INTEGRATED REVIEW OF PRECALCULUS MATERIAL IN CALCULUS 1

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Outline

1. Overview
2. Reviewing at the beginning
3. Integrated Review
4. Experimental design
5. Source of variability

Overview

Goal of experiment: compare and test two different methods of reviewing precalculus in calculus 1.

Precalculus: the idea of functions and the different type of functions (linear, exponential, logarithmic, trigonometric, inverse trigonometric, rational).

This project is mostly in the design phase, although IRB is complete.

College Calculus 1

Typical background of calculus 1 students

- Precalculus junior year of high school
- Calculus senior year of high school

Usual options for precalculus review in calculus

- No structured review
- Review chapter/sections at beginning
- Integrated review
- Two semester integrated precalculus/calculus course

Reviewing at the Beginning

Review precalculus concepts *during the first few weeks of the course* – first six/seven sections of the textbook

Rationale for the setup:

- Help students review precalculus material.
- Help students get used to the book, which has a more applied approach than some high school texts.
- Help students get used to the Rule of Four approach, that is represent mathematical objects/concepts graphically (graphs), numerically (table of values), algebraically (formula and expressions), and verbally (words).

Current method for everyone but Kim.

Integrated Review

Skip the first six sections of the text and start with continuity where calculus and precalculus overlap.

Review the precalculus concepts as they are needed in the discussion of a calculus concept.

Example:

Review relevant facts about linear functions (slope, equation) when the lesson is about finding the equation of the tangent line.

Rationale for Integrated Review:

- Most students are exposed to and are familiar with the Rule of Four approach before they go to college.
- The review of precalculus material in the current set up is fast-paced.
- Students with weak precalculus skills do not benefit from the review.
- Students with a strong precalculus skills do not need the review.
- Students will have an earlier idea of what calculus is about.
- More time to focus on calculus.
- Shorter time between review and use of topics

Currently used only by Kim.

Experimental Design

- We will both teach two sections of calculus 1 in a semester.
- We will give a precalculus quiz at the beginning of the semester in each class.
- Students can retake the quiz if they do some extra practice on the topics they missed the first time.
- One section will review at the beginning, other will do integrated review.
- Compare performance on similar in-class exam questions and a common final.
- Expect that there may only be differences among the weaker students.

Sources of variability

- Students between sections-not controlled with current design. Crossing difficult.
- Students between semesters-not controlled with current design, may need to control by taking more data
- Instructor effect- somewhat controlled by design
- Instructor familiarity with approach-Henry will try some of the method in the spring before we start collecting data