

Jane Long

*mathematics & statistics*

# A Few of James Lang's *Small Teaching* Pitches in Practice

SFASU CTL Teaching Showcase

February 28, 2023

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Department of Mathematics & Statistics

# Predicting and Motivating



Spring 2023

Consider this scenario...

Nick drove the 60 miles from Nac to Tyler in 1 hour.

The speed limit is 60 miles per hour.

*Was he ever speeding?*

Consider this scenario...

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The speed limit is 60 miles per hour.

*Was he ever speeding?*

**Idea: Average rate of change (60 mph) versus**

**Instantaneous Rate of Change** (speedometer reading)



This is Calculus 1!

# Retrieval Practice

## Quick Check-in:

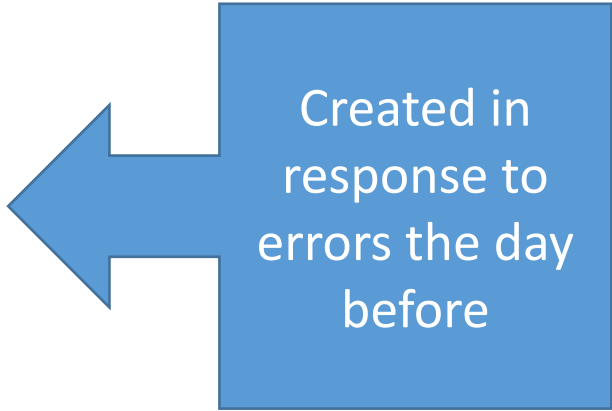
A. If  $f(x) = 2x + 7$ , then  $f(a + h) =$

B. True or False:  $\frac{1}{2} + \frac{1}{3} = \frac{2}{5}$

C. True or False:  $\frac{1}{x} + \frac{2}{x+5} = \frac{3}{x+x+5}$

D. What is the equation of a line?

E. What does *tangent* mean?



Created in  
response to  
errors the day  
before

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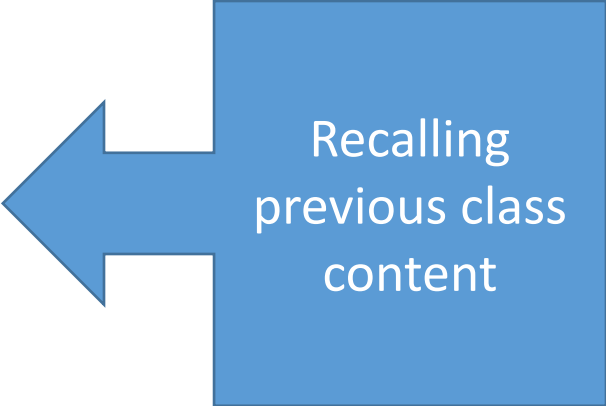
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Recalling  
previous class  
content



# To Start Today

Work together to  
write *all* the  
**derivative rules**  
we know on the  
board.

Work together to  
put relevant  
**trig identities**  
on the board

# Quick Check-In

Find at least 3 different ways to describe the derivative.

# Some Retrieval Practice Objections

- *Takes too much time*
- *They should already know this, I shouldn't have to*
- *My job is to teach critical thinking*

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- *Takes too much time*



Make small changes

- *They should already know this, I shouldn't have to*

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Make small changes

If you don't, who will?

- *They should already know this, I shouldn't have to*

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# Some Retrieval Practice Objections

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If you don't, who will?

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Students must have something to think critically about

# Exit Papers

# Exit Paper

Ask a question

and/or

Tell me how class is going for you



# Exit Paper

How do you organize  
your class notes/papers?

# Exit Paper

What prevents you from coming to office hours?

Motivating  
(In a Different Sense...)

# What Shows *Satisfactory* Understanding?

- Show your work
- Right answer – except for minor issues that don't mask understanding
- Proper notation
- Able to follow reasoning/work on the paper
- Be sure to use that learning target/topic
- Use class vocabulary/laws/ideas
- Be able to write 1-2 sentence explanations



The students  
generated this  
list!

# Motivating (In a Different Sense...)

*The energy that actually shapes the world  
springs from emotions.*

*George Orwell*

# Exit Paper

Ask a question

and/or

Tell me how class is going for you

# Questions for Dr. Long

- Favorite TV show? **Ted Lasso**
- Favorite cereal? **I kind of hate cereal, but I like Chex Mix**
- Favorite snack? **Dark chocolate!**
- Favorite soda? **Original Coke**
- What do I like to do on the weekend other than baking?  
**Sleep, read, hang out with kids and dog**
- Do you like cheesecake or pie?  
**I'm gluten-free and dairy-free, so...**
- If you weren't a math professor, what else would you do?  
**Childhood dream: professional ballet dancer**  
**Realistically: teach K-12 or something with computing**



**Chance the Doggo**

## Your Goals

- Be confident when a problem is put in front of me
- Do better than before
- Get comfortable with calculus
- Really understand the math
- Deep understanding of how things work
- Use critical thinking skills

- Pass the class
- Make an A
- Move on to calculus II
- Graduate

- Be successful in the future
- Become an engineer
- Go to med school
- Be able to use calculus in the navy
- Apply knowledge to chemistry
- Become an actuary
- Use calculus in computer science
- Use calculus in my future career



# References

- Lang, James M. *Small Teaching: Everyday Lessons from the Science of Learning*, 1<sup>st</sup> edition. Jossey-Bass, 2016. <https://jamesmlang.com>
- SFASU CTL Training: *Principles of Small Teaching*, facilitated by Megan Weatherly, August 2021. Materials available at <https://www.sfactl.com/january-jumpstart>
- Jane Long, longjh@sfasu.edu

Thank you!