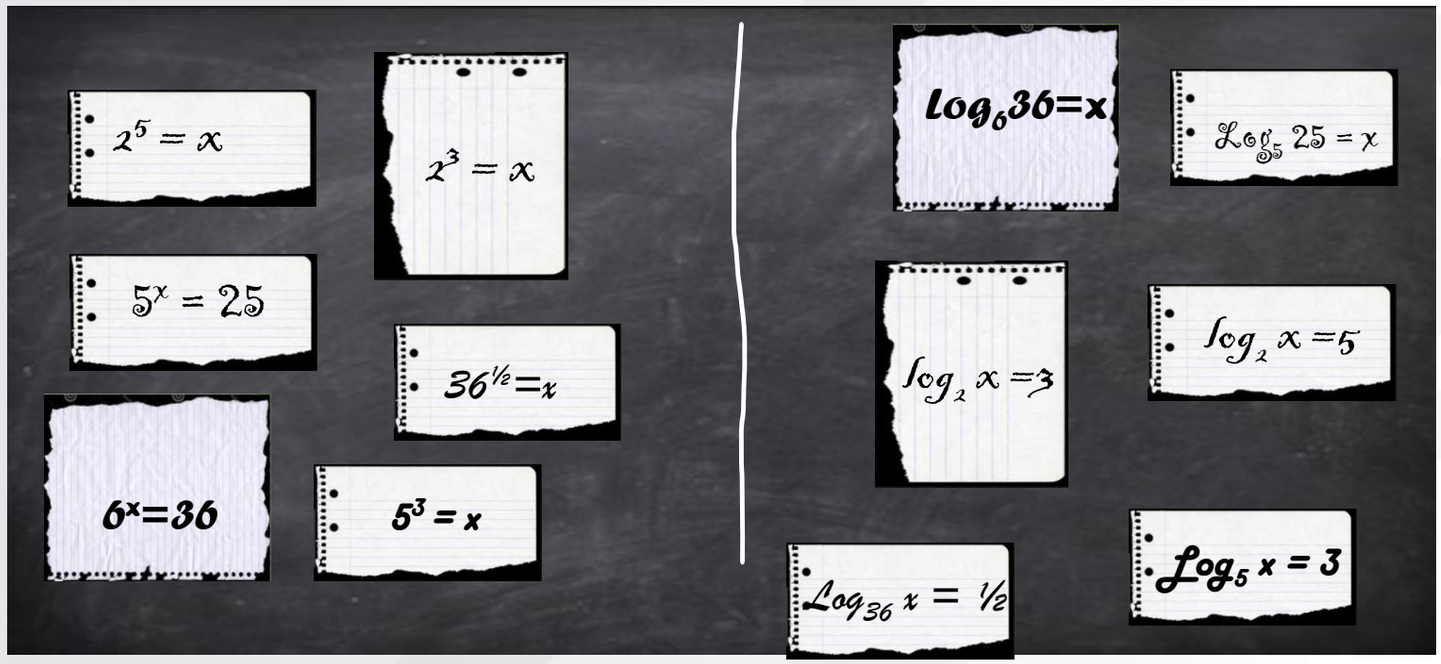
Game 2: Paper Tear-ups on the Board!

- Instead of trading in pairs, tape all the “problems” up on one side of the board, all the “answers” on the other side.
- Challenge teams or individuals to find the matches!



Super fun with logarithms!

- Get some of your best students to throw in a few that are really hard, or to do two that are very similar.
- Challenge teams to find the matches *and* the value for x!



Game 3: The Coin Game

- Place two kinds of coins in an envelope, with an algebra problem about them on the outside.
- Students work in groups to try to figure out the answer.

The Coin Game

Do NOT Open the envelope until you have solved the problem!

- This envelope contains pennies and nickels.
- The number of pennies **IS** 6 more than the number of nickels.
- The total amount of money in the envelope is $0.30.

If you solved the problem correctly, **KEEP** the money. If you did not solve it correctly, GIVE BACK the money. Either way, go on to the next envelope!

Bonus round!

Bonus Round – Double your money!!!
Put some of your money in this envelope, and write a word problem for it, here:

- This envelope contains _____ and _____.
- The….
- The total amount of money in the envelope is _____.

Give the envelope to another group.
If the other group solves your the problem correctly, you get **double the money you gave them.**

Game 4: xPonum, a FREE Digital Game!

- NSF grant-funded
- **xPonum** is a puzzle game in which players collect gems using a beam of energy.
- **Game play emphasizes exploration**, so that players experience mathematics as being about trying out various ideas, not just about already having the answer.

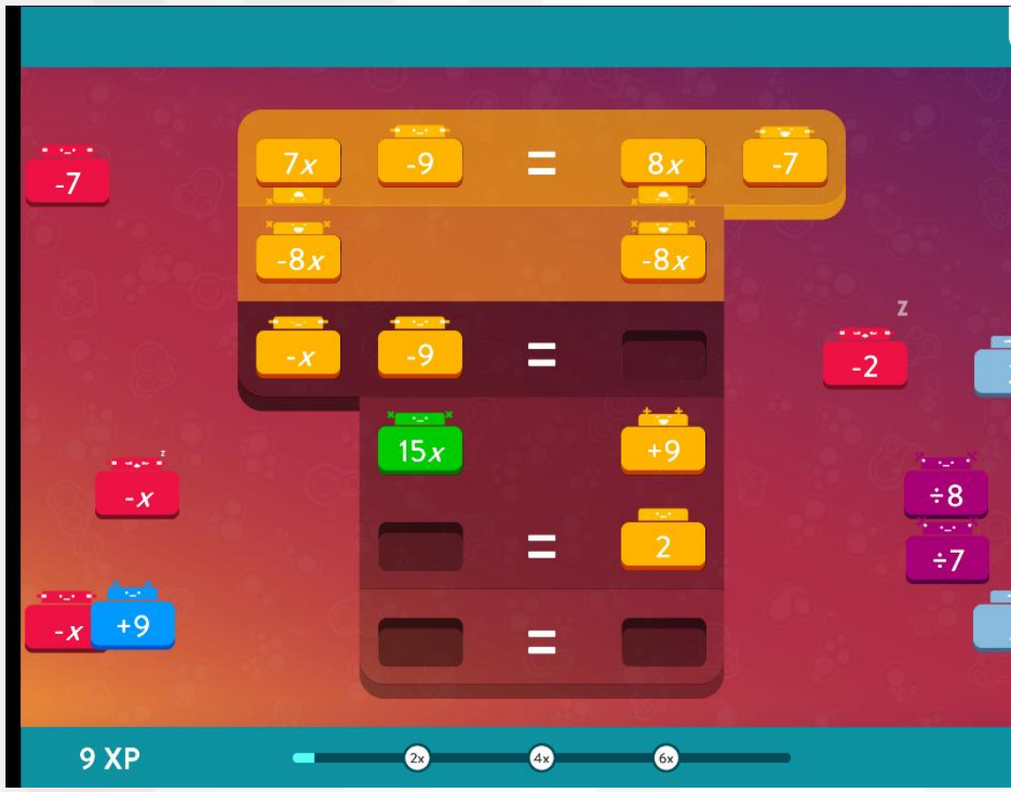
Game 4: xPonum, a FREE Digital Game!

- At the basic level, in the first world, players use slope and intercepts and must find points along the line, using the slider to shift the line. This level can be played in an introductory algebra class.
- At later levels, players explore shifts in parabolas, cubic and trigonometric functions, which are suitable as pre-calculus topics.

Game 4: xPonum, a FREE Digital Game!

- Available for free in the App store, for ipad
- Available for free PC or Mac download at Mathgamesforstem.wordpress. com

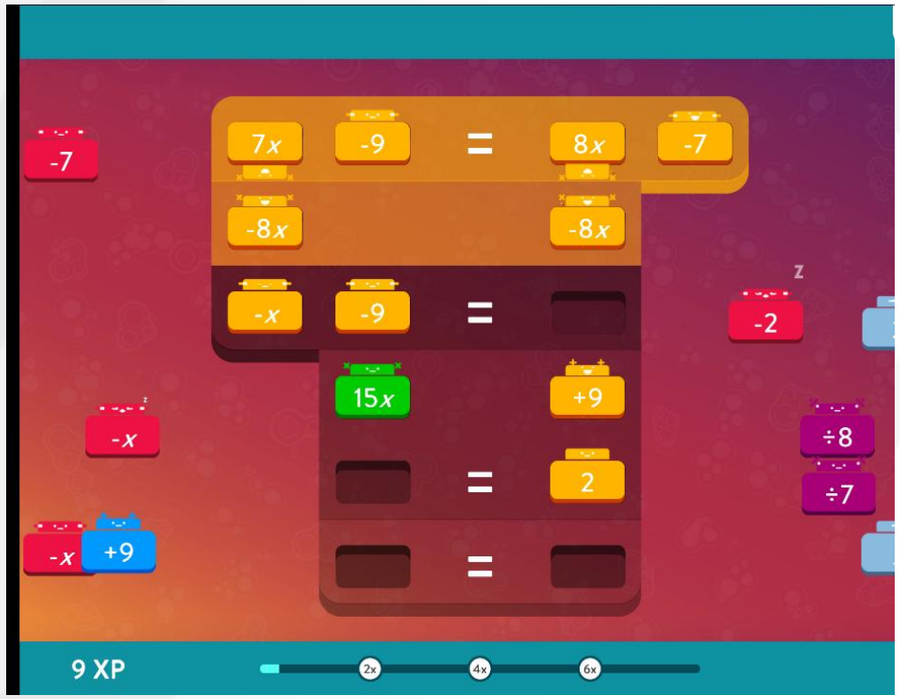
Game 5: Algebots, a FREE Digital Game!



- **Algebots** is an equation-solving puzzle game, with little robots who cheer when you get the steps right, and fall asleep if you don't move them around!
- Equations range from basic to advanced, including absolute value, systems and radical equations.

Game 5: Algebots, a FREE Digital Game!

- Also available for free in the App Store or at mathgamesforstem.wordpress.com
- **Algebots** is more procedural than xPonum, but still, the game emphasizes that solving is about "undoing" – applying the inverse function – to both sides of the equality or inequality.



Bonus Game 6: Project Sampson!

- An adventure game involving linear equations!
- Also available for free in the App Store or at mathgamesforstem.wordpress.com.

Project Sampson

- Students experience real-life GIS context for graphs through resource management.
- Equations of lines represent damage to supplies.
- Key take-aways include that math is used in exciting contexts.

Interested in More?

- CUNY Games Network: https://games.commons.gc.cuny.edu/
- Our one-day conference January 18th in NYC will focus on workshops where you create your own games, and on playtesting existing games to modify for your classes.

Interested in doing your own research?

- Talk to me, I'd love to hear about it!
- If you'd like to use the digital games in your research, please let me know and I'll lend you a hand if you like.
- KathleenOffenholley@yahoo.com
- For readings and articles, see the handout for my talk, "Game Up Your Math" on Sunday morning.

Use SPIT to Solve Inequalities

Julie Gunkelman
Oakland Community College

2018

Problem with Inequalities

$$12x - 9 \geq 18x + 45$$

$$-6x \geq 54$$

$$x \leq -9$$

2018

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SPIT
Method Credit: Marie Aratari

- Solve
- Plot
- Interval
- Test

2018

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Solve

$$|x+3| \leq 4$$

$$|x+3| = 4$$

$$x+3=4 \qquad x+3=-4$$

$$x=1 \qquad x=-7$$

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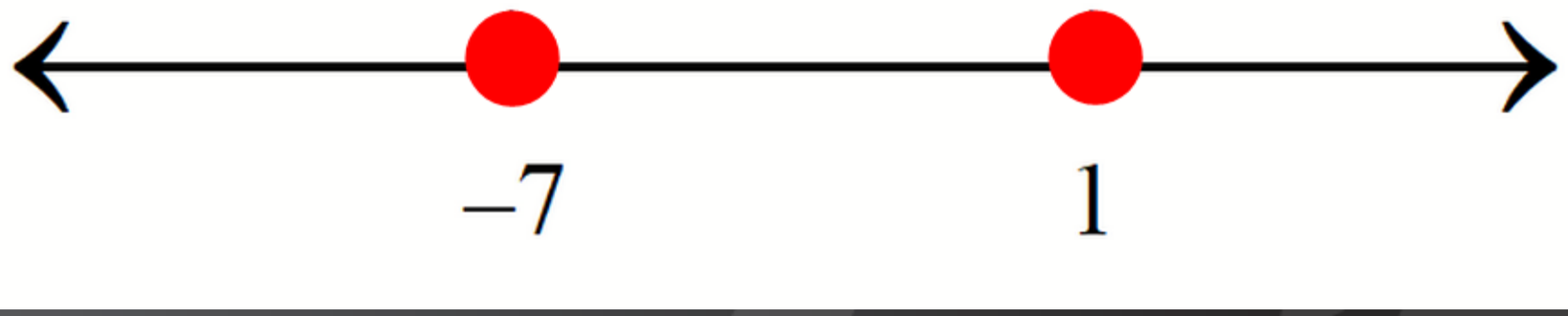
Plot



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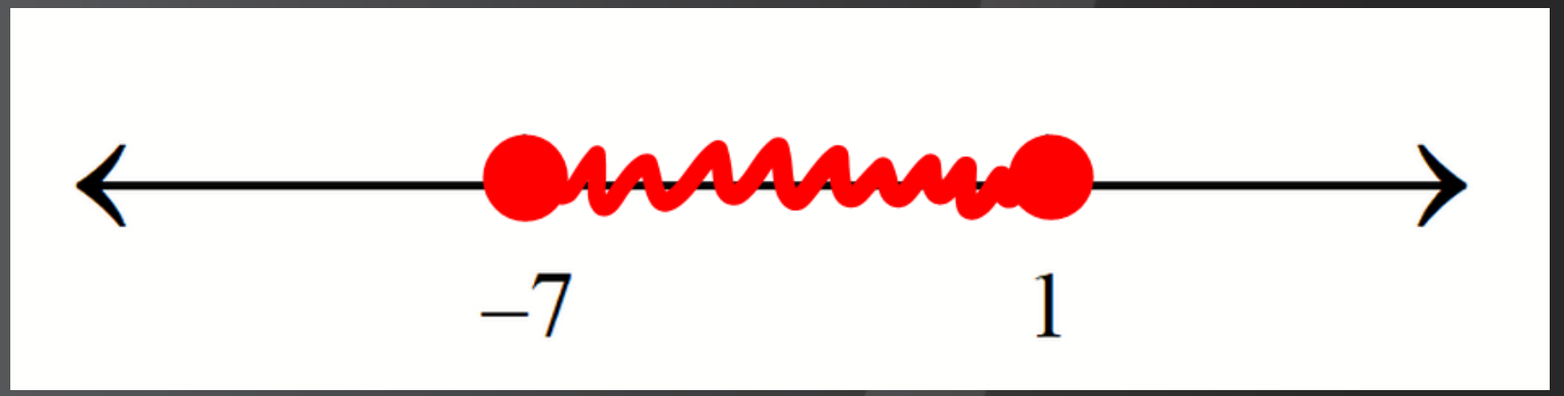
Interval Test

$$|-8+3| \overset{?}{\leq} 4$$

$$|-5| \overset{?}{\leq} 4$$

$$5 \not\leq 4$$

Interval Test

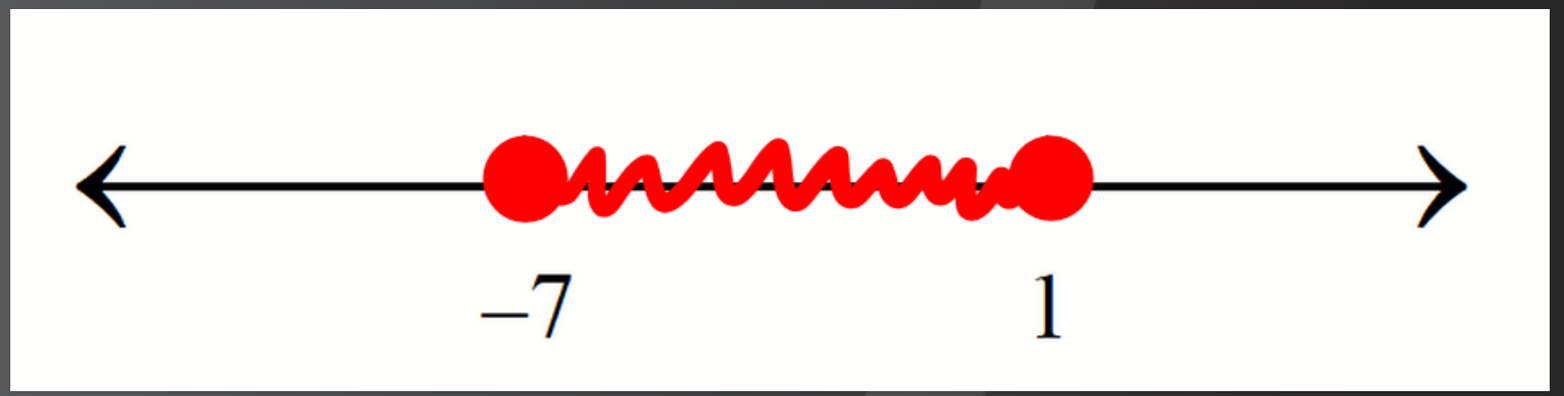


$$|0+3| \overset{?}{\leq} 4$$

$$|3| \overset{?}{\leq} 4$$

$$3 \leq 4$$

Interval Test

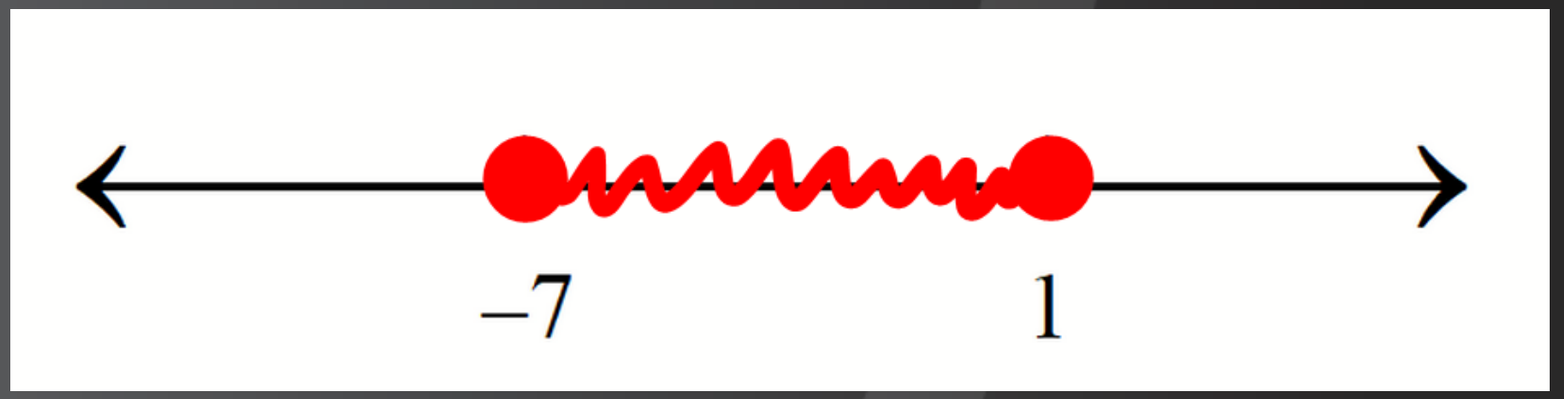


$$|84+3| \overset{?}{\leq} 4$$

$$|87| \overset{?}{\leq} 4$$

$$87 \not\leq 4$$

Interval Test



Solution $[-7,1]$

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SPIT

- Solve
- Plot
- Interval
- Test

2018

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Polynomial Inequalities

$$x^3 + 2x^2 - 4x - 8 > 0$$

$$x^3 + 2x^2 - 4x - 8 = 0$$

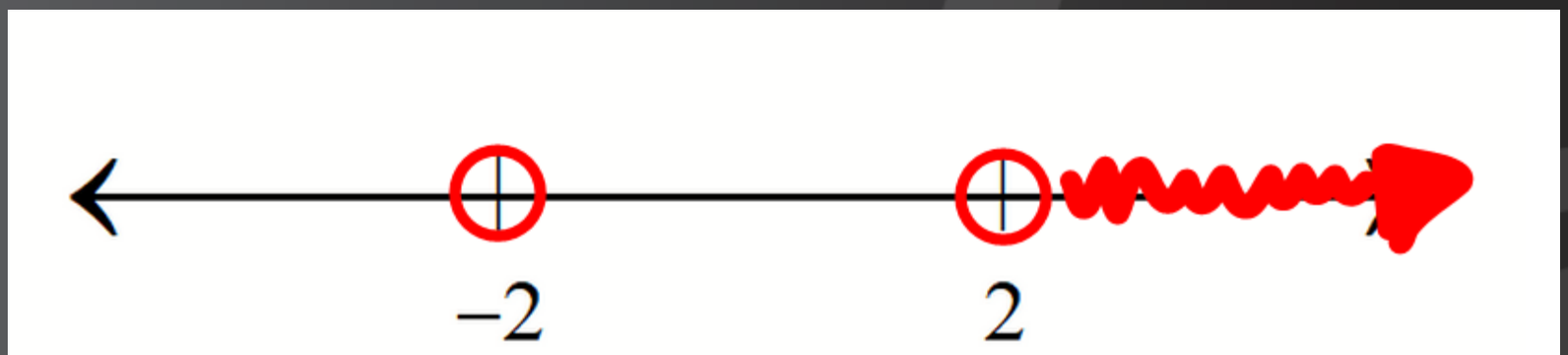
$$x^2(x+2) - 4(x+2) = 0$$

$$(x+2)(x^2 - 4) = 0$$

$$(x+2)^2(x-2) = 0$$

Polynomial Inequalities

$$(x+2)^2(x-2)>0$$



Solution $(2,\infty)$

Rational Inequalities

$$\frac{x+5}{x-2} \geq 0$$

$$\frac{x+5}{x-2} = 0, \quad x \neq 2$$

Rational Inequalities

$$\frac{x+5}{x-2}=0, \quad x \neq 2$$

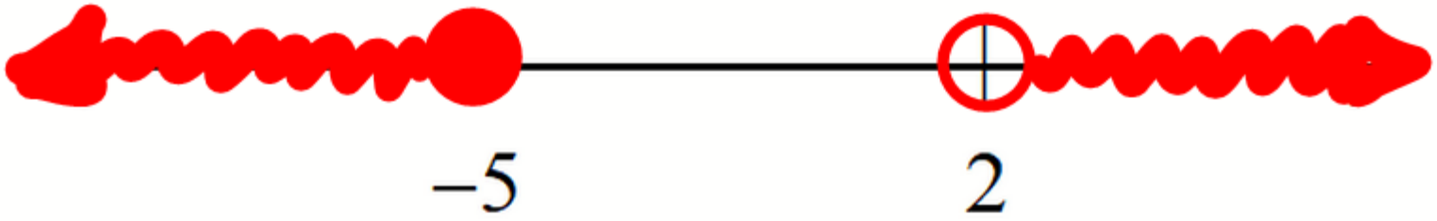
$$x+5=0(x+5)$$

$$x+5=0$$

$$x=-5$$

Rational Inequalities

$$\frac{x+5}{x-2} \geq 0$$



Solution $(-\infty, -5] \cup (2, \infty)$

Rational Inequalities 2.0

$$\frac{1}{x+1} > \frac{2}{x-1}$$

$$\frac{1}{x+1} - \frac{2}{x-1} > 0$$

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Rational Inequalities 2.0

$$\frac{1}{x+1} > \frac{2}{x-1}$$

$$\frac{1}{x+1} = \frac{2}{x-1}, \quad x \neq -1 \ \& \ x \neq 1$$

$$x - 1 = 2x + 2$$

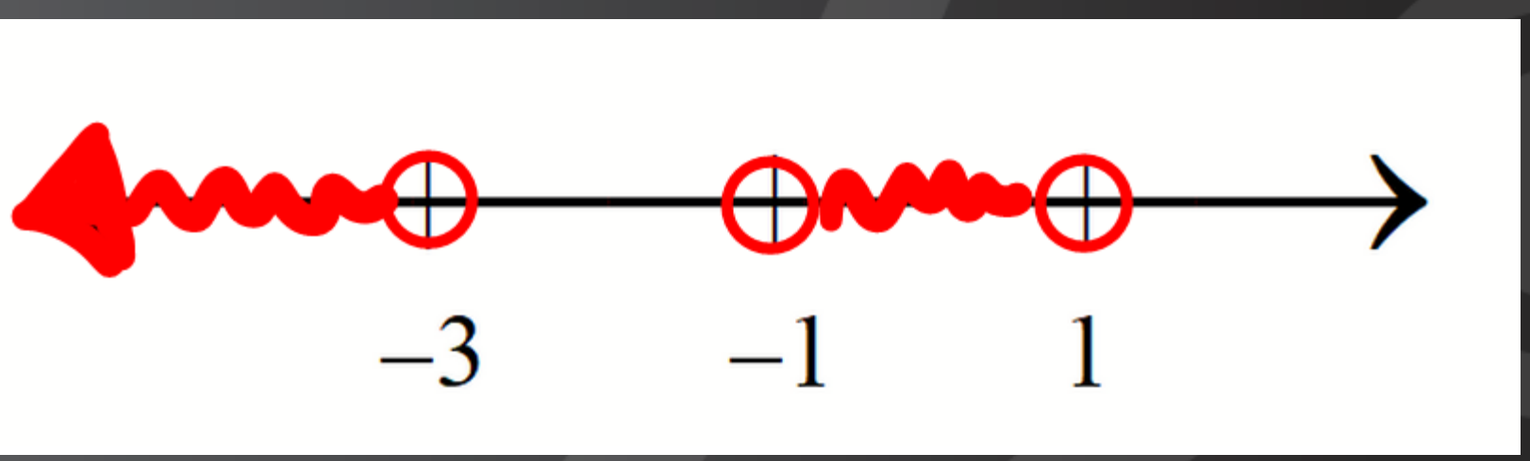
$$-3 = x$$

2018

O'REILLY

Rational Inequalities 2.0

$$\frac{1}{x+1} > \frac{2}{x-1}$$



2018

O'REILLY

Rational Inequalities 2.0

$$\frac{1}{x+1} > \frac{2}{x-1}$$

$$(-\infty,-3)\cup(-1,1)$$

2018

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Ignite AMATYC

SPIT

- Solve
- Plot
- Interval
- Test

2018

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Center for Community Studies (CCS) at Jefferson Community College: Producing Real Data

Joel LaLone
Larry Danforth

STATE UNIVERSITY OF NEW YORK JEFFERSON The Center for Community Studies

2018

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History of CCS

- Completed over 150 community-based studies in Northern New York since 1999, employ over 100 students each year
- Research for all types of community desired studies for agencies
  - Annual Quality of Life Surveys of the Community
    - Jefferson County (Spring)
    - St. Lawrence County (Summer)
    - Lewis County (Fall)
  - Regional Economic Tracking Survey (Spring - odd years)
  - Additional Contracted Studies

Organization & Funding

- Multiple Organizational Models since 1999
- Current Model
  - Research Director
    - 12 hours of release time from teaching load, stipend
  - Research Director
    - 6 hours of release time from teaching load, stipend
  - Advisor Board
    - Approximately 20 community members
- Funding – Endowment Fund, Local Sponsors

Survey Methodology

What are the factors to consider when determining the best methodology for data collection?

- Representativeness
- Valid Measurement
- Budget
- Timing
- Access to the Population
- Need for Large Sample Size
- Rewards

Annual Survey Methodology

Landline Telephone: 2000 - 2009

Representativeness Issues

Introduced Weighting in 2006

Weight Variables: Gender, Age, Education, Phone Ownership, Geography, Military Affiliation

Lewis County 2018	Raw	Weighted
Gender: Male	40%	51%
Age: Under 30	7%	19%
Age: 70 and Older	26%	16%
Ed: Graduate Deg	10%	6%

Methodology Improvements

Included Cell Phones in 2009

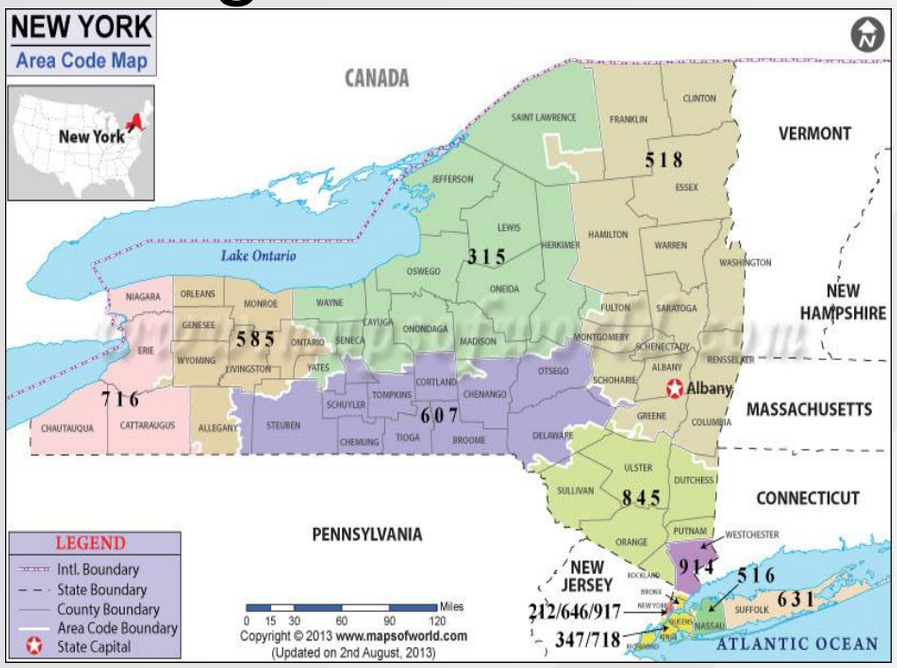
Lewis County Raw Results (Oct. 2018)

	Landline	Cell Phone
Gender: Male	30.7%	48.8%
Gender: Female	69.3%	51.2%
Age: Under 40	6.1%	34.5%
Age: Sixty or Older	60.8%	25.0%

Further Improvement in Jefferson County

Hard to Reach Subpopulation in Jefferson County – Military and their Families stationed at Fort Drum, NY

Integrated Intercept methodology into the design in 2017



Full Intercept Methodology

DPAO Economic Impact Study of their Summer Concert Series

Economic Impact of ATV Trail riders in the Tug Hill Region

Email Methodology

Membership Survey for WPBS

Emailed survey to current members and former members

Telephone methodology for non members.

Website Links

School Collaboration Survey

Posted a link to the survey on 17 different K-12 District websites

SUNY North Country Consortium Higher Education Needs Assessment

Telephone Methodology Supplemented with website links

	Telephone	Website
Total Sample	1365	711
Currently Enrolled/ Planning to Attend College	267	624

Mail

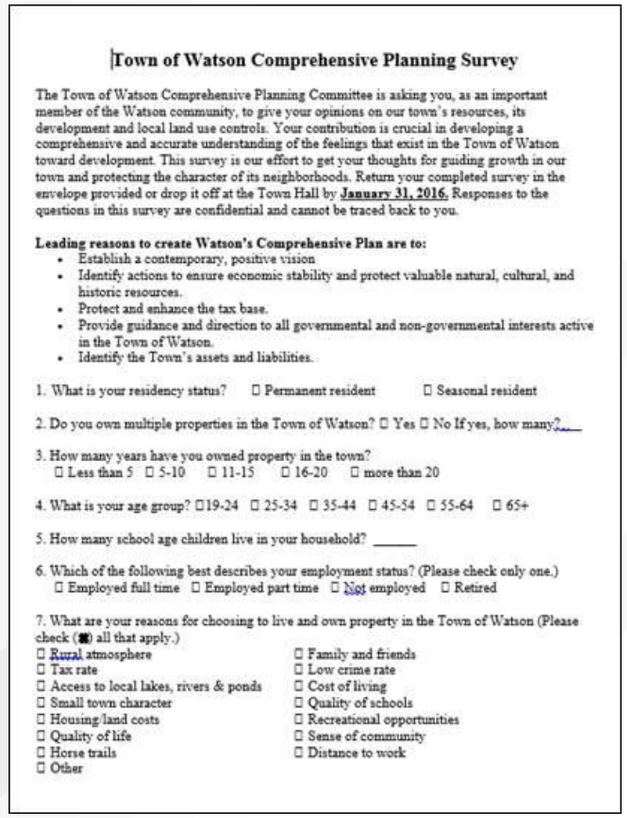
Thousand Islands International Tourism Council

Town of Watson

Town of Greig

Lewis County New York

What is Adult Entertainment ?



Town of Watson Comprehensive Planning Survey

The Town of Watson Comprehensive Planning Committee is asking you, as an important member of the Watson community, to give your opinions on our town's resources, its development and local land use controls. Your contribution is crucial in developing a comprehensive and accurate understanding of the feelings that exist in the Town of Watson toward development. This survey is our effort to get your thoughts for guiding growth in our town and protecting the character of its neighborhoods. Return your completed survey in the envelope provided or drop it off at the Town Hall by **January 31, 2016.** Responses to the questions in this survey are confidential and cannot be traced back to you.

Leading reasons to create Watson's Comprehensive Plan are to:

- Establish a contemporary, positive vision
- Identify actions to ensure economic stability and protect valuable natural, cultural, and historic resources.
- Protect and enhance the tax base.
- Provide guidance and direction to all governmental and non-governmental interests active in the Town of Watson.
- Identify the Town's assets and liabilities.

1. What is your residency status? ☐ Permanent resident ☐ Seasonal resident

2. Do you own multiple properties in the Town of Watson? ☐ Yes ☐ No If yes, how many?___

3. How many years have you owned property in the town?
☐ Less than 5 ☐ 5-10 ☐ 11-15 ☐ 16-20 ☐ more than 20

4. What is your age group? ☐19-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65+

5. How many school age children live in your household? _____

6. Which of the following best describes your employment status? (Please check only one.)
☐ Employed full time ☐ Employed part time ☐ Not employed ☐ Retired

7. What are your reasons for choosing to live and own property in the Town of Watson (Please check (✱) all that apply.)

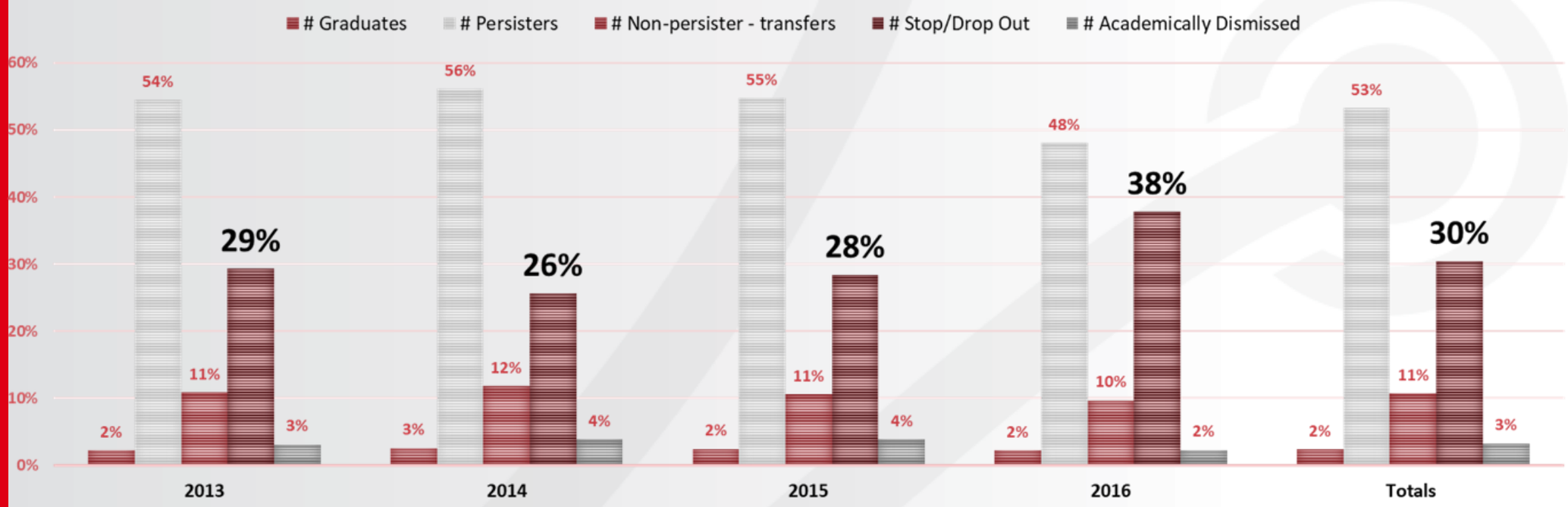
☐ Rural atmosphere	☐ Family and friends
☐ Tax rate	☐ Low crime rate
☐ Access to local lakes, rivers & ponds	☐ Cost of living
☐ Small town character	☐ Quality of schools
☐ Housing/land costs	☐ Recreational opportunities
☐ Quality of life	☐ Sense of community
☐ Horse trails	☐ Distance to work
☐ Other	

Focus Groups

Watertown City Charter

JCC Non-Persisters study

AT THE BEGINNING OF WHAT WOULD BE THEIR FOURTH SEMESTER:



Observation

NEIGHBORS OF WATERTOWN, INC.

A Neighborhood Preservation Company
Serving Watertown Since 1969

Not all individuals are humans

Needs Assessment Study to assess the condition of the housing stock in NESNID

Key Factors

- Underrepresented Groups
- Difficult to Access Populations
- Difficult to get Participation
- Confidentiality/Anonymity Concerns

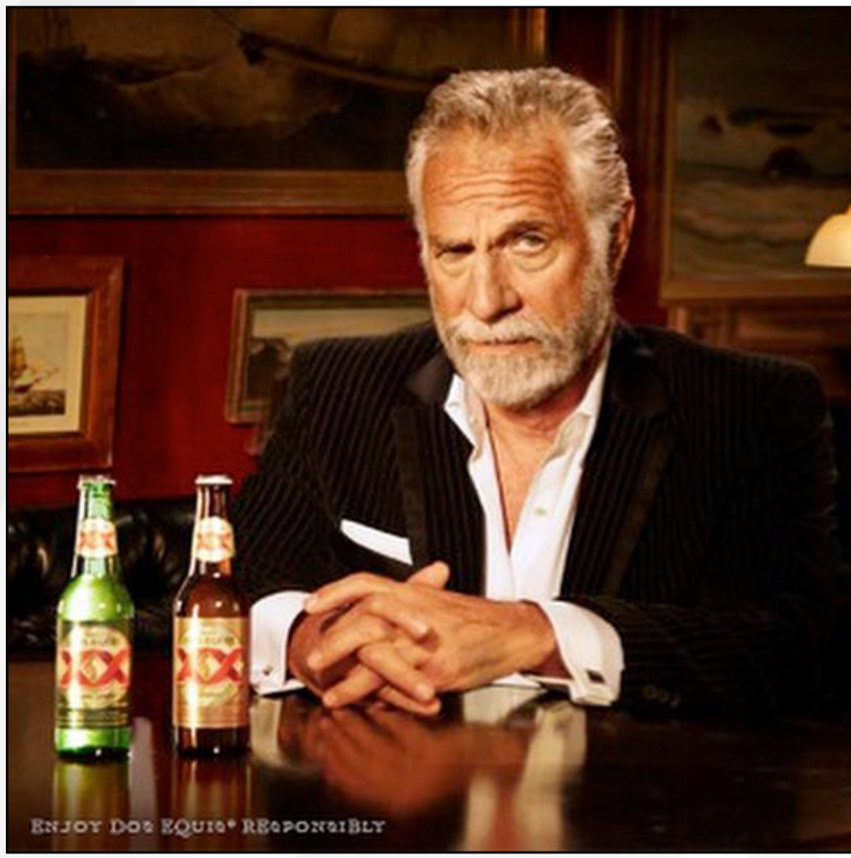
Secondary Analysis

Jefferson County Youth Bureau

Prevalence of the LGBTQ Community among youth in Jefferson County and Associated Risk Factors

Unless you are the most interesting man…

No one could possibly be an expert in every aspect of all of the subject matter you have just seen.



This is part of what makes what we do so much fun for us.

Take-Aways

- Call Landlines
- Call Cell Phones
- Intercept Survey
- Send Emails
- Website Links
- Mail
- Focus Groups
- Observation
- Secondary Data Analysis
- Representativeness
- Accessibility
- Participation
- Confidentiality/ Anonymity
- Legality
- Cost

Thank You

We have just rapidly mentioned 15 of the 150+ studies completed by the CCS at Jefferson.

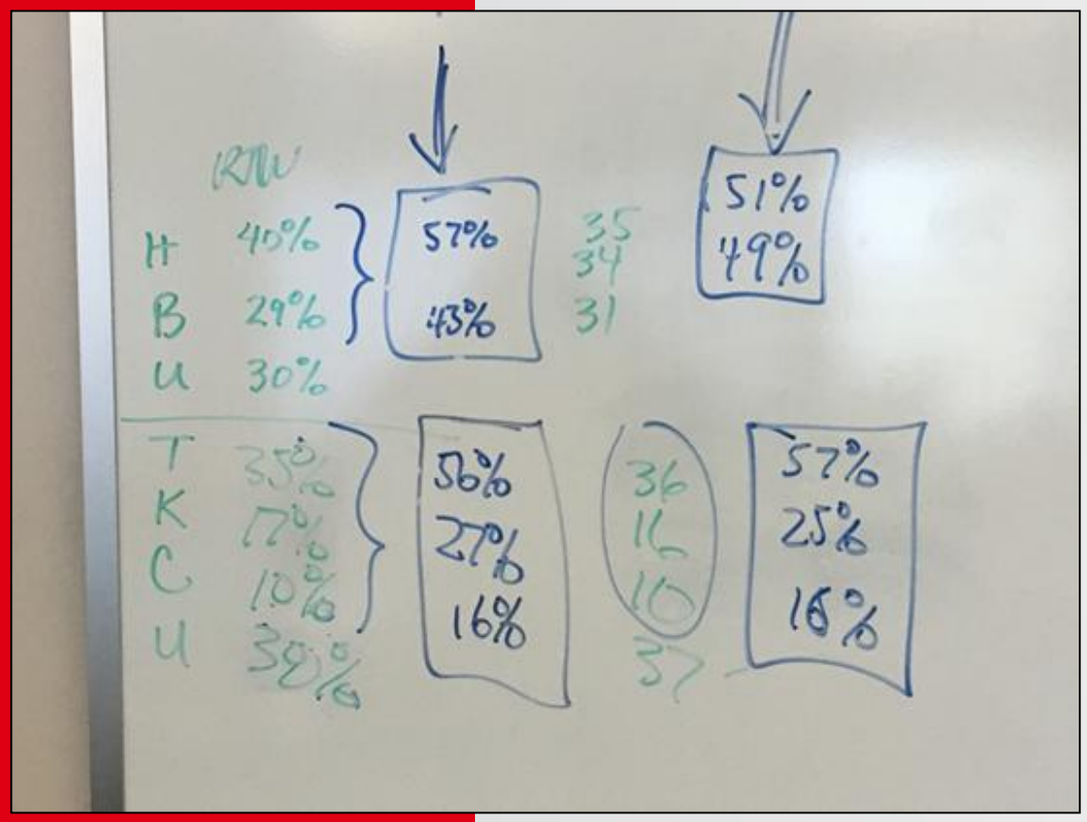
In the previous slides you saw exactly one result.

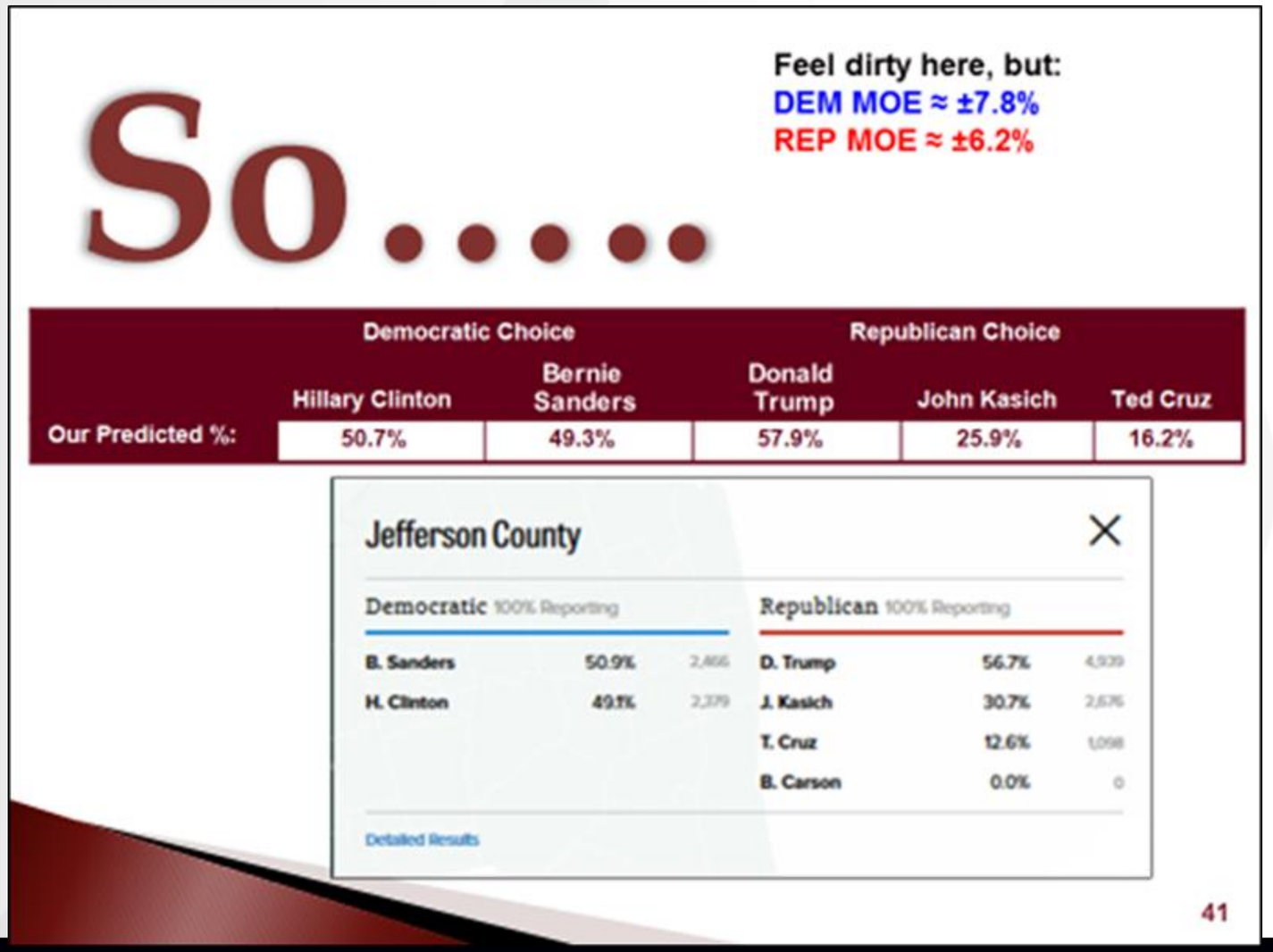
If you have any further results-related, methodological-related, or analysis-related questions…

Joel: jlalone@sunyjefferson.edu
Larry: ldanforth@sunyjefferson.edu

Okay, one more result…

In 2016 we completed our only politically related research in nearly 20 years.





Rate My Professors: Why You Should Care and What You Can Do About It

Brianna McGinnis
Associate Professor
Chair of Mathematics and Engineering Div.
Carroll Community College, Maryland

2018

“You can’t opt out of having an online reputation in today’s world. Instead, you can be proactive, get ahead of common issues and own your digital presence. It’s never too early -- and it’s also never too late -- to start participating and taking control of your online reputation.”

– Tripp Donnelly in Why Your Digital Reputation Matters and How to Influence It, 5/7/18

https://www.forbes.com/sites/forbesagencycouncil/2018/05/07/why-your-digital-reputation-matters-and-how-to-influence-it/

“91% of people trust what they see and read in search engine results, and…65% of people trust these results more than any other source.”

– Tripp Donnelly in Why Your Digital Reputation Matters and How to Influence It, 5/7/18

https://www.forbes.com/sites/forbesagencycouncil/2018/05/07/why-your-digital-reputation-matters-and-how-to-influence-it/

What is *Rate My Professors?*

- Student-centered **public** website and free app where college students can anonymously rate their schools and professors
- Easily searchable:
  - http://www.ratemyprofessors.com
  - Google Play and App Store
  - Facebook page
- Recently acquired by Cheddar

continued

- “For Students, By Students”
- **20 million ratings** across **1.8 million professors**
- Over **7,500 schools** in the United States, Canada, and the United Kingdom
- Used by more than **6 million** college students **each month**
- Updates coming in 2019

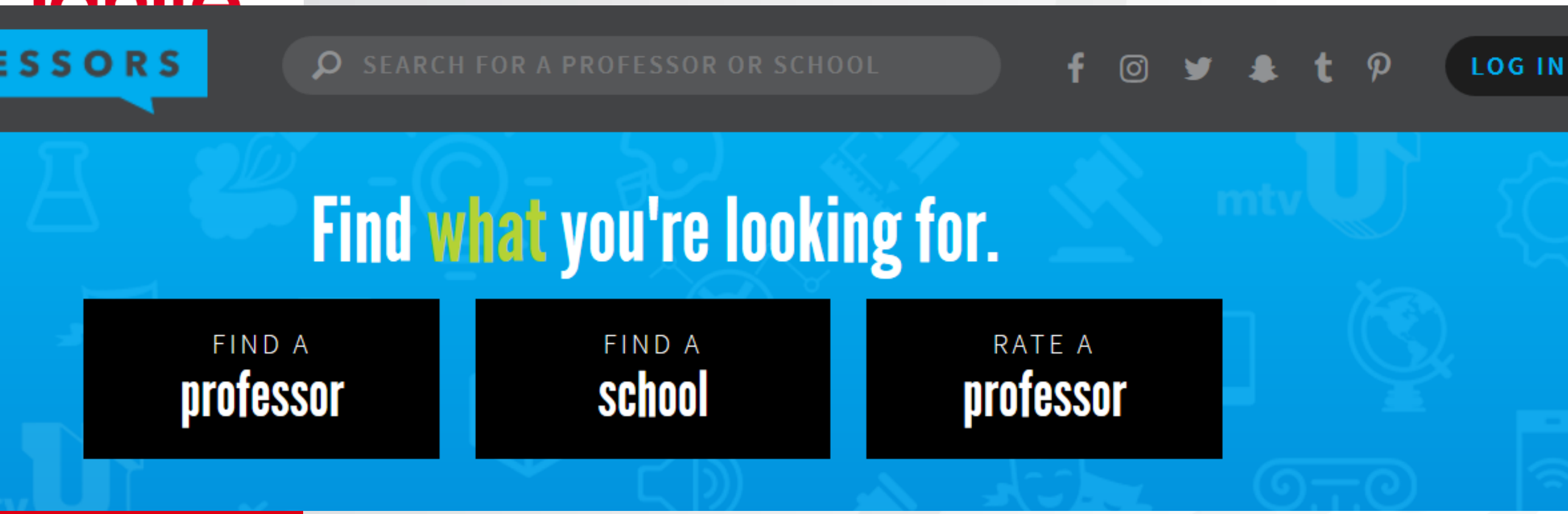
https://news.cheddar.com/cheddar-acquires-rate-my-professors-the-definitive-college-and-professor-ratings-site-f74b74d74979

- Student accounts on the website are optional; an account is not required to post a rating and a comment

- Not all ratings are negative; over half are positive!

- Reviews **should** only be viewed as opinion, not fact

Home Page of Website
www.ratemyprofessors.com



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Rating Categories for Schools

- Reputation
- Location
- Opportunities
- Facilities and Common Areas
- Internet
- Food
- Clubs
- Social
- Happiness
- Safety
- Additional Comments

Carroll Community College

Westminster, MD

WEBSITE

Rate this campus

Share

SUBMIT A CORRECTION

Top Professors

VIEW ALL PROFESSORS

Crumley, Kristie 27 REVIEWS	5.0
Virostek, Mary 17 REVIEWS	5.0
Young, Robert 53 REVIEWS	4.9

3.74 AVERAGE PROFESSOR RATING

How This School Stacks Up

3.8 OVERALL QUALITY RATING

3.8	REPUTATION	4.0	LOCATION
3.7	INTERNET	3.3	FOOD
3.7	OPPORTUNITY	4.0	FACILITIES
3.6	CLUBS	3.4	SOCIAL
4.1	HAPPINESS	4.5	SAFETY

O'REILLY®

Rating Categories for Professors

- Overall Quality
- Level of Difficulty
- Would Take Again
- Textbook Use
- Average Grade
- Additional Comments

- No more “Hotness Rating” with chili pepper icon
- Students can add professors (verified by moderator)
- Raters must agree to the site’s Guidelines, Terms of Use, and Privacy Policy
- Ratings are posted immediately while simultaneously entering a queue to be reviewed by a moderator.
- The moderator does not always catch broken rules so you must review ratings yourself!

Site Guidelines (condensed and paraphrased)

- DO:
  - Rate if you have actually had the professor or attended the school
  - Rate only once
  - Be honest, objective, and helpful
  - Limit comments to professional abilities
  - Proof your comments
  - If needed, give constructive criticism

continued

- DO NOT:
  - Use definitive language (“always”, “never”)
  - Give contact information
  - Post about professor’s personal life
  - State your opinion as fact
  - Make threats of violence (this is reported to authorities with IP address and time of posting)
  - Post about yourself or a colleague (professors)

THERE ARE MANY MORE DON’TS – see site!!

To weed out some bad reviews…

- Be familiar with the Site Guidelines, especially the “Don’ts”
- Read your reviews objectively when you are in a good mood and sober
- Report/flag any review that breaks a rule
- Any flag gets pulled to the top of the moderator’s queue and may be deleted

One of my bad reviews that I could report…

10/18/2011

POOR

1.5 OVERALL QUALITY

4.0 LEVEL OF DIFFICULTY

MATH097

For Credit: N/A

Attendance: N/A

Textbook Used: Yes

Would Take Again: N/A

Grade Received: N/A

Yeah.. the math journals were ridiculous and did not help what-so-ever. Complete waste of ti
This class isn't even credited and I had more work in it than all three of my other classes combined. Dropped her. Never again!

0 people found this useful 0 people did not find this useful

report this rating

Report a Student's Rating

You're reporting:

Yeah.. the math journals were ridiculous and did not help what-so-ever. Complete waste of time. This class isn't even credited and I had more work in it than all three of my other classes combined. Dropped her. Never again!

Whats the problem?

If you think this comment is inconsistent with Rate My Professors' Site Guidelines, report it and tell us why.

TELL US WHAT'S WRONG WITH THIS COMMENT:

EILLY®

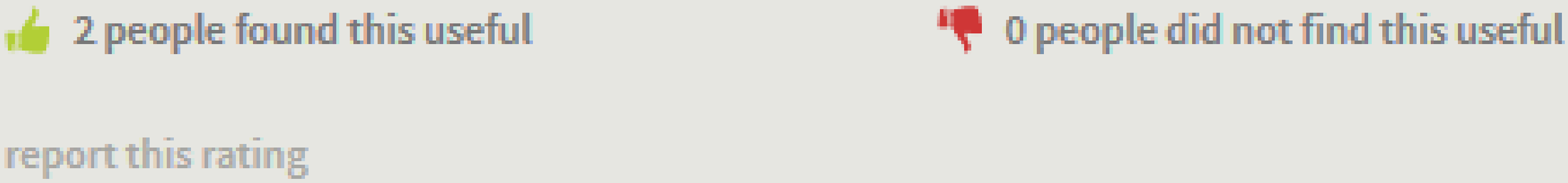
Hear/See this!!

"…**every time** I'm planning my classes I go to [RMP] and see if the teacher has a good rating. If the teachers don't have a positive rating I **drop the section** and choose a different section or a different class all together! I know **every single one of my friends** also use [RMP] to compare all their potential teachers!"

- One of my (Brianna's) former students, Oct. 2018

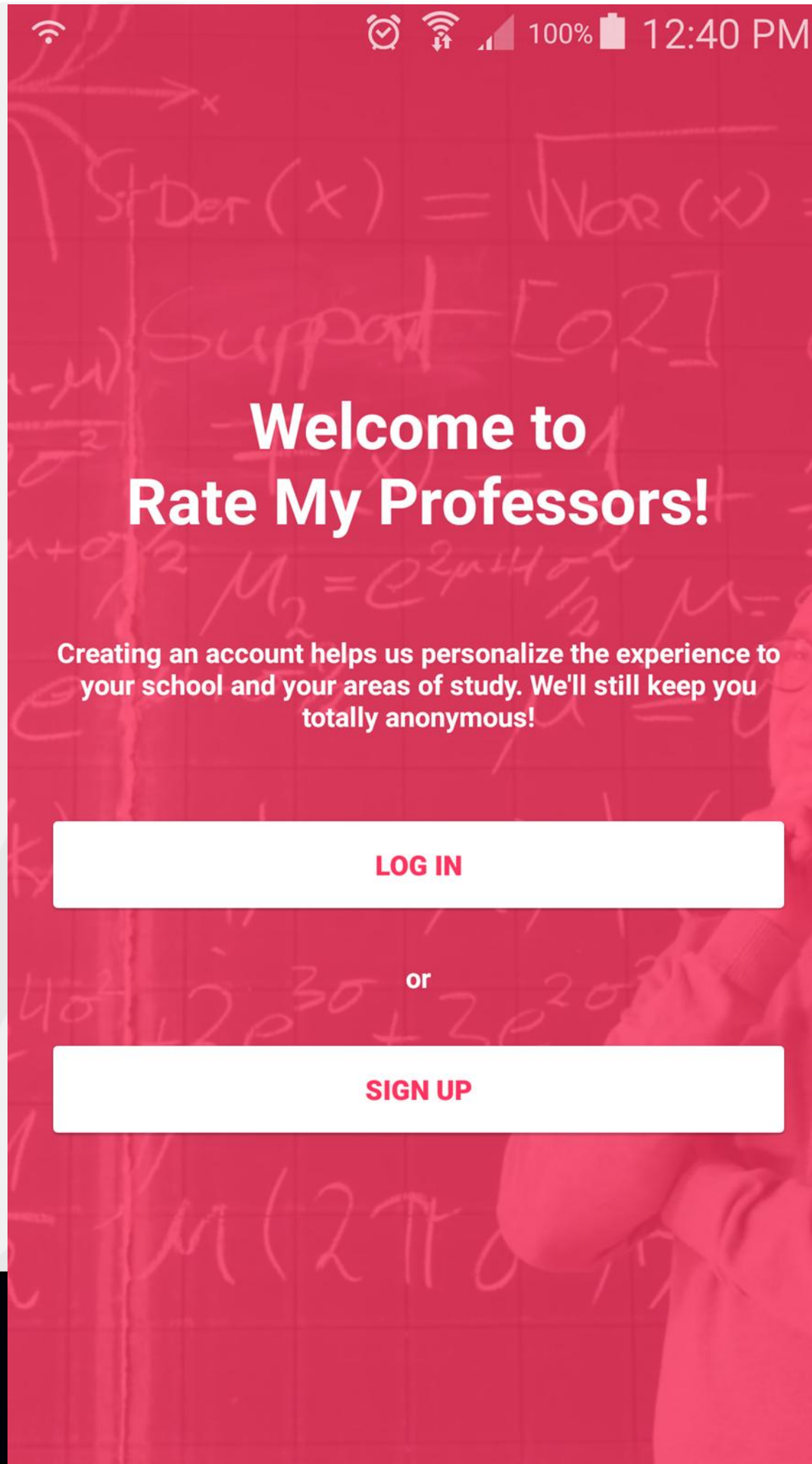
To Beef Up Good Reviews…

- Send **select** students (not the entire class) a **direct link to your page** and ask them to write a review for you. Remind them if necessary.
- “Like” all of your good reviews.



App

- Different from website
  - Students **must** create an account
  - “Compare professors” feature



Professor Accounts

- Sign up to receive **email alerts** when a new rating is added to your page
- Can add a personal URL, photo, and/or Twitter handle
- Can add specific notes to let students know that you care about their feedback

In conclusion…

- Think and share: Do you plan to review your ratings (personal and school)? Why or why not?

- Tips that I missed? Questions?
  - bmcginnis@carrollcc.edu

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YOU'VE BEEN

PAT RILEY
Hopkinsville Community College (KY)

2018

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Assigning projects in class lead to a major problem for me.

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Examples → Copycats

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No Examples → Chaos

2018

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food network

2018

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FORMAT

Four chefs… three timed rounds (appetizer, main course, dessert)…one chef Chopped after each round.

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FORMAT

Each round the chefs are given a basket with four random ingredients that they have to use…..

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…math problems can be the same way. Give the students things they have to use/do for a project.

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JUDGING CRITERA

1. Taste
2. Creativity
3. Presentation

2018

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Cooking Taste Criteria
=
Math Calculation Accuracy

2018

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CREATIVITY

Cooking: Did they use the ingredients in the obvious way or did they transform them?

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CREATIVITY

Math: Did they just re-do the same calculations from class examples or come up with something original?

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PRESENTATION

Chefs: When they were done, how did they present the food?

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PRESENTATION

Math: How well did they organize the calculations/graphs/etc?

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TIME LIMIT

Given a time limit helps focus the direction and gets the job done…also forces preparation.

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NO ASSISTANCE

NO REMINDERS

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The judges are detailed, particular, and critical of mistakes…..

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…but are also positive, helpful, and encouraging.

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Students don't actually get "Chopped", but have incentive to attempt to excel…make grades comparative.

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Suggestions: Start small scale and build up as the semester progresses…and Have Fun with it!

House Renovation – Juicy Math Problems

For those interested in mathematical applications in the real world.

Ben Aschenbrenner, Ivy Tech CC

2018

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Did you ever know someone that bought a home and then realized the little plan for renovation was actually going to be a full gut rehab?

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I like to try to look on the bright side…

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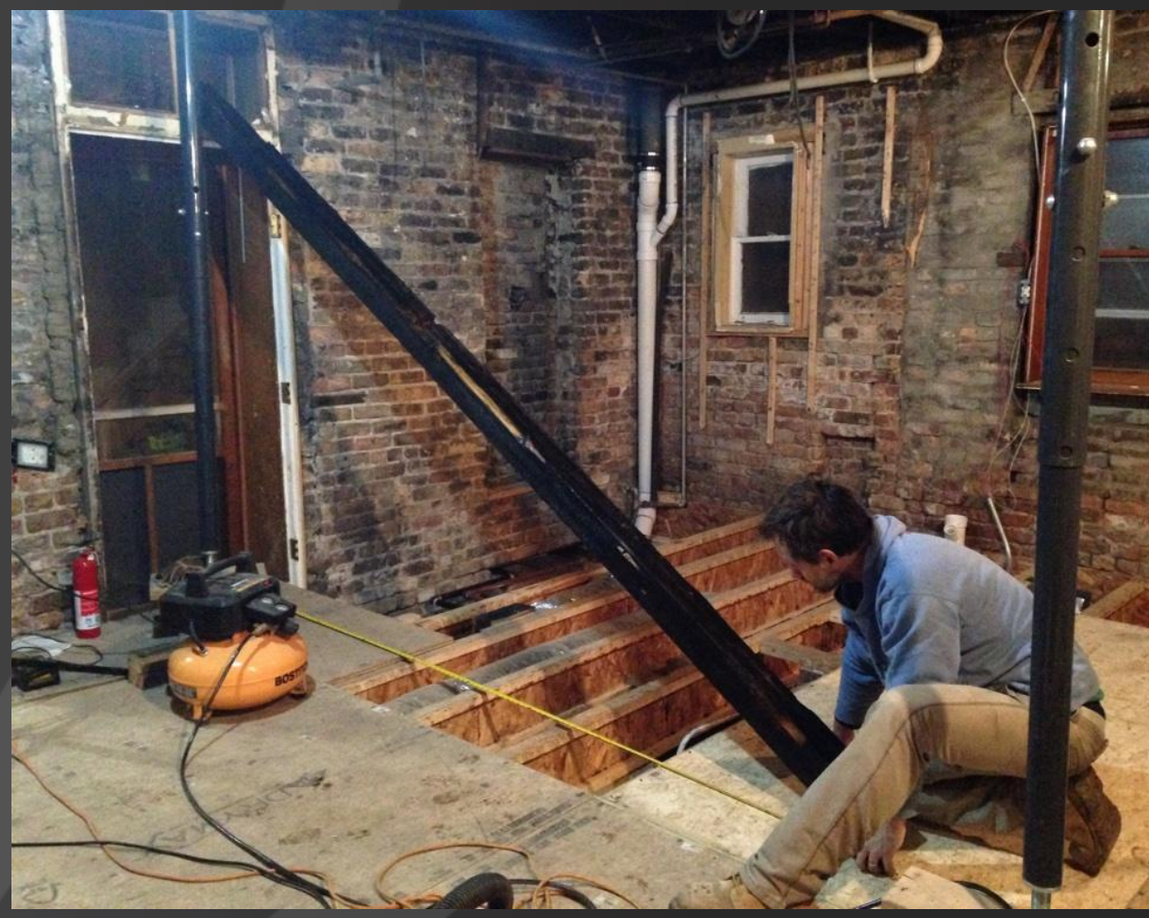
I needed to use the Pythagorean Theorem to know where the end of the beam would land.



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How many bags of concrete would I need?

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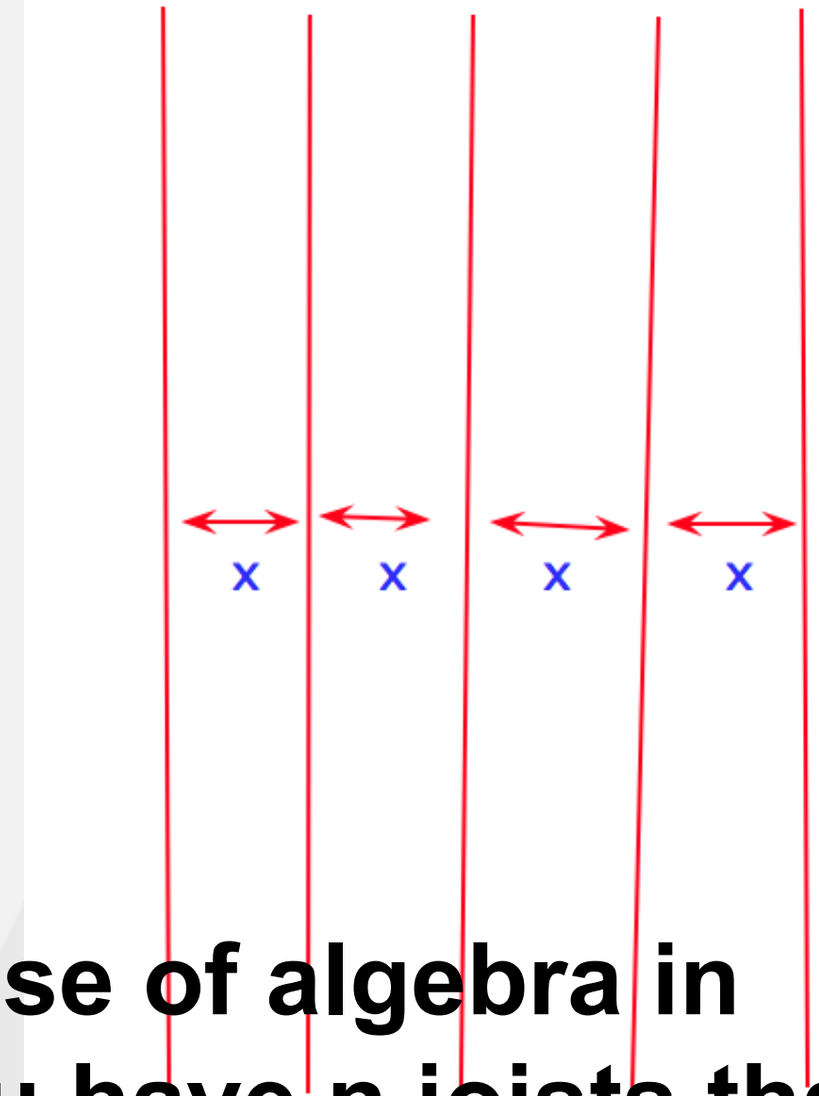
Ignite AMATYC



I discovered a real use of algebra in construction…. If you have n joists that you want to space evenly (x inches apart), how many joists will you need and what will the spacing be?

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An easier problem… How many 4’x8’ OSB sheets for the subfloor?

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A problem I wish I had figured out…

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One of the most consequential problems: how high would I build the concrete forms to get a level floor?

And the (a) way around it when you mess that one up…

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A fundamental (and reoccurring) question

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Ignite AMATYC

Another reoccurring issue – the old conduit in the crawl space problem

2018

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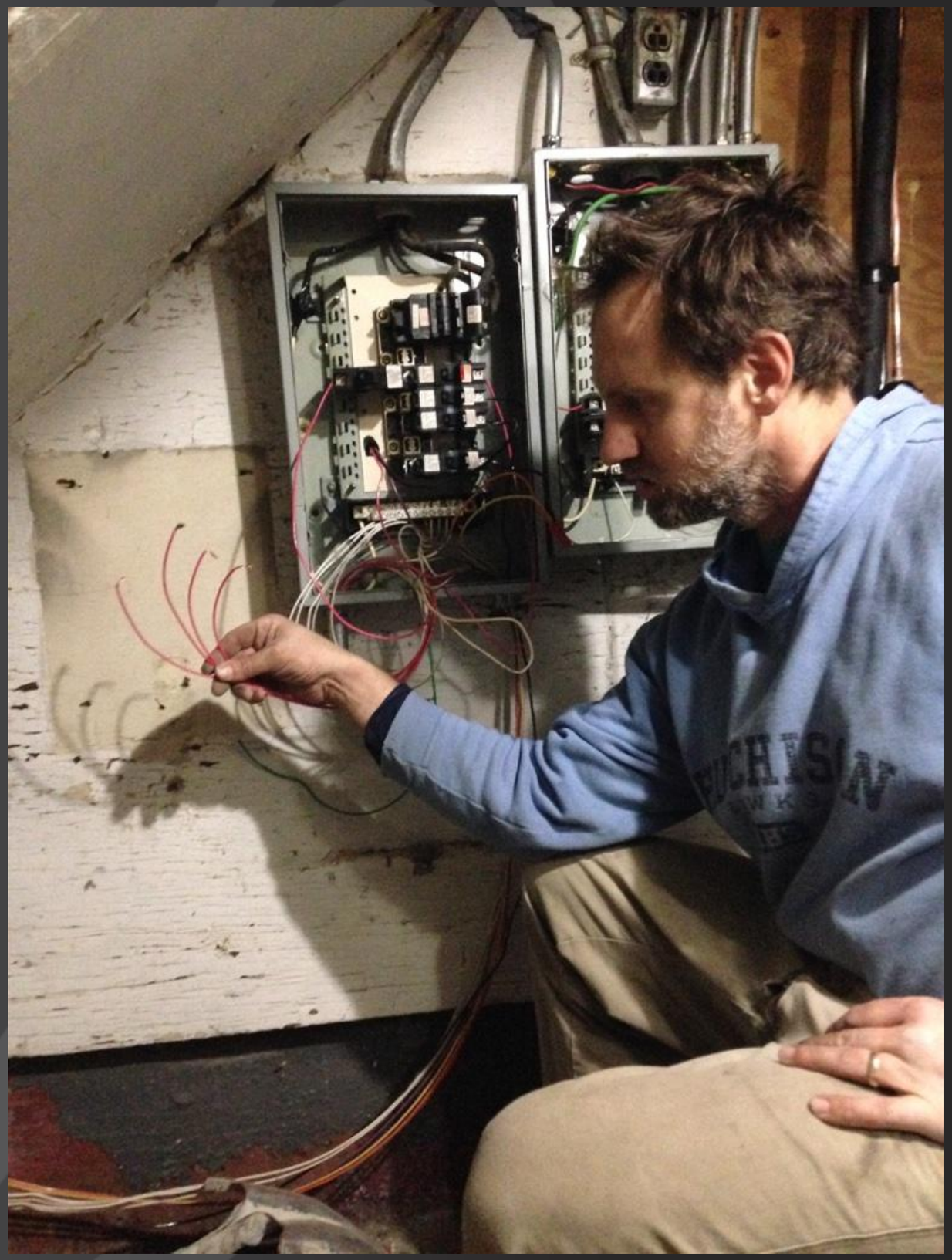
Ignite AMATYC

A fun probability question! What are the chances that of the six red wires I ran through the conduit I would not connect the right one to the panel until the last one.



O'REILLY

Speaking of wire… only a mathematician would ask this question?

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More math and electricity!

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Ignite AMATYC

Plumbing and math fun – the quarter inch to a foot drain ratio.

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Some problems are more difficult because of the spatial reasoning, not the computations

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Quite a bit of math has gone into the project – some necessary, some fun, and some just cool.

O'REILLY

Real Life Applications

- Show relevance even for situations not experienced directly by students
- Should always be couched in real terms, including acknowledgment of other ways of solving the problem
- Important for equity

The Struggle is Real

- What happens when something in your life outweighs what is happening in school?
- How do we respond when it's clear that math class is not our students' first priority?
- How do we construct our classes and policies to engage and challenge students even as we acknowledge that math won't be first priority?

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2nd That Emotion: Support for the Affective Domain

COASTLINE COMMUNITY COLLEGE

Fred Feldon
ffeldon@coastline.edu
slideshare.net/ffeldon

2018

O'REILLY

Well if you feel like giving me a lifetime of devotion, I second that emotion

Smokey Robinson and the Miracles, 1967

Three Domains of Bloom's Taxonomy:

Knowledge Comprehension Application	Feelings Emotions Attitude Behavior	Manual or Physical Skills

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Bloom's Affective Domain

http://www.learner.org/workshops/algebra/workshop6/teaching.html

Krathwol, Bloom, and Masia, 1964, *Taxonomy of Educational Objectives Handbook II: Affective Domain*

Ignite AMATYC

"Develop concurrent support courses and activities to address the affective side of learning."

California Law: AB 705!

2018

O'REILLY

Ignite AMATYC

NCTM | NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

The Affective Domain in the Mathematics Classroom

Imagine a classroom, a school, or a school district where all students have access to high-quality, engaging mathematics instruction ... **Students confidently engage** in complex mathematical tasks chosen carefully by teachers. They draw on knowledge from a wide variety of mathematical topics, sometimes approaching the same problem from different mathematical perspectives or representing the mathematics in different ways until they find methods that enable them to make progress. Teachers help students make, refine, and explore conjectures on the basis of evidence and use a variety of reasoning and proof techniques to confirm or disprove those conjectures. **Students are flexible and resourceful problem solvers**. Alone or in groups, and with access to technology, **they work productively and reflectively**, with the skilled guidance of their teachers. Orally and in writing, students communicate their ideas and results effectively. **They value mathematics and engage actively in learning it.** (*PSSM*, p. 3).

Principles & Standards for School Mathematics, 2000

"The above passage shows the NCTM recognizes the affective domain—that how students perceive mathematics is as important as the topics they study."

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MAA
MATHEMATICAL ASSOCIATION OF AMERICA

HARVEY MUDD COLLEGE

Francis Su's famous talk "Mathematics for Human Flourishing" wins MAA award for Best Paper. He proposes the deeply human themes that drive people to do mathematics can create a more beautiful and just world in which all can flourish!

Visit https://www.math.hmc.edu/funfacts

2018

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“The affective domain plays an undeniable role in education. The Maslowian hierarchy of needs put self-actualization on top of the peak. If our more basic needs aren’t met, there is no internal mechanism to reach our higher potential.

Studies show a direct relationship between the stress response of the hypothalamic-pituitary-adrenal axis, leading to higher cortisol production and cognitive dysfunction, which are associated with lower levels of performance, information processing, memory and problem solving. Simply put—we do not think well when we do not feel well, and that ‘feel’ can be as much psychological as it is physiological.

This interferes with a student’s ability to do well; the focus turns to perceiving the environment as hostile or apathetic. The functioning turns to survival mode, leaving little energy for higher critical or creative pursuits. We need to balance the affective with the cognitive to fully realize the essential goals of education.”

Monica Bhattacharjee, 2014

SFU
SIMON FRASER UNIVERSITY

2018

O’REILLY

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Stanford University

Randomized experiments have found that seemingly “small” social-psychological interventions in education—that is, brief exercises that target students’ thoughts, feelings, and beliefs—can lead to large gains in achievement and sharply reduce achievement gaps even months and years later.”

Yeager and Walton, *Review of Educational Research,* p. 267, June 2011

Ignite AMATYC

“Associating math with joy instead of fear is surely one of our most important goals as teachers!”

Dr. Jo Boaler, Professor of Mathematics Education, Stanford University. Visit www.youcubed.org for more info.

2018

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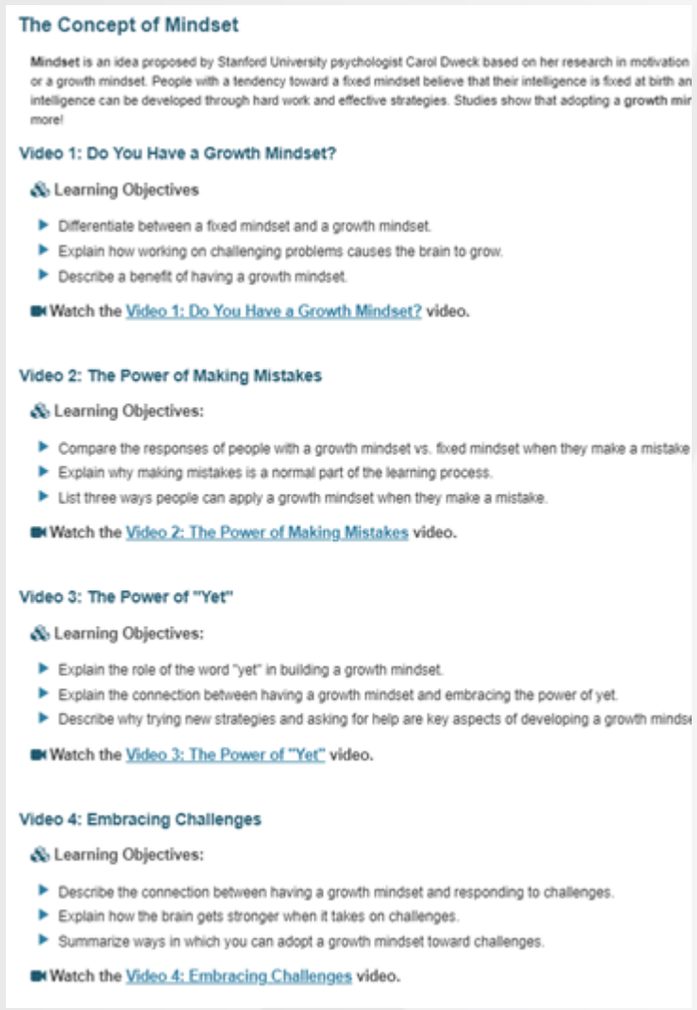
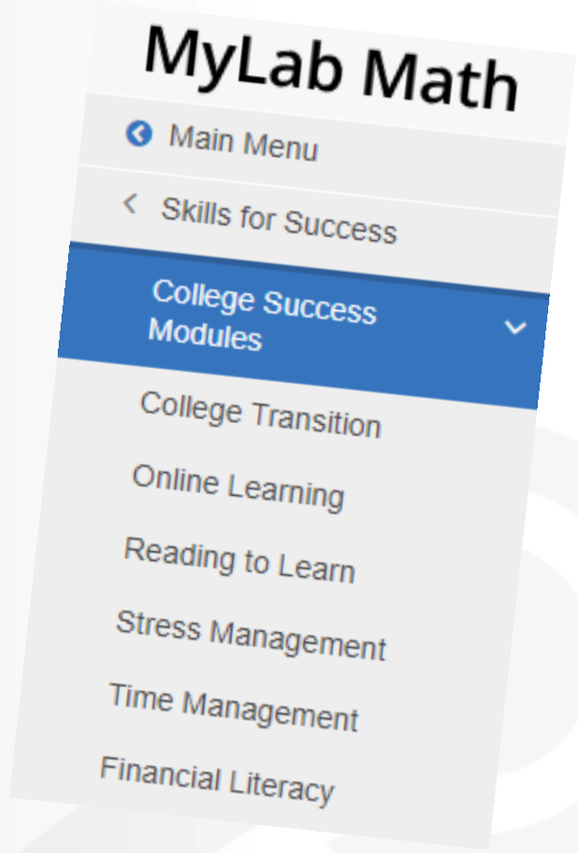
Even Pearson *MyMathLab* Includes Affective Domain!





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Faculty May Resist

- I’m just here to teach content
- There’s no time to cover anything else
- “Joy” should come from the inherent beauty of mathematics
- This is college: it isn’t my job to teach study skills
- Students should already know how to learn
- Why should I bother to motivate students who have the potential to fail?
- If a student fails it’s not my fault
- This is going to fail anyway; soon we’ll be right back to enforcing prerequisites
- Assessing affective domain outcomes is difficult
- I haven’t been trained to deal with affective needs
- Let counselors do it

The Solution: A Professional Learning Community (PLC)

2018

Sample Activities

100 Pages!

PASADENA CITY COLLEGE

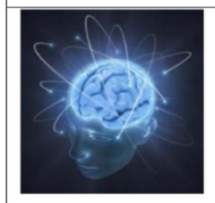
MATH SUCCESS TEACHER PACKET

Math 131 and Math 003

1st Edition

Revised May 2018

Growth Mindset Intervention 1: Brain Function
Faculty PRESENTATION Notes

	www.tinyurl.com/GrowthMindsetIntervention1 *8 Blue, 8 yellow, green handouts*
	☐ As it says on your handout, we go to school to learn, but we do not often talk about **how** we learn. So we are going to spend several sessions this semester talking about how the brain learns.
	☐ To start, on your handout, please write down under Question 1 anything you know or believe about how the brain works. ☐ I'll give you a couple of minutes for this. ☐ Great. Finish up your last thought. ☐ Okay, and we're going to move on.
	☐ Now we're going to talk more about how the brain functions. ☐ And watch a short video about the brain structure.
	Video plays ☐ Okay, so we're going to take a closer look at neurons and dendrites.

Learning Discussion 1: Brain Function
Handout – these are the yellow, blue, & green pages

Name: _____

We go to school to learn, but we do not often talk about how we learn. So we are going to spend several sessions talking about how the brain learns.

Question 1/Freewrite: Describe how your brain works.

_____

_____

_____

_____

_____

Question 2: Do you think an adult's height is fixed, or it grows?

_____

Question 3: Do you think an adult's muscles are fixed, or they grow?

_____

Question 4: Do you think intelligence is fixed, or grows? Why?

_____

_____

_____

_____

Something to think about for the future: Think of a specific time when you learned a new physical skill, or subject in school. How did you learn this? Was learning this stressful? How might this past learning experience be seen as an example of "growing" your mind?

Created by and adapted from Apigo & Powers

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Sample Activities

Ignite AMATYC

Convincing Students to Change Their Mindsets about Their Math Abilities

Author: Carolyn Robinson
Subject: Specifically math for the first video by Jo Boaler. Any subject if first video is not shown.
Created: 2017-08-24

From The Author

A plethora of information has been released which supports the fact that our intellect is not fixed and that our brains can grow and change. The information is inspiring, as it encourages students to change their mindsets in order to achieve success and persevere through difficult learning tasks. Being at the community college, I frequently encounter students from semester to semester who through various life challenges, believe they do not possess the intellect to be successful in college. This toolkit contains information about brain growth and plasticity, and dispels the notion that you are born with the brains you have and that your intelligence is fixed. These resources have served as a mechanism to motivate students in believing they have the skills to be successful in math.
- Carolyn Robinson

Toolkit Overview

This toolkit contains video, internet assessments and pdf resources which can be used individually or collectively as a homework assignment, or as an in-class presentation to introduce students to the growth potential of their brains. An assessment is included to assist students in identifying their own mindsets. The video resources are closed-captioned and presented by prominent professionals in their field.

Steps To Implement

I generally assign this activity as an extension of class by introducing one video during class and assigning one to two mindset assessments, two additional short videos and a brief pdf reading assignment. I encourage students to take notes while watching the videos and reading the assigned article. I ask the students to be prepared to display a screenshot of their mindset results, and create a brief summary of what they learned from the information.

Toolkit Survey

Faculty Toolkit Survey

Please rate the usefulness of this toolkit.

Extremely useful

Very useful

Online Resources

- A TED Talk video presented by Jo Boaler of Stanford University.
- A Brief Mindset Assessment
- An Interactive Quiz and Videos Pertaining to Mindset
- A PDF Pertaining to Growing Your Intelligence
- The Power of Perseverance by Angela Duckworth

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Sample Activities

COLLEGE OF THE CANYONS

One-Semester Affective Domain Faculty Mentoring Program

Essential Activity #3: When to Let Learners Struggle

Setup:
Many instructors assign these activities for the weekend so that students have more time to reflect on the material. However, it is a shorter article and can be assigned any day.

https://www.canyons.edu/Faculty/silvad/Documents/Struggle%20A

Implementation:
Please respond to following questions using complete sentences. Pl
question thoroughly and honestly.

1) What were the results of the study mentioned in this article?
2) What are the three conditions Kapur identified that promote a better lea
3) Briefly state (in one sentence) the conclusion of this article.
4) Describe an example in your own life that supports this article's conclusic
5) Do you agree or disagree with the article's conclusion? Why?

Closure:

The following day, facilitate a class discussion.

- Ask students to share their thoughts about the article
- Ask students about their own experiences with struggle and how they ov
- As an option, you can do the "Ten Minute Plan" mentioned in this article

Essential Activity #4: How to Make Stress Your Friend

Setup:
Watch the following TED Talk video

http://www.ted.com/talks/kelly_mcgonigal_how_to_make_stress_your_friend

Implementation: Questions for Students

Please respond to the following using complete sentences.

1. Before watching this talk, did you believe that stress was bad for you? What do you think now?
2. How does the speaker say your body prepares you to overcome stressful situations? Do you recognize these responses from your past experiences?
3. The stress hormone _____ is also known as the _____ hormone.
4. Chasing meaning in your life is better for your health than trying to _____
5. How can we protect our bodies from the harmful effects of stress? How should we respond when we feel stressed?

Closure:

Ask students to write a reflection on what is the most important thing they have learned from this activity. Have them write about a time when they were stressed, and how it helped them become stronger?

Optional Activity #3: Dare to Disagree

Setup:
Watch the following 13-minute video:

https://www.ted.com/talks/margaret_heffernan_dare_to_disagree

Most people instinctively avoid conflict, but as Margaret Heffernan shows us, good disagreement is central to progress. She illustrates (sometimes counterintuitively) how the best partners aren't echo chambers — and how great research teams, relationships and busi allow people to deeply disagree.

Implementation:
Watch the video and type your response to the following:

1. Briefly summarize two stories the author provides to support why it is important "Dare to Disagree."
2. In one sentence, what is the point of the article? Are you surprised by this?

upports the thesis of this article.
ive a classmate who says, "I think t
something?"

her as a class discussion or in a disc

Optional Activity #2: The Secret of Effective Motivation

Setup:
Read the following article: https://www.nytimes.com/2014/07/06/opinion/sunday/the-secret-of-effective-motivation.html?_r=0

Implementation:

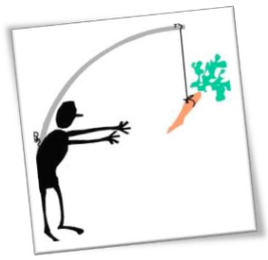
Read and type your response to the following:

1. List and define the different types of motivation.
2. In one sentence, what is the point of the article? Are you surprised by this?
3. Provide an example from your own life that supports the thesis of this article.
4. Based on this article, what advice would you give a friend who says, "My parents want me to become a doctor, because they make a lot of money; but I want to become a statistics instructor because I love data and working with students.

OR

Based on this article, what advice would you give a friend who says, "My parents want me to become a doctor because they make a lot of money, but I want to become an elementary school teacher because I love children and organizing activities for them"?

Closure: You will be responding to each other either as a class discussion or in a discussion board online.



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Fred's Favorites - https://bit.ly/2QmHbWL

THE MATH AFFIRMATIONS

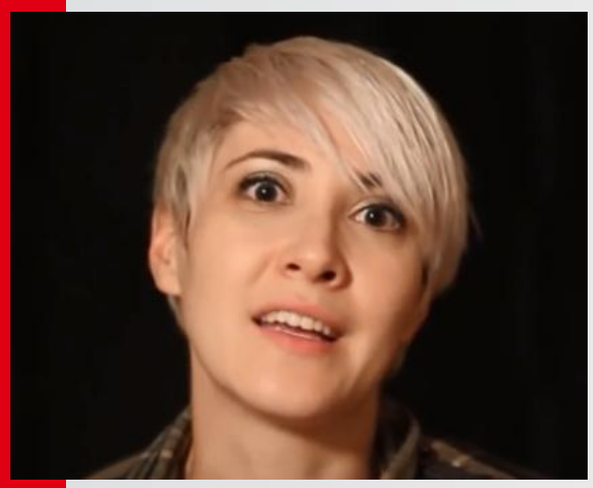
1. I am capable of learning and doing math.
2. Knowing math will positively affect my destiny.
3. Math is everywhere in the world.
4. Hard work is often mistaken for luck or natural ability.
5. If I play the victim, I will give up my power to change the world.
6. I may not know how to do something today, but I *WILL* tomorrow.
7. I will be patient with myself and others when learning math.
8. Success comes from not being afraid to ask questions.
9. Asking for help isn't embarrassing, not asking for help is.
10. I have a right to be selfish about my needs as a student.

Geillan Aly, PhD. University of Hartford, Hillyer College

Fred's Favorites - https://bit.ly/2QmHbWL

A Math Major Talks About Fear

Have you ever thought "I'm terrible at math?" or "I'm just not a number person?" or had "math phobia?" Watch this four-minute video. Post your comments and feedback. What did you learn? Did it change any feelings about yourself, or about learning math?



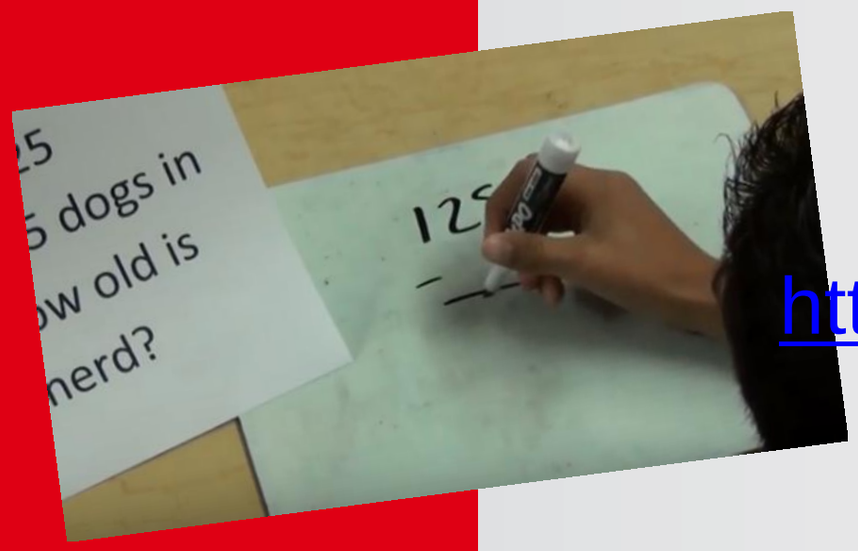
https://www.youtube.com/watch?v=Xs9aGVUZ3YA

Fred's Favorites - https://bit.ly/2QmHbWL

Math Mistakes *OR* **#mathmistake**

http://mathmistakes.org

https://twitter.com/hashtag/mathmistake



How Old Is the Shepherd?

https://www.youtube.com/watch?v=kibaFBgaPx4

Sources for Non-Routine Problems That Stimulate Discussion

Books

Math Contests Grades 4-6, 7-8 and Algebra, by Conrad & Flegler, Math League Press
Math Contests High School, by Conrad & Flegler, Math League Press
Can You Solve My Problems? By Alex Bellos Math Puzzles Vol. 1, 2 and 3 by Presh Talwalkar
Principles to Actions: Ensuring Mathematical Success for All, NCTM
The Scientific American Book of Mathematical Puzzles and Diversions, by Martin Gardner
What Students Abroad Are Expected To Know About Mathematics: Exams from France, Germany and Japan
Empowering Students by Promoting Active Learning in Mathematics, NCTM
Challenging Math Problems, by Terry Stickels

Websites

http://mathforum.org/problems_puzzles_landing.html http://blog.mrmeyer.com
http://cemc.uwaterloo.ca/resources/potw.php http://donsteward.blogspot.co.uk
http://www.mathleague.com https://ed.ted.com http://www.onetwoinfinity.ca
https://www.mathcounts.org/resources/problem-of-the-week
https://www.math.purdue.edu/pow https://mindyourdecisions.com
http://orion.math.iastate.edu/ehjohnst/PoW/PoW.html
http://www.numberphile.com http://www.openmiddle.com
http://www.sixtysymbols.com http://www.estimation180.com
http://mathmistakes.org https://twitter.com/ExploreMTBoS (Math Twitter Blogosphere)
http://www.sciencealert.com https://twitter.com/MathVault
http://www.iflscience.com http://wodb.ca (Which One Doesn't Belong)
http://www.ted.com http://www.visualpatterns.org
http://www.smartereveryday.com http://mathquest.carroll.edu/
https://www.youtube.com/channel/UC1_uAIS3r8Vu6JjXWvastJg (Mathologer)

Journals

Journal for Research in Mathematics Education, NCTM
Mathematics Teacher, Monthly Calendar Problems, NCTM

Thank You!

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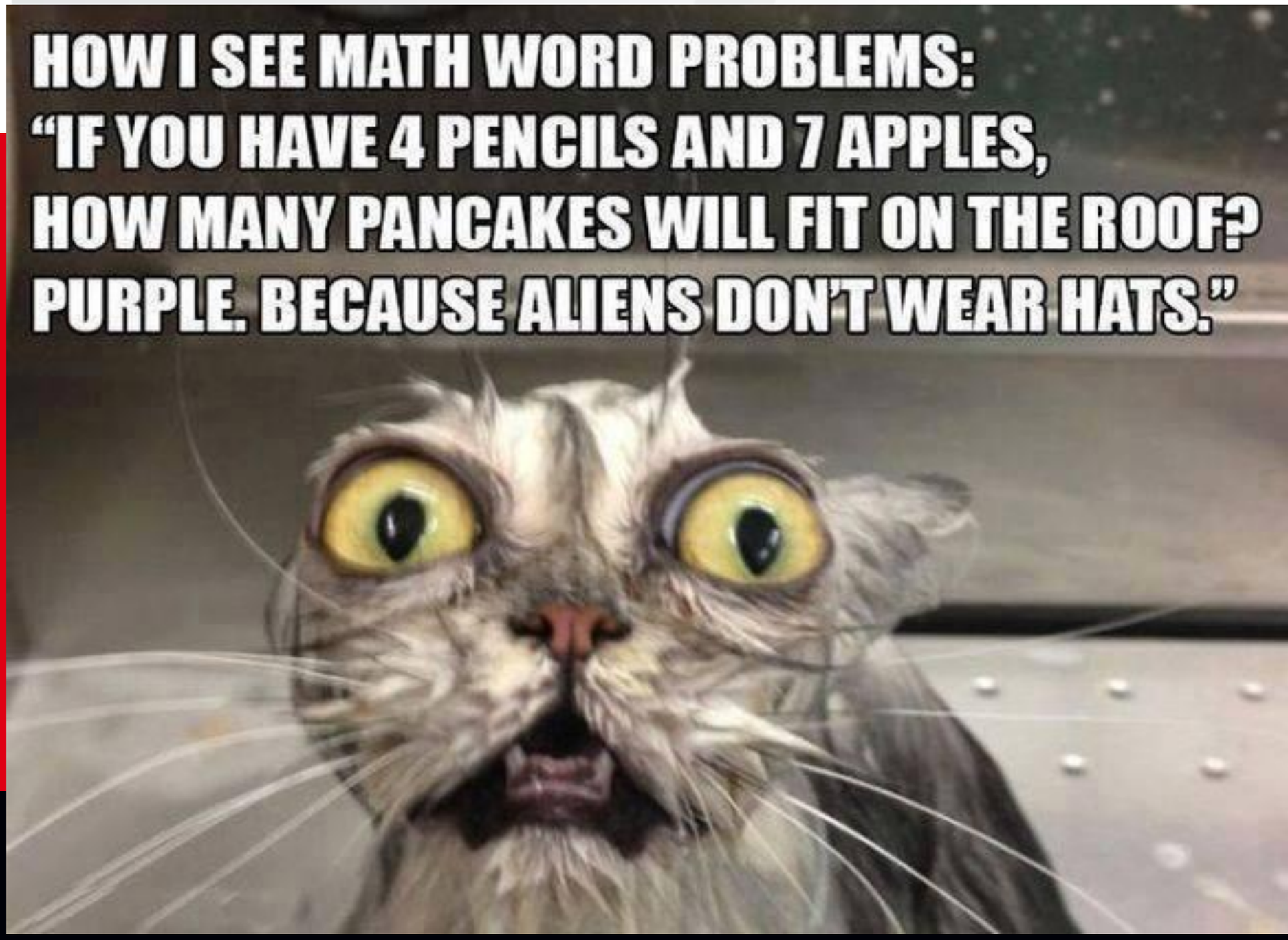
https://bit.ly/2PiEKb

How my Friends see Math on Facebook

Jennifer Ackerman - JCTCS



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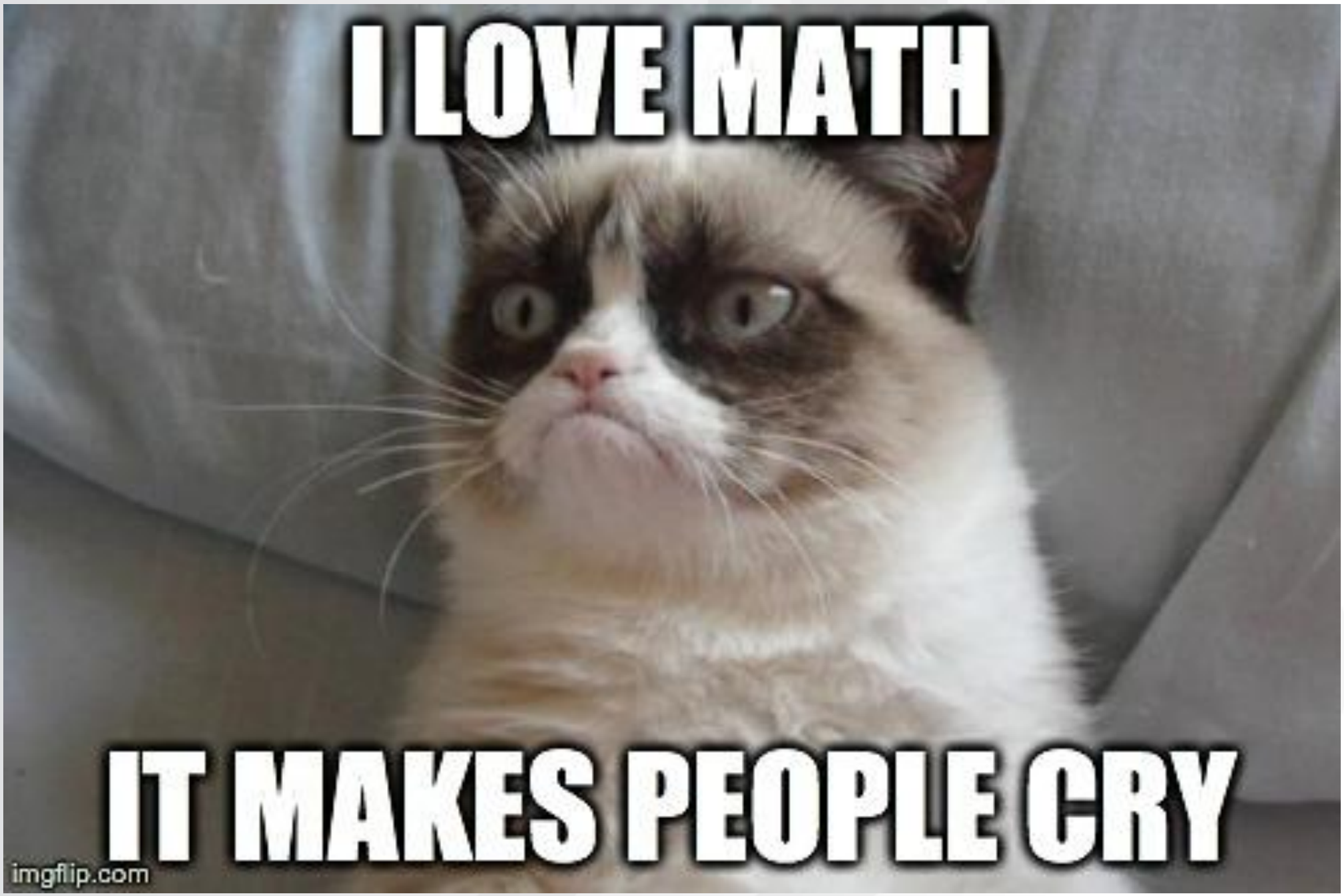

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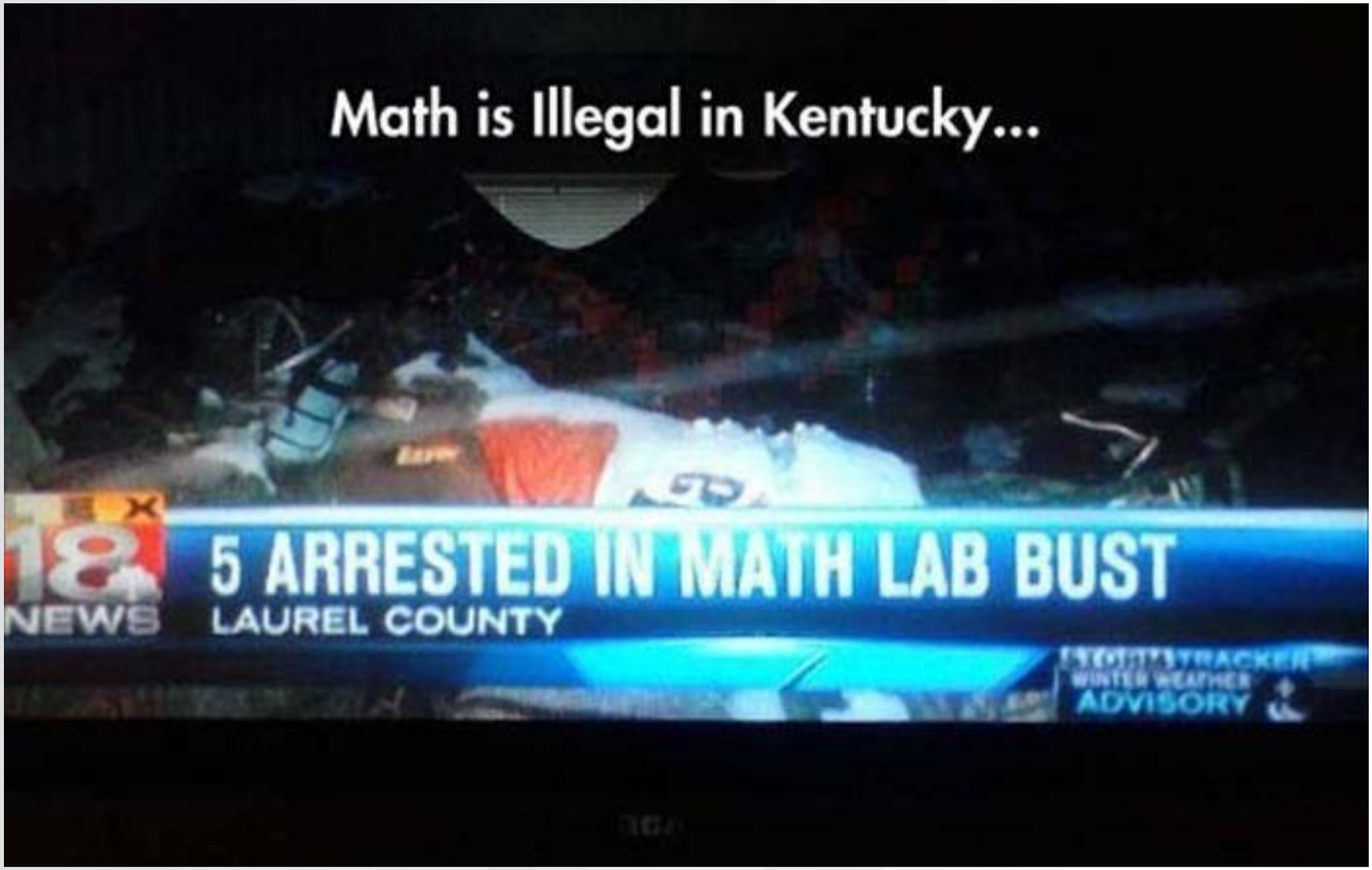

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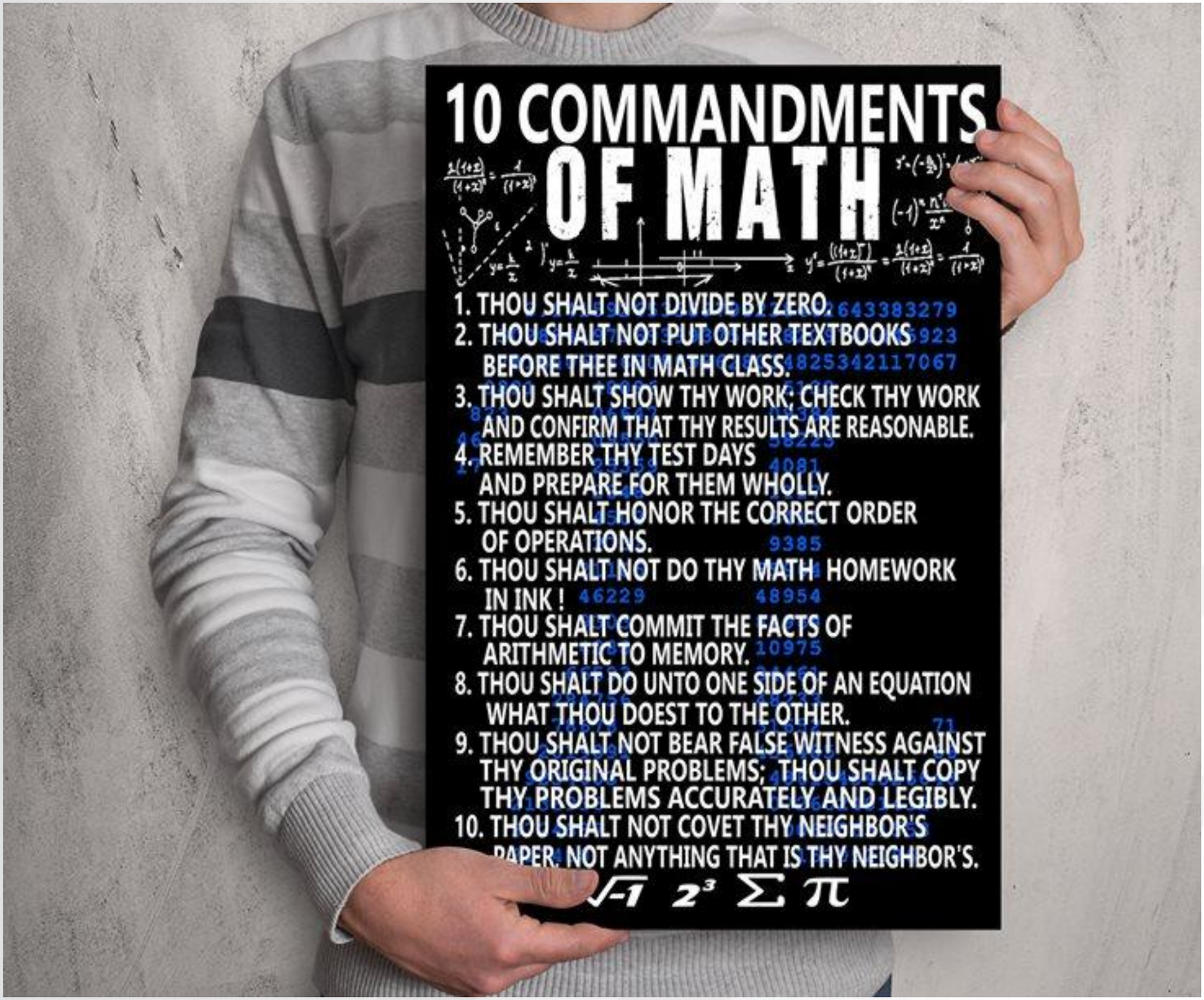

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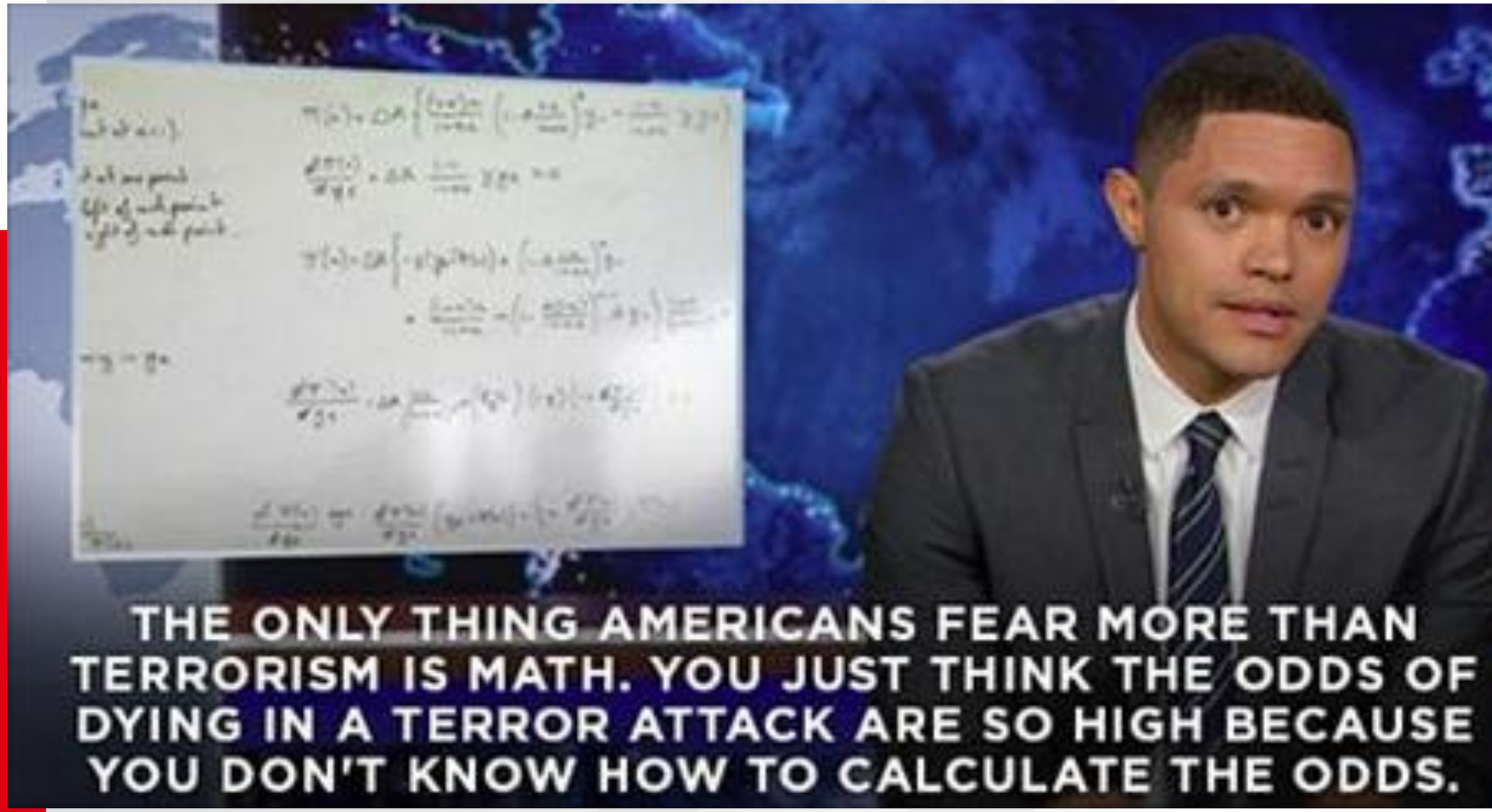

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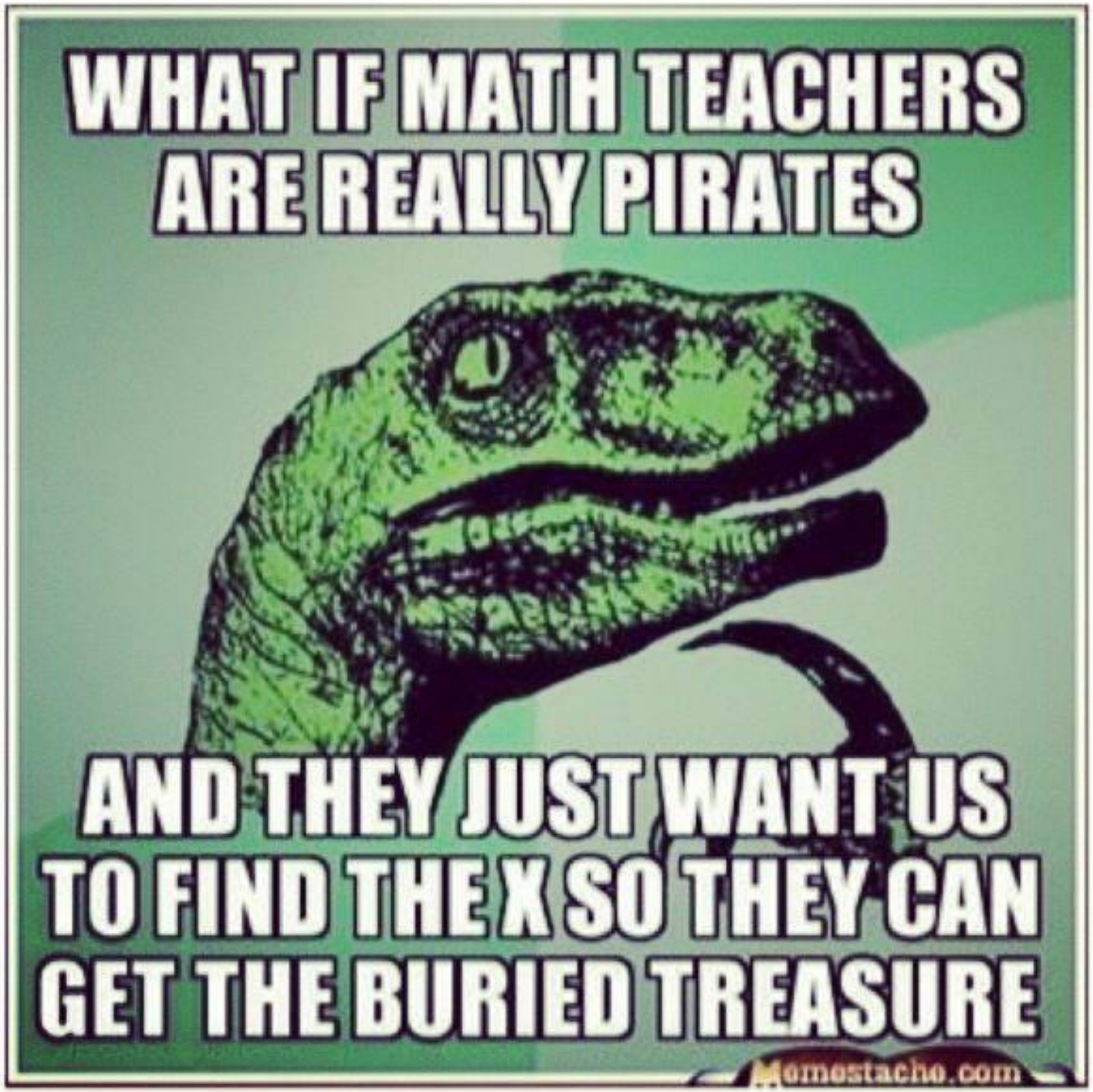

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$$\text{Velociraptor} = \frac{\text{Distanceraptor}}{\text{Timeraptor}}$$

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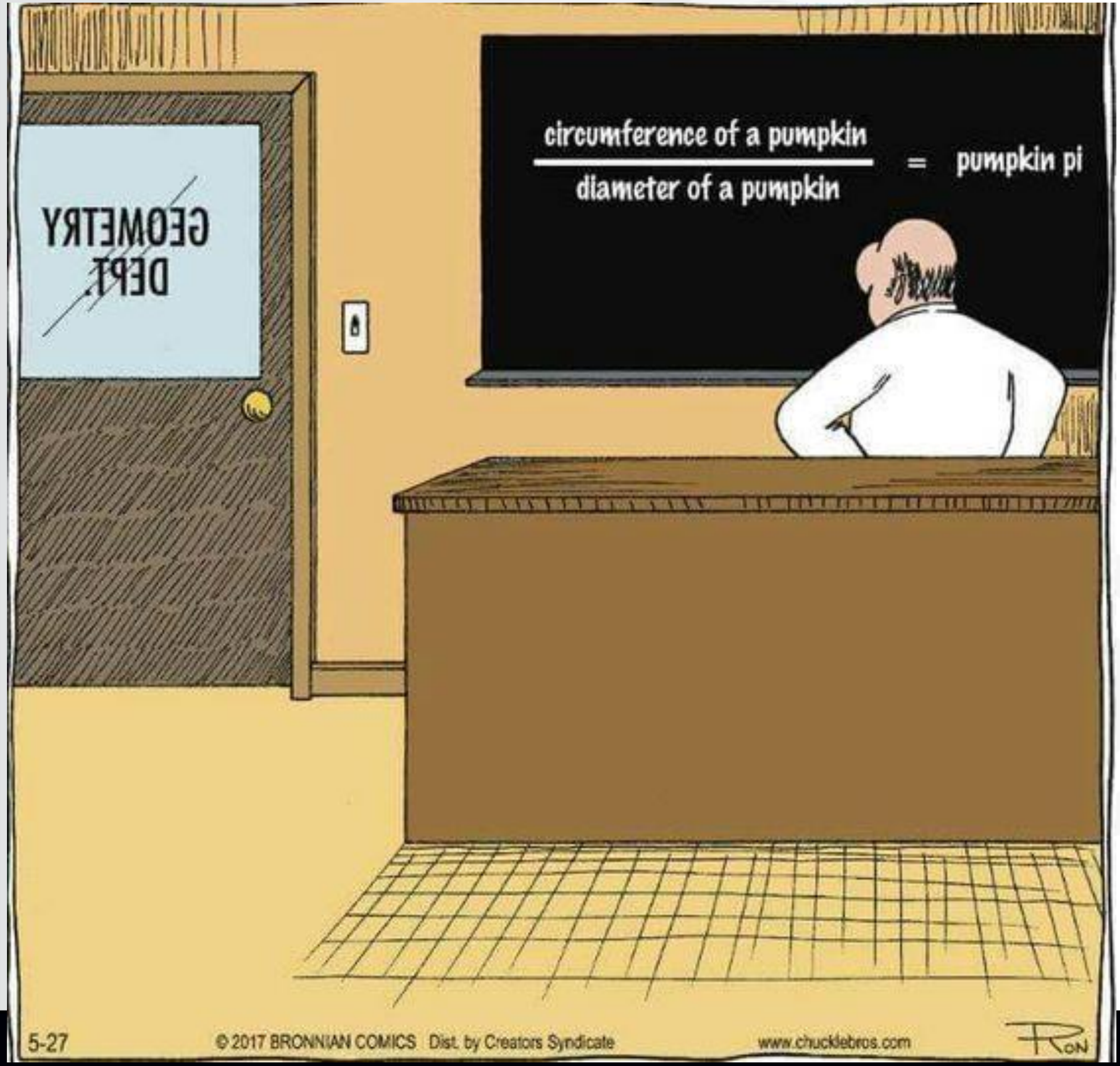

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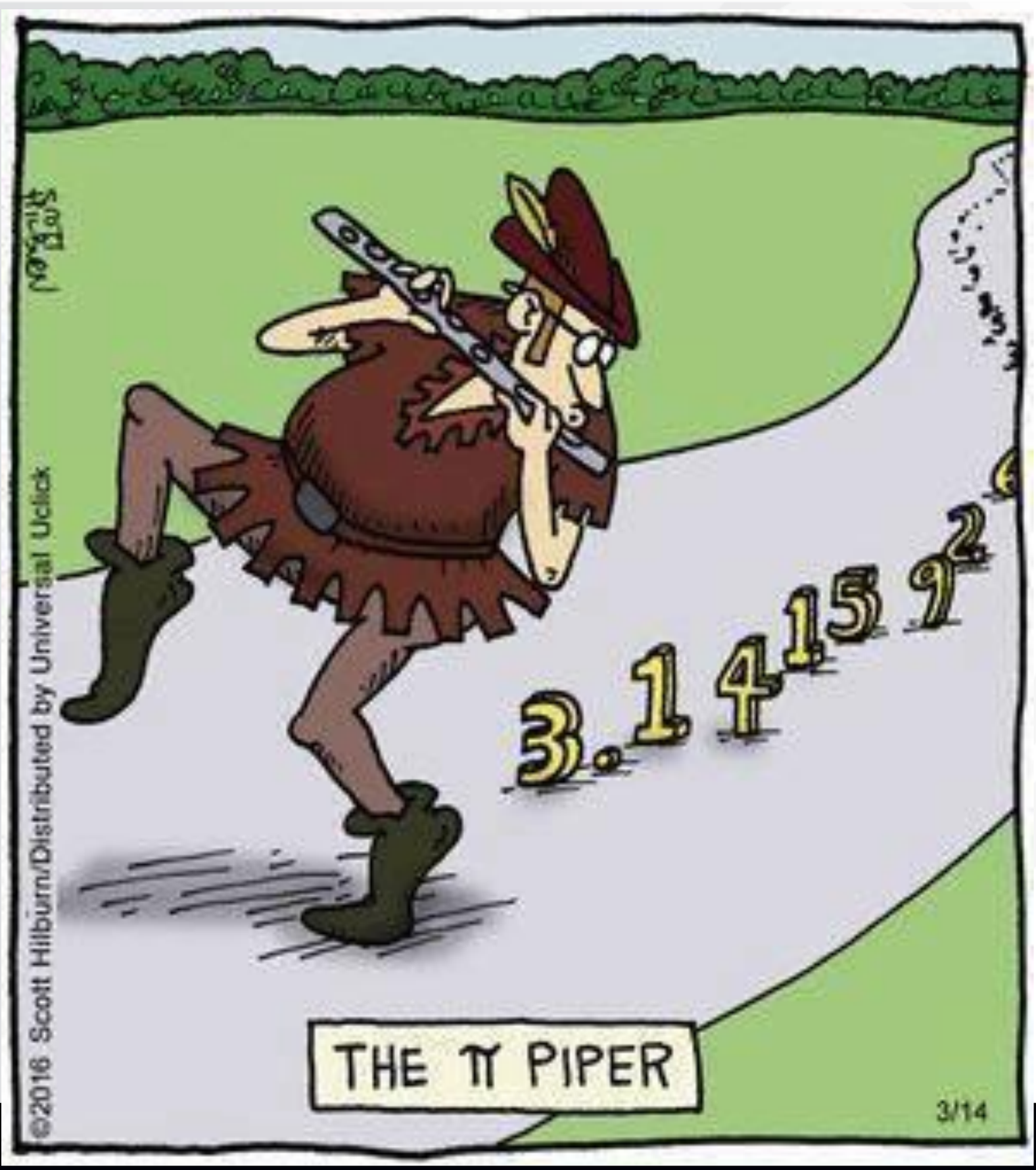

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what do you call a snake that's
3.14 meters long?
A π-thon

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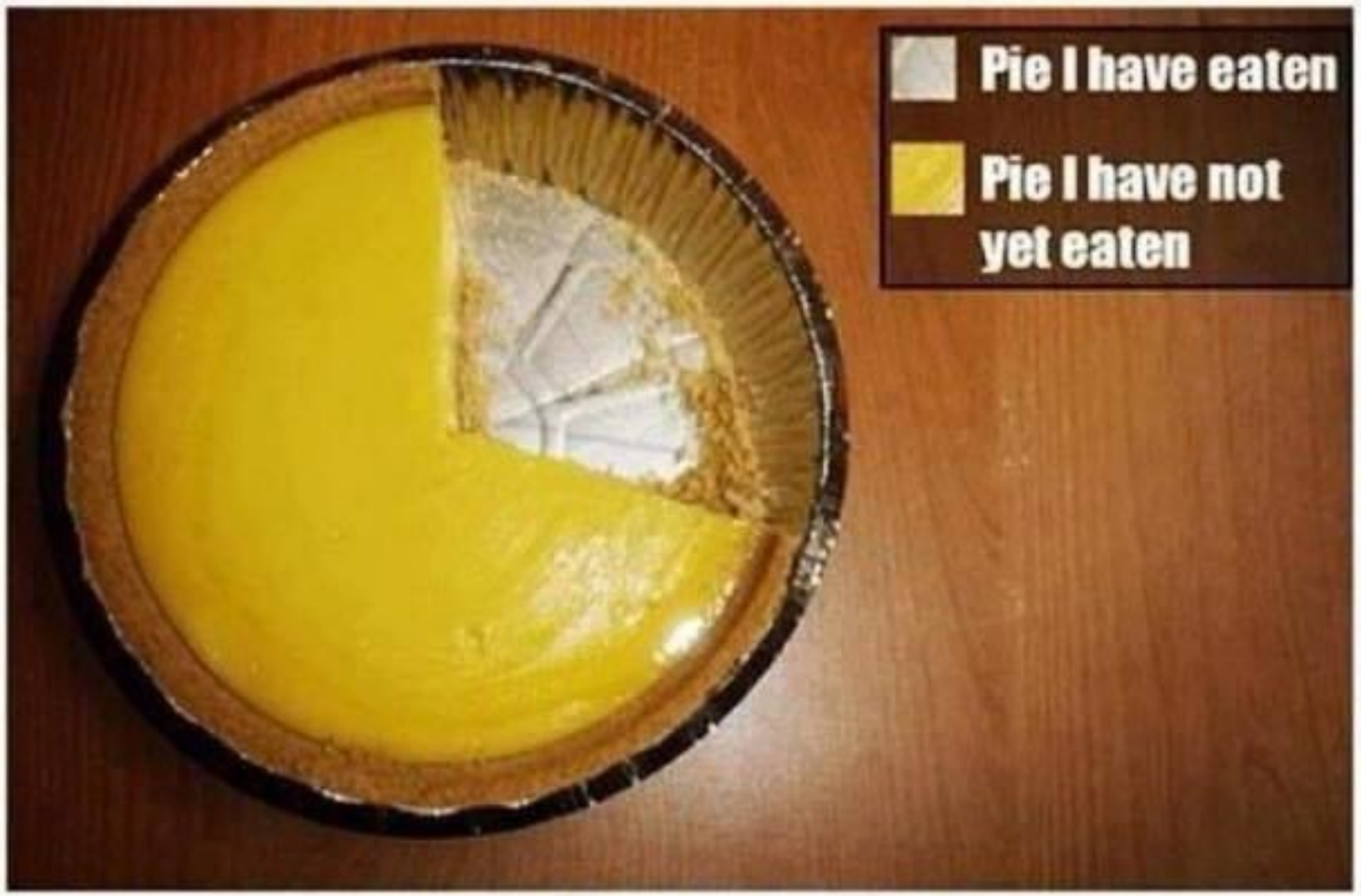
World's Most Accurate Pie Chart



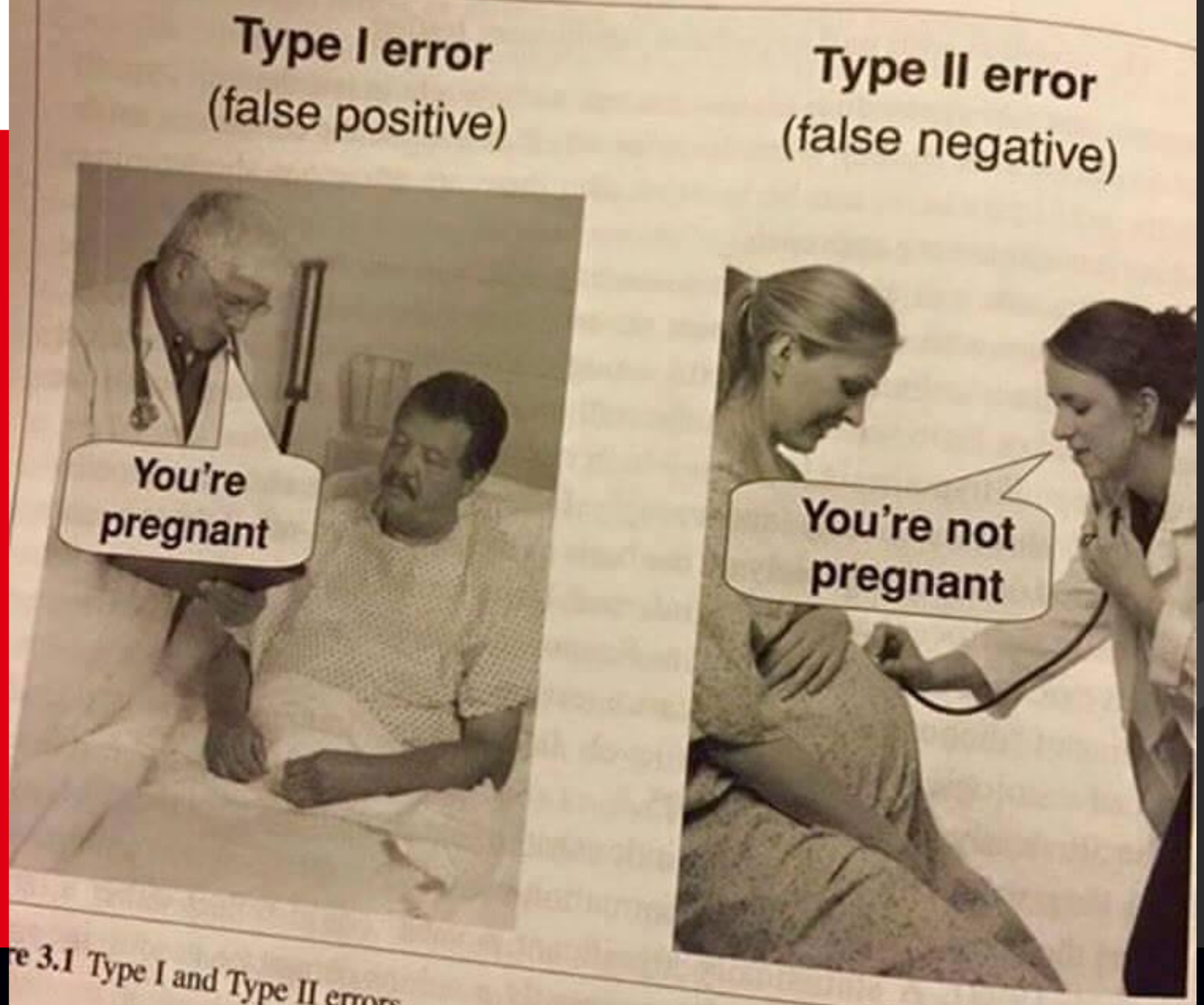


Figure 3.1 Type I and Type II errors

levels to .01 or even .001

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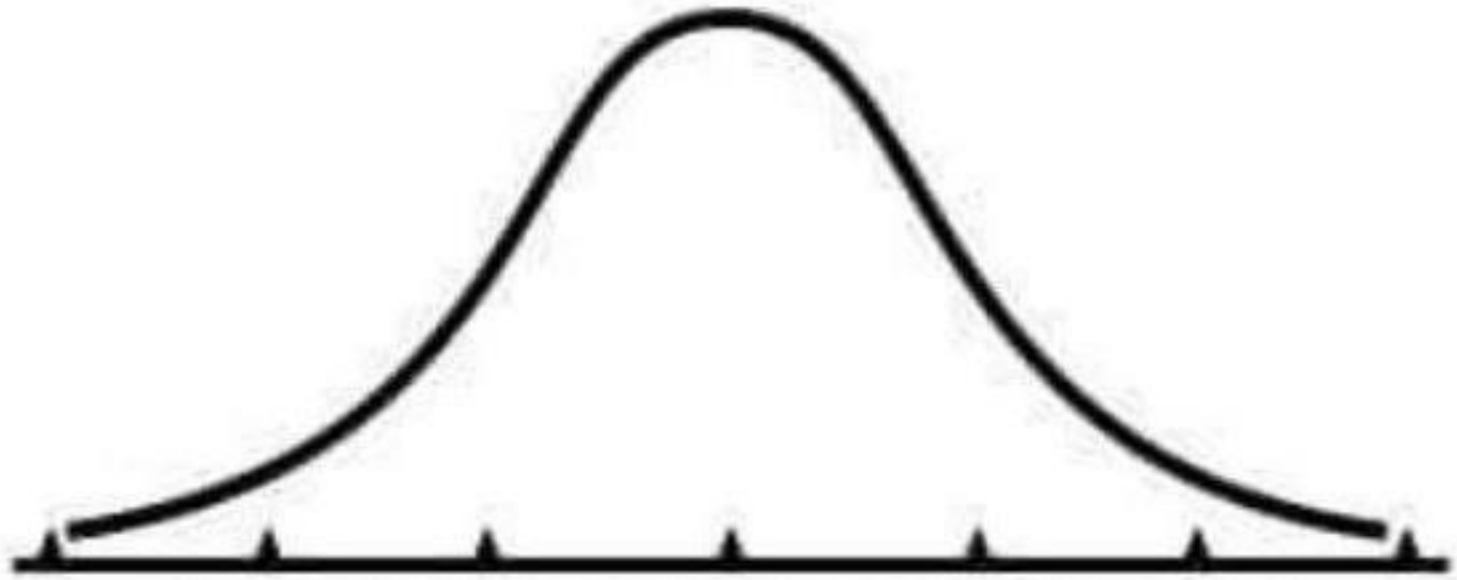

NORMAL DISTRIBUTION

PARANORMAL DISTRIBUTION

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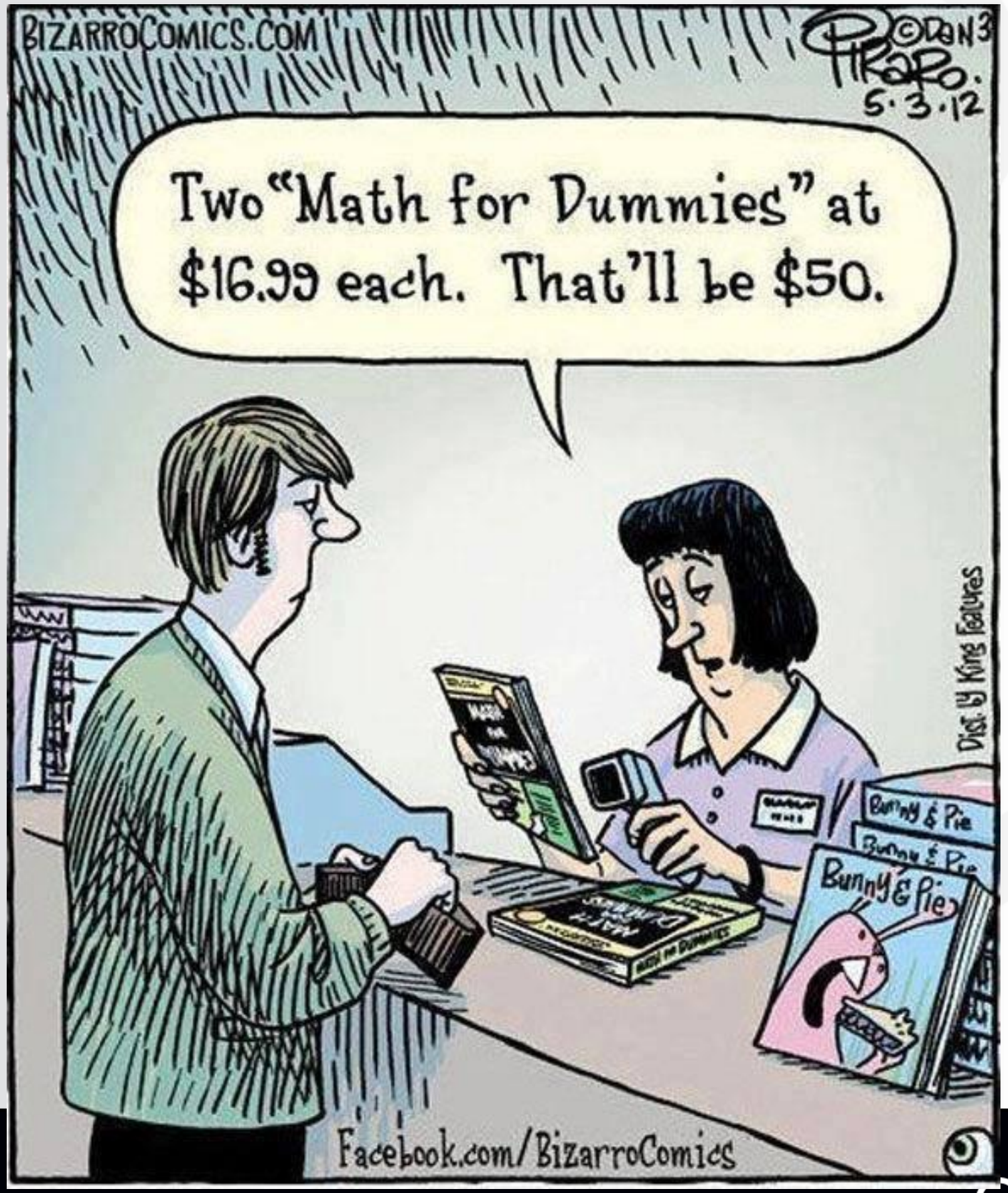

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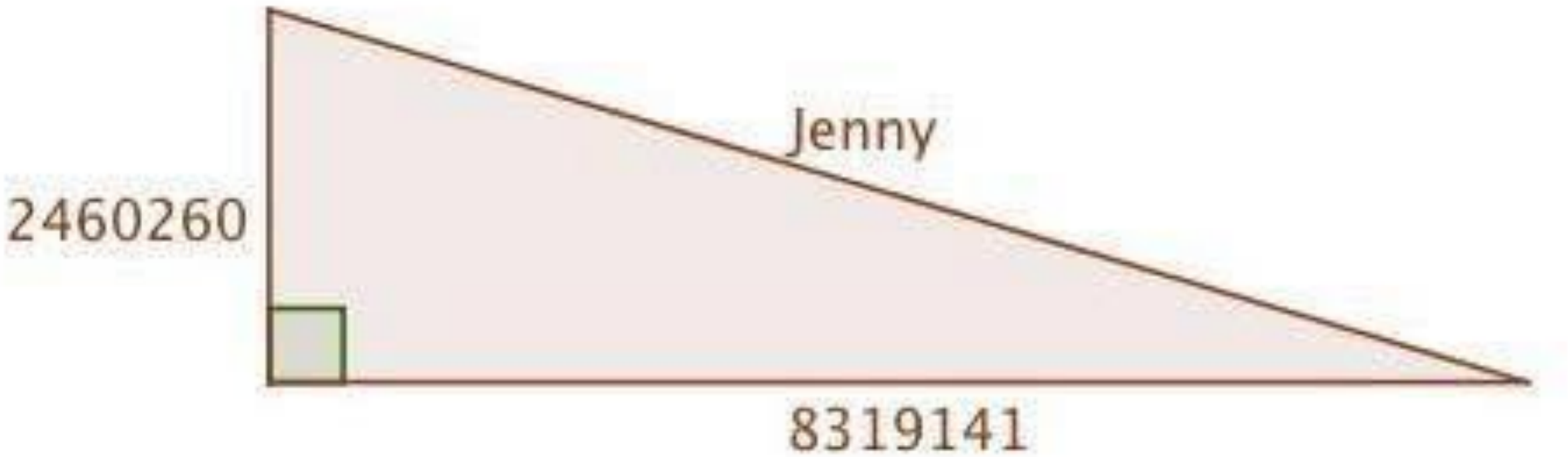

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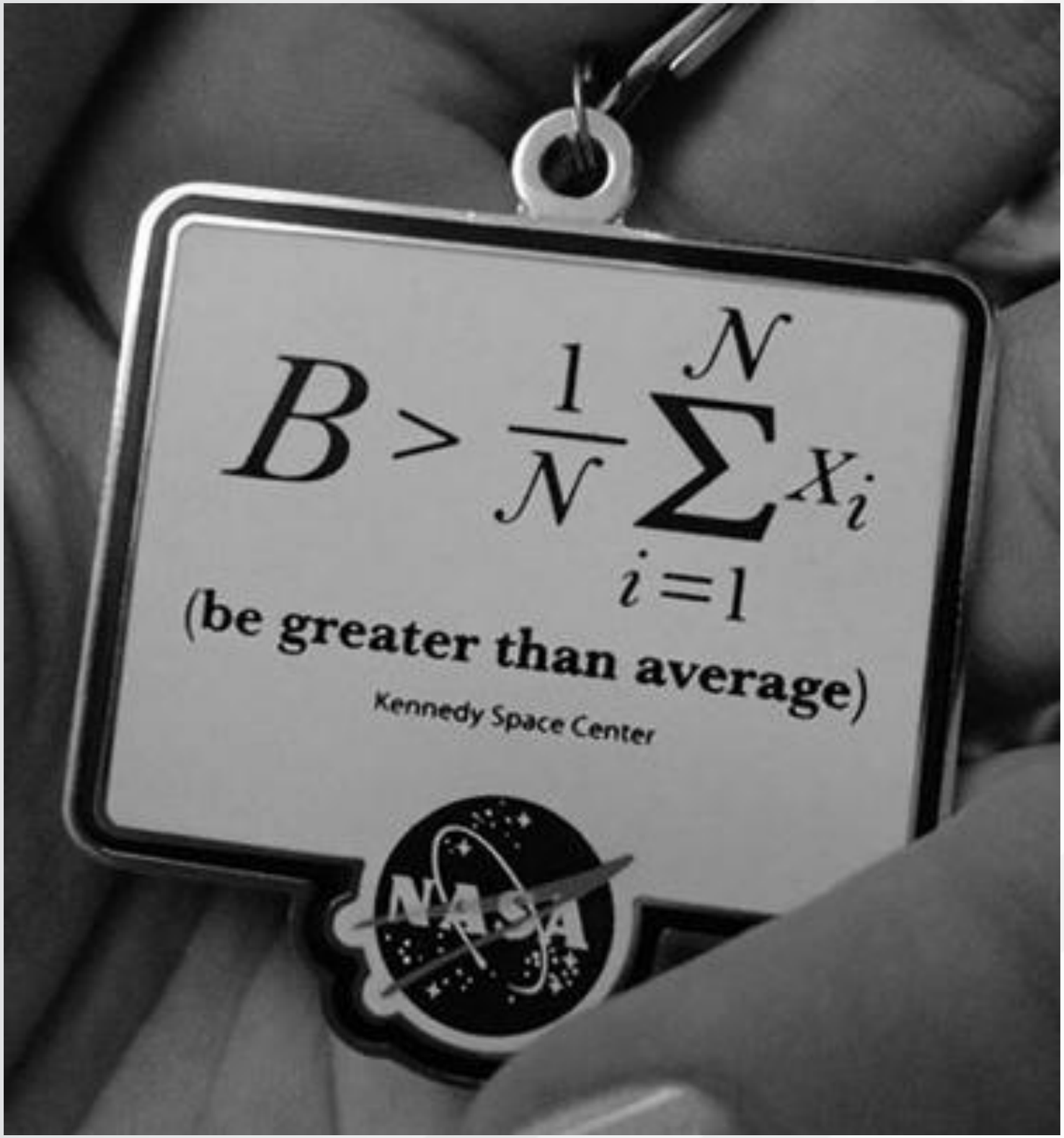

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toothlessrebel

A limerick:

$$\frac{12 + 144 + 20 + 3\sqrt{4}}{7} + (5 \times 11) = 9^2 + 0$$

Doesn't look like a limerick to you? Try this:

> A dozen, a gross, and a score
> Plus three times the square root of four
> Divided by seven
> Plus five times eleven
> Is nine squared and not a bit more.

janothar

Fine, fine, we'll kick it up a notch:

Integral zee squared dee zee
From one to the cube root of three
Times the cosine
Of three pi over nine
Is the log of the cube root of e

$$\int_1^{\sqrt[3]{3}} z^2\,dz \times \cos\frac{3\pi}{9} = \ln(\sqrt[3]{e})$$

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Unforeseen Consequences

I
wrote
a poem
on a page
but then each line grew
to the word sum of the previous two
until I started to worry about all these words coming with such frequency
because, as you can see, it can be easy to run out of space when a poem gets all Fibonacci sequency.

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