Onboarding Instructors in an Active Linear Algebra Course

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University of Toronto

Alfonso Gracia-Saz
1976–2021
Educator, Mentor, Friend

Post your memories of Alfonso at
https:
//uoft.me/alfonso-memorial

The Course

Linear Algebra I, MAT223 (*per semester*)

- ∼1100 students
- ∼7 sections
- ∼7 instructors (mostly inexperienced)
- First-year students (mostly inexperienced)

Redesign Linear Algebra I, MAT223

- Revamp curriculum
- Provide a uniform student experience
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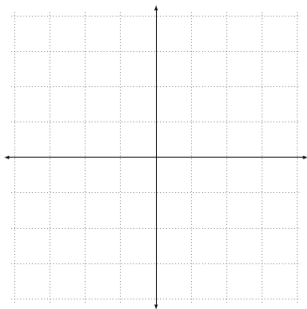   - ❯ Provide high-quality materials and guides.

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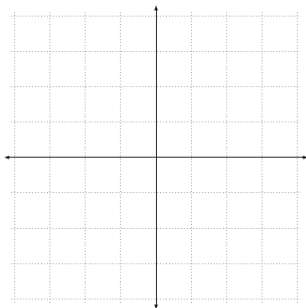27.4 If possible, express A as a span.

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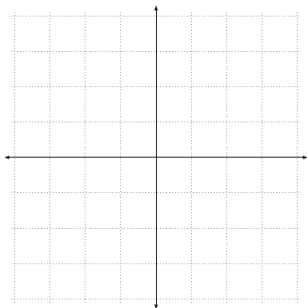
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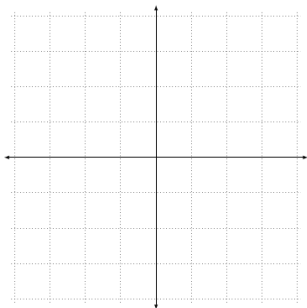# What does active learning look like in MAT223?

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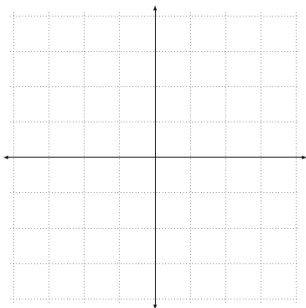# What does active learning look like in MAT223?

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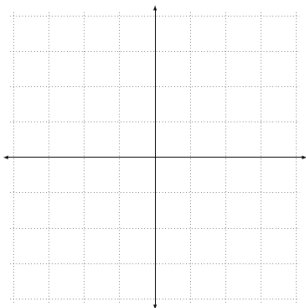# What does active learning look like in MAT223?

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5. Wrap-up

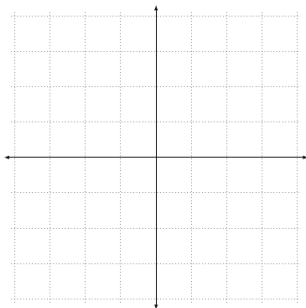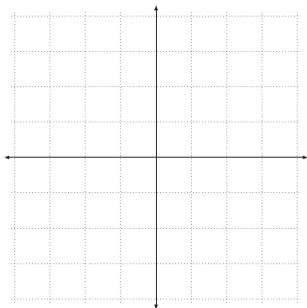# What does active learning look like in MAT223?

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What are some prerequisites/challenges in teaching this way?

Share your thoughts at:

https://tinyurl.com/
ACTIVE-ONBAORDING

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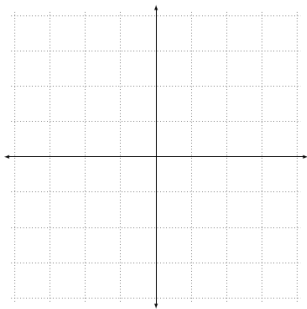- Created instructor guide to in-class exercises.

The Instructor Guide

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Generate lines using orthogonality.

The goal of this problem is to
- Visually see how the set of all vectors orthogonal to a given vector forms a line.
- Given a line defined as the set of all vectors orthogonal to a given vector, express the line using an equation or span.

Notes/Misconceptions
- This problem won't be hard, so don't spend too much time on it.
- For part 1, students might insist on drawing arrowheads and tails on their vectors. This is an opportunity to discuss when you should draw arrowheads/tails and when you shouldn't.

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Support provided:

- Open invitations to visit my lecture.
- Teaching observations.

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Challenges

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- $2/3$ of instructors *didn't* adopt an active-learning style.

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It's as if four hours of training are not enough!

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- Instructors try, are *interrupted*, and retry.

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- Lecture TAs are trained in both how to help students and how to help instructors.

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Thank You

Instructor Difficulties

Role Playing *Common Issues*

Instructors tend to...

- Give hints on a problem before students start.
- Explain details without measuring student's knowledge.
- Offer their own explanations rather than build off student knowledge.

All of these issues come up and are discussed.

Classroom *Common Issues*

- Everything from role playing, and
- Suggestions rather than instructions (e.g., "if you'd like, discuss with your group").
- Having "office hour"-style discussions instead of whole-class discussions.
- Transitions, transitions, transitions!